A Conceptual Evaluative Framework for the Management of Virtual Learning Environments in UK Universities

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Award date:
2014

Awarding institution:
Coventry University

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A Thesis submitted in partial fulfilment

of the University's requirements of the award of Doctor of Philosophy

2014

Acknowledgements

This thesis has been completed with the support of people whom I cannot ever repay my debt of gratitude. To my long suffering Director of Studies Anthony Olomolaiye a great 'thank you'. You have been a superlative DoS and I would wish for many others to have the pleasure and privilege of being guided to their aspiration to be called 'Dr'by you. Professor Ian Marshall for always going that extra mile for me, including turning up for impromptu meetings when he was supposed to be taking his holidays. Professor Brian Lehaney, who having infected me with the bug to pursue the PhD, then promptly left for greener pastures.

To my inspiration, my partner and best friend, Yvette who has been the rock in this personal odyssey of over 7 years, two knee replacements and one heart attack, steadfastly encouraging me to finish it.

My son, Usman, who having arrived on this planet and into my life 19 years ago has taught me the joys and challenges of parenthood and continues to be a source of pride, joy and consternation in roughly equal measure.

My friends Rochelle, Julie, Nick, Saad and the many others who have all at some time or other succumbed to the test of my friendship and provided advice, guidance and startling insight and clarity.

Finally, last but most certainly not least, my brother Tariq who has been the best brother and friend that a person could ask for all of his life (he is younger than I); my mother who continues to believe in me in spite of evidence to the contrary; to my brother in law Brian who has, through his humanity, liberated me from gardening and has shown a keen interest in my 'Fid'; my nieces and nephews who rejuvenate me with their youthful energy and exuberance and my sisters Ghazala and Roswana who have always been the lights in my darkness and have shown me such love and affection as to humble me.

Abstract

Virtual Learning Environments (VLEs)/E-Learning has been adopted extensively by Higher Education (HE) in the UK and in the case study Coventry University (CU). Frameworks predicated upon pedagogic considerations evaluate VLEs/E-Learning but the evaluation of the management of VLEs/E-Learning through Knowledge Management (KM) Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) has not been considered. Furthermore there are no frameworks that seek to reconcile the intent of VLEs/E-Learning with the resultant instantiation. Therefore, a conceptual framework to evaluate the management of VLEs/E-Learning has been derived. Action Research has been used by exposing every stage of the development of the conceptual framework to critique by stakeholders. The drivers for the uptake of VLEs/E-Learning have been identified and classified according to two schema, one schema is into people, processes and technology and the other into strategic/tactical or operational types. Existing evaluative frameworks have, on review, been classified according to a schema incorporating a purpose, theory, context, evaluative criteria, evaluative processes and management activities. VLEs/E-Learning can be considered to be a specialized computer system and therefore the fields of Knowledge management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) have been investigated, salient concepts extracted. From KM, knowledge appositions (know why; know-what; know who; know-when; know-where and know-how) are mapped onto tacit and explicit knowledge; people, processes and technology. From SSM, CATWOE (customer, actor, transformation, weltanschauung, owner, environment); and from CSH the concept of 'is' and 'ought' has also been mapped across the knowledge appositions. The resultant framework can be used by HE organisations as a tool for self development and also by external auditing agencies which wish to evaluate the management of VLEs/E-Learning.

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1.1 Introduction

The Higher Education (HE) sector has engaged with Information Communications Technology (ICT) for many years with a significant shift towards Virtual Learning Environments (VLEs) Coventry University (2004) VLEs have been deployed for many reasons including widening access & student diversity; employability; quality and standards; increased IT and literacy of students; student expectations of ICT use; the earner-learner and increased provision of part time courses amongst many others Coventry University (2004)

However evaluation has centred on the pedagogical efficacy of VLEs/E-Learning e.g. Britain & Liber (1999)(2004). The management of the development and implementation of VLE/E-Learning has not been considered. This may pose a considerable problem for stakeholders Coventry University (2006b) for example not having an effective and efficient evaluative framework results in ad hoc development and implementation with systemic and systematic failures which may not be fit for purpose.

In this chapter the nature of the problem addressed in this research is explored; evidence from a review of literature and the case organisation Coventry University (CU) is presented to establish the requirements for the research; the fundamental research question along with aims and objectives will be specified; the scope of the problem domain will be explored; the initial research design will be tendered; the research methodology employed will be identified and a summary introduction of each succeeding chapter will be outlined.

1.2 Important definitions

Chapter 2 provides an extensive set of definitions for VLE; E-Learning; the rationale for the use of Knowledge Management (KM), Critical Systems Heuristics (CSH); Soft Systems Methodology (SSM) predicated upon the definition of a computer system as perceived through the lens of each of the aforementioned disciplines. For ease of reference the two definitions of VLEs, E-Learning as separate entities is given

followed by the definition of E-Learning in terms of its relationship with VLES is tendered.

> *'... A Virtual Learning Environment is a collection of integrated tools enabling the management of online learning, providing a delivery mechanism, student tracking, assessment and access to resources'.*
>
> JISC (2014)

There are many examples of VLEs e.g WebCT, Blackboard and most recently Moodle. Moodle is a technological development of WebCT and Blackboard. (Open source, 2014) and contains many features including

- Modern, easy to use interface
- Personalised Dashboard
- Collaborative tools and activities

A definition of E-Learning, derived from several sources (chapter 2) was used as the working definition for the purposes of the research.

> *"E-Learning is the acquisition of knowledge explicitly facilitated by information and communications technologies."*

Therefore, E-Learning is inextricably bound with a VLE and E-Learning is the product of the interaction with a VLE.

1.3 Establishing the problem domain

In order to progress along a path of enquiry and research an oft quoted question that was logically asked was 'Why'. The aim of the research as stated below was to answer the research question (considered later in the chapter):

'What criteria can be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, operational and tactical development and implementation of VLEs/E-Learning in UK Universities?'

So the question was 'why' answer that research question? Evidence from literature (including Britain & Liber (1999) (2004); Chohan (2001); Kearsley & Shneiderman (1999); Dalkir (2011) and supported by a case organisation, Coventry University (2003) (2006) was presented below that established that the evaluation of the management of VLEs/E-Learning has not been carried out in a systemic and systematic way. However the non existence of a thing does not necessarily establish a need for its existence. None of the papers reviewed actually called for an evaluative framework to evaluate the management of VLEs/E-Learning. Empirical evidence collected and collated by the author (see chapter on Research Methodology) suggested that there was a perceptual difference about the VLEs/E-Learning between different stakeholders in the case organisation. Again this in isolation did not beg the need for a framework. The author at this juncture avers that the major driver to answer the 'why' question was intellectual curiosity. The author stands upon the right and justification to have pursued an avenue of research to fulfil that curiosity. Human history can be argued to be a continuum of satisfying that curiosity.

To further expand upon the study the author (for reasons which were discussed in greater detail later) applied concepts derived from the fields of Knowledge Management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM). The rigorous and logical links between these fields and answering the research question were established later, however the nature of VLEs/E-Learning was argued to be in the purview of KM ,because it was argued that VLEs/E-Learning are interactive technologies which are centrally juxtaposed with KM. Furthermore from a slightly different perspective VLEs/E-Learning can be treated as systems in various guises of that term and the fields of CSH and SSM were systems development methodologies which lent specific, unique and useful perspectives on the development of the framework to evaluate the management of VLEs/E-Learning.

In addition, an anecdotal need to answer 'why' was predicated upon the experience of the author as an Ofsted inspector, external examiner, moderator and auditor of education at several different levels (from secondary to tertiary) spread over 24 years. The benefits that were to be accrued from the development of an evaluative framework included filling the gap of the non existence of a framework; to cast the

light of KM/CSH/SSM on a problem domain in a manner that had not been attempted before and which highlighted issues and opened new lines of enquiry.

Furthermore in the various modes of exposure (which included a conference, several seminars; PRPs (PhD Performance Review panels) and experts on the PhD review team) of the research undertaken especially in:

- the formulation of the research question,
- the adoption of an appropriate research methodology,
- the review of literature of extant frameworks, drivers for the uptake of VLEs/E-Learning, KM, SSM and CSH,
- the development of the conceptual framework and its subsequent refinement in light of critique received,

the need for the existence of the framework was accepted in light of the reasons mentioned in the previous paragraph.

To summarise, it became apparent from an extensive review of literature (including Britain & Liber (1999) (2004) Chohan (2001); Kearsley & Shneiderman (1999); Dalkir (2011) and supported by a case organisation CU (2003) (2006) (2012) that the evaluation of the management of VLEs/E-Learning had not been carried out in a systemic and systematic way. It was the contention of the author that VLEs/E-Learning have become central pedagogical technologies and their uptake in Higher Education continues apace. The evaluation of the management of these technologies had not received due consideration

1.4 Evidence from literature review of extant frameworks

The literature review was conducted upon three areas of endeavour, the results of which are briefly addressed here and in greater depth in later chapters. The first part of the literature review surveyed the extant evaluative frameworks; the second area examined the drivers for the uptake of VLEs/E-Learning and the third area derived salient concepts from Knowledge management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) which contributed to the development of a conceptual framework to evaluate the management of VLEs/E-Learning.

Frameworks abound for the evaluation of the pedagogical aspects of VLEs for example Britain & Liber (1999) (2004); Chohan (2001). Most evaluative frameworks identified an underlying theory which were either pedagogic or evaluative (Chapter 2 explored more fully the authors proposed taxonomy of frameworks) for example:

- Britain & Liber (2004) use conversation theory:
- Ray (2008) uses Blooms Taxonomy:
- Chohan (2001) using Kirkpatricks 5 levels of evaluation.

The VLE was evaluated against a set of criteria for example

- Kearsley & Shneiderman (1999) the degree of student engagement and motivation:
- Ivanova & Smrikarov (2006) use number of unique users, unique visitors tracking, new and returning visitors, visitors geographic location, referring visitors source, content performance and navigational analysis.

These criteria were supported by a set of evaluative activities for example interviews: focus groups and questionnaires.

However no framework provided a systemic and systematic evaluation of the management of VLEs/E-Learning.

1.5 Evidence from CU

From Coventry University (CU) the following sources were identified and considered:

- a critical appraisal of CU including strategies for Teaching Learning and E-Learning and reports externally commissioned consultants CU (2002) (2003) (2006b) (2012)
- student module questionnaires and staff survey carried out by CU (2012)
- Questionnaires distributed by the author (5.13.5) adapted from Ulrich & Probst (1984)(see later for details)

An initial review of CU documentation (as identified previously) revealed that a study carried out by CU (2003) identified several issues:

1. a lack of awareness of the corporate vision of VLEs/E-Learning at the implementation level.
2. Implementation lacked coherence and failed to accommodate the diversity of e-learning.
3. a need for a clear vision and leadership
4. the necessity of technologies to act as a coherent whole including supporting different students throughout the university experience
5. expansion of E-Learning to accommodate Continued Professional Development (CPD) requirements
6. optimizing the distance learning offering
7. obtaining a complete picture of students perceptions of E-Learning
8. developing innovative and exciting E-Learning materials to stimulate learning

Even a cursory examination of the various sources at CU gave an indication that:

- many of these issues were not addressed e.g. 2, 4, 5 and 6 above
    - where they were addressed they were not evaluated in a systematic and systemic manner. Therefore Item '1' was addressed with formulation of an E-Learning CU (2004) and more recently with 'Digital Literacy' as a major strand of the teaching and learning strategy of the university CU (2012) remain no methods, tools or techniques devoted to evaluation.

1.6 Empirical evidence from E-Learning questionnaires

The lack of awareness of the corporate vision for VLE/E-Learning was subsequently, empirically supported. Ulrich & Probst (1984) devised a questionnaire which established the readiness of an organisation to adopt ICT. The questionnaire sought to investigate the Is/Ought paradigm for a selection of different areas of ICT implementation (see chapter 5 for a fuller treatment of this).

From the responses elicited, it was discovered that the perception of VLE/E-Learning was quite different at the senior management level to that of teaching staff and students. Furthermore it demonstrated that items '1' to '7' were not evaluated at all. This supported the CU (2004) findings and further highlighted the continuing lack of awareness of VLE/E-Learning evaluation in the University. A conceptual framework would encourage an increasing awareness within the organisation

The university issues its staff an annual survey in order to ascertain staff perceptions on various aspects of the University. An examination of the most recent Staff survey at CU (2012) revealed that the VLE/E-Learning was not examined. This continues to demonstrate that that point from the CU (2004) is still outstanding and the VLE is not examined in any depth

It emerged that:

- the perception of management differs from the perception of others about e-learning
- There was no formal evaluation of the management of VLE built into the development and implementation of the VLE
- in the University's own staff survey CU (2012) there were no questions on VLE/E-Learning.
- Students were not surveyed by the University in an institution wide sense and the organ of feedback that was carried out was a module questionnaire which was used for eliciting student views and perceptions given to students at the end of the delivery of a module (at CU any formal qualification e.g a degree is composed of modules, each of which accrue a set of study credits and which are then pursued until the number of credits required for the successful attainment of a qualification are completed). There are two questions which asked students about the use of the VLE to support learning in these module questionnaires. This continued to contravene the CU (2004) findings of obtaining a complete picture of students perceptions of E-Learning and highlights the lack of a framework to evaluate the management of VLEs/E-Learning.

- The questions did not aid in evaluating the management of VLE's.

A framework would provide a set of activities which would invite a systemic, systematic whole institution approach to the management of the VLEs/E-Learning

1.7 The Research Question

Having established from the literature and the case organisation that a whole organizational framework for evaluation of the management of VLE did not exist, a research question was advanced:

'What criteria can be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, operational and tactical development and implementation of VLEs/E-Learning in UK Universities?'

1.8 Aim

The aim of this research was to develop a conceptual framework, which was designed to help evaluate, within the contexts of knowledge management and critical systems heuristics and soft systems methodology the management of Virtual Learning Environments/E-Learning in UK HE

1.9 Objectives

Therefore pursuant to the aim, the objectives of this research were to:

- Examine the history of the uptake of E-Learning in UK universities, including the drivers, factors and reasons for implementation.
- To critically appraise existing frameworks of evaluation and abstract possible elements of an evaluative framework.
- Demonstrate the underlying philosophy of Knowledge Management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) and identify the salient, appropriate principles to inform an evaluative framework.
- Develop and evaluate by exposure to critical appraisal, a conceptual framework that is intended to evaluate the strategic and operational management of Virtual Learning Environments/E-Learning in UK universe.

1.10 Scope

This research sought to address the lack of a whole institution framework to evaluate the management of VLE/E-Learning experience in the Higher Education Sector in the UK. The stakeholders including (but not limited to) the staff, management, students, other interested parties in HE institutions were considered. However, evidence that was pertinent, was drawn from other related areas for example the concept of evaluation used in the training industry was cited in the references Kirkpatrick (1994) and Blooms Taxonomy Overborough (2008).

The conceptual framework a tool to be used by stakeholders in the HE sector in the UK:

- as a diagnostic framework, which will enable senior management to determine the status quo of the VLE/E-Learning in the organization
- as an aid for management to chart a strategic trajectory for the furtherance of the juxtaposition of VLE/E-Learning in the organization and to become aware of the practice in appropriate sector organisations.

1.11 Contribution of research to knowledge

In the pursuance of the research there were several key contributions to knowledge

- Classification of drivers into strategic/tactical and operational drivers and also people processes and technology.
- Extraction of criteria from literature of evaluative frameworks (purpose, theory, context, evaluative criteria, evaluative activities, management activities).
- The combination application of KM specifically processes/ technology/ people; tacit and explicit knowledge and the knowledge appositions; SSM (CATWOE) and CSH (is/ought)
- Development of a conceptual framework for the evaluation of management of VLE/E-Learning.

Research Design

1.12 Action Research

In a later chapter, the underlying philosophy and summary of various research methodologies was outlined. However, here, it is to be noted that Action Research (AR) was the adopted methodology for this research and was predicated upon a central assumption. This assumption was about the nature of the reality that was under investigation.

It was assumed that the nature of organisations was a social construction, a dynamic and fluid reality which was characterized by its ability to be malleable. Furthermore, and an even more powerful construction was that the act of observing this phenomenon may have an effect upon it. These assumptions were then accommodated in the research design.

In practice this necessitated rigorous and assiduous reflection and exposure at every level of the research. Therefore and pursuant to this reasoning the research itself and then the process of the PhD itself was open to reflection and exposure. The modus operandi of action research Costello (2011) followed was:

1. Planning
2. Action
3. Observation
4. Reflection

Therefore at every stage both of the research and the PhD process was subject to scrutiny and exposure.

Figure 1 below, illustrates the embedding of the research within the action research philosophy. A notation was created in order to illustrate the embedded nature of Action Research (AR).

The outer most ellipse represented the activities which characterise AR, i.e Planning, Action, Observation and Reflection and which were carried out iteratively. The inner ellipse consists of the inputs and the outcomes of following the embedded AR activities. Two forms of input are manifest, the first, is the review of appropriate

literature, represented by a segmented circle, the nature of which will discussed in greater detail in later chapters.

There were several components to the literature review these being:

- drivers for the uptake of VLe's/E-Learning in HE UK
- evaluative frameworks in E-Learning
- Knowledge Management (KM)
- Critical Systems Heuristics (CSH)
- Soft Systems Methodology (SSM)

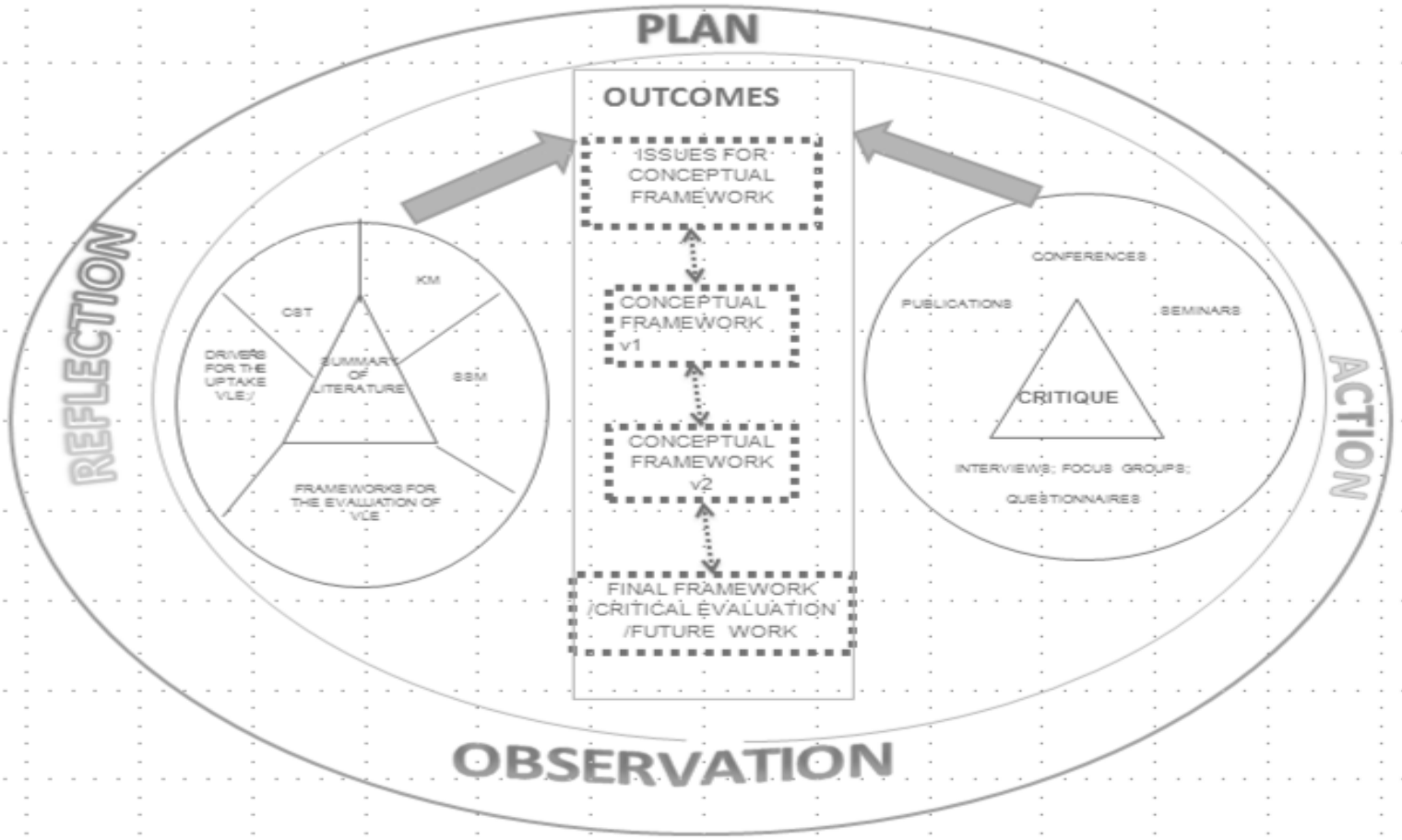
Each component, e.g. the review of extant evaluative frameworks, yielded a contribution to the trajectory of research, this contribution was filtered through a process of Critique or Reflection. This critique is represented by the second circle and achieved empiricisty by involving a variety of techniques to elicit critical appraisal .

The outcomes are represented by dotted boxes and include

- Issues for conceptual framework
- Conceptual framework v1-final version.

Therefore in summary each aspect is planned, the activity is carried out e.g the review of literature, observation is carried out, using the different mechanisms entitled critique, the results of which are reflected upon and predicates the next stage of planning. This is iteratively conducted at every stage of the research trajectory.

Figure 1 research design



1.13 Mapping of research design onto Chapter structure of dissertation

1.13.1 Introduction

The following Figure 2 seeks to reconcile and illustrate all the planned activities of the application of AR to addressing the research question, fulfilling the research aim and attaining the research objectives. The notation used has been clarified in Table 1.

Figure 2 consists of a sample of possible mechanisms for scrutiny (e.g conference, publication, seminars etc), summary of the literature (drivers for the uptake of VLEs/E-Learning; Critical Systems Heuristics (CSH); Knowledge Management (KM); Soft Systems Methodology (SSM); research methods) and which components of each specifically juxta pose with the chapters and development of the conceptual framework.

1.13.2 Ethics in research

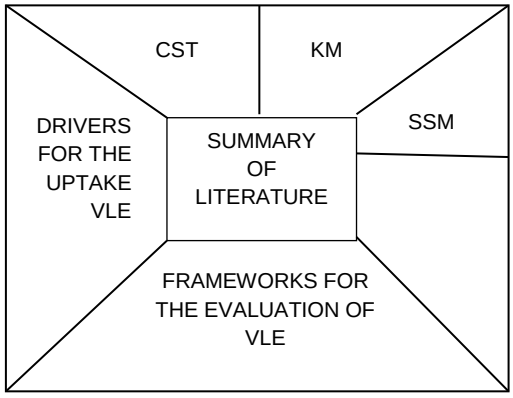
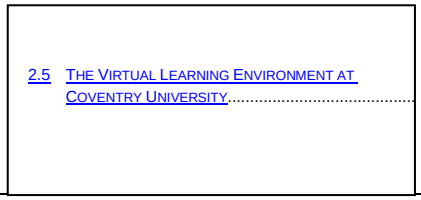
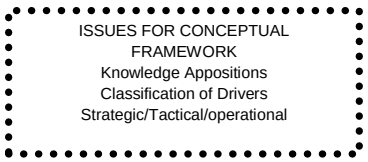
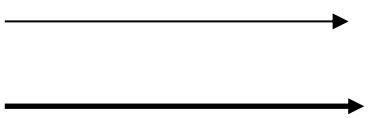
The university's ethics procedure was followed. This dealt with respect, risk, rights routes to be pursued especially contingent upon whether non-living or living participants were involved in the research. Furthermore the discipline of record keeping was endorsed. An ethics form was completed and the project was deemed to be a low risk project. A low risk project is one where even though data is collected from living participants, the data is anonymised i.e. data that cannot be traced back to named or identified individuals either from other students or from other groups of people CU (2010) It was signed by the author and DoS (Appendix C).

1.13.3 Mapping research design onto chapter 1

Chapter 1 being an introduction to the research has been populated with information clearly identified in the subheadings, a representative sample of which has been captured in Figure 2. (e.g introduction, problem domain, research question, aims and objectives etc). Thus far, the chapter has set the scene for the ensuing research to be uncovered in subsequent chapters. The chapter has been subjected to scrutiny by exposure to an Operational Research conference (details of which are to be found in Table 11); several seminars with external experts and distribution of questionnaires by author.

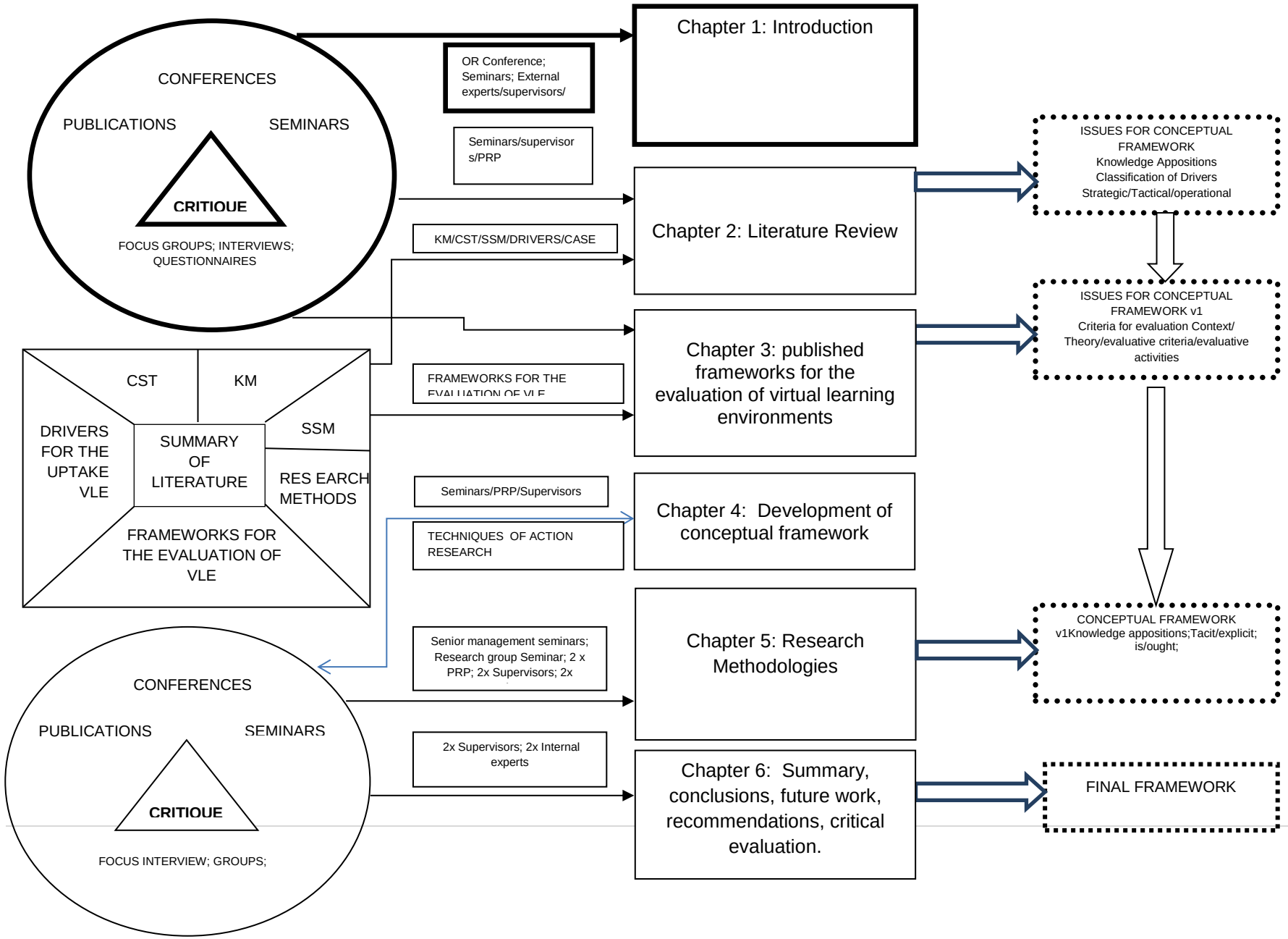
Figure 2 considers that chapter by chapter mapping onto the research design.

Table 1 Notation used in mapping AR onto research trajectory

The notation used is as follows:	
	Possible mechanisms for scrutiny and critical appraisal instantiated in order to apply Action Research e.g conferences, seminars, external experts, internal experts, focus groups
	The segmented square illustrates the various components of the Literature Review: ○ Drivers for the uptake of VLE's/E-Learning ○ Salient concepts in Knowledge Management(KM)/ Critical Systems Heuristics (CSH)/ Soft Systems Methodology (SSM) ○ Summary of Frameworks to Evaluate VLE's/E-Learning
	Chapters with main headings
	Contribution to development of conceptual framework
	Inputs to chapters, highlighted for each chapter demonstrating the progression

	Mapping of chapters on to the conceptual research pathway Highlighted to demonstrate progression

Figure 2 Position of Chapter 1 in research trajectory



1.14 Summary of Contents of Chapters

Figure 2 also mapped chapters across the research trajectory therefore this section outlined the contributions of each of the chapters to the development of an evaluative framework for Virtual Learning Environments/E-Learning.

Table 2 Summary of Chapters mapped to research objectives

Chapter	Summary of work carried out	Research Objective (RO)
Chapter 2	Summarised the: • Drivers for the uptake of VLEs/E-Learning fulfilling Research Objective 1	RO 1 *Examine the history of the uptake of E-Learning in UK universities, including the drivers, factors and reasons for implementation.*
	• Published frameworks for the evaluation of virtual learning environments. It demonstrated that existing frameworks were primarily concerned with pedagogy and management at course/module level. A tabulated summary of existing frameworks identified elements that were considered in an evaluative framework for the management of the development and implementation of VLEs.	RO 2 *To critically appraise existing frameworks of evaluation and abstract possible elements of an evaluative framework.*"
Chapter 3	• Summarised the concepts underlying knowledge management; systems thinking and soft systems methodology. This provided the	RO 3 *Demonstrate the underlying philosophy of Knowledge*

	theoretical underpinning for a set of criteria which contributed towards the development of an evaluative framework.	*Management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) and identify the salient, appropriate principles to inform an evaluative framework*
Chapter 4	• Proposed the conceptual framework, identifying the various sources and disciplines which contributed to its development. This fulfilled	RO 4 *Develop and evaluate by exposure to critical appraisal, a conceptual framework that is intended to evaluate the strategic and operational management of Virtual Learning Environments/E-Learning in UK universities.*
Chapter 5	• Summarised research methodologies and identified the chosen methodology for this research. Provided an audit trail of the various elements of feedback elicited from different mechanisms of critique as outlined above.	
Chapter 6	• Developed the framework further, in light of critical appraisal and presented future work.	

In the foregoing chapter the problem domain was identified, evidence to support the proposed research summarized, a research question postulated, aims, objectives aims stated and a proposed trajectory of research was illustrated and explained. Subsequent chapters further instantiated the research trajectory. Figure 2 illustrated the juxta position between this chapter as laid out and the outline of the rest of the research work. The scope of the research and the problem domain was critiqued by the presentation of a paper at an Operational Research (OR) conference, along with exposure to several seminars and focus groups

2 Literature Review

2.1 Introduction

This chapter explores the most commonly used terms to describe the juxta position of digital technology and education and a table is provided giving the most often used terms (Virtual Learning Environments (VLEs) and E-Learning); Virtual Learning Environments (VLEs) and E-Learning are defined, VLE's as a system are explained; Knowledge management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) are introduced and the contribution of each to the proposed course of research established, specifically the juxta position between

- VLE and KM:
- E-Learning and KM.
- CSH and VLE's
- SSM and VLE's

This chapter also explores Universities as Learning Organisations; identifies the major institutional, governmental and sector wide drivers which have stimulated the uptake of VLEs and summarised the usage of VLEs in UK Universities and a schema of classification for the summary of evaluative frameworks is proposed

2.2 Terms used to describe the juxta position of digital technology and education

There are many terms that juxtapose between digital technology and education. The term digital technology has been used in order to transcend the complexity of words used in the past to describe what might crudely be described as 'computers'. For example Information Technology (IT), Information Communications Technology (ICT), Computer technology (CT) etc.

To further confuse the issue some of the common terms used to juxtapose that relationship between digital technology and education are given here, the full name is given first followed by the acronym, where appropriate:

- Virtual Learning Environment (VLE)
- Electronic Learning (E– Learning)

- Virtual Learning System (VLS)
- Computer Based Training (CBT)
- Managed Learning Environment (MLE)
- Computer Based Learning (CBL)
- Learning Management System (LMS)
- Online Learning Environment
- Content Management System (CMS

However within the UK Higher Education sector the terms VLEs and E-Learning were the most often quoted, (Table 13) identifies the terms used.

VLE/E-Learning were the most frequently used term. Therefore for the purposes of this research, VLEs and E-Learning were the central focus.

2.2.1 Definition of VLE

(CU, 2004) states that originally VLEs were simply an extension of ICT with the use of any computing technology (e.g. standalone computers, Local Area Networks (LANs)) to augment pedagogic activity in any tier of education (primary, secondary or tertiary). Furthermore, that over time, VLEs have begun to acquire a clear identity and suggests that a VLE consists of systems and tools which work together as a coherent whole to support teaching and learning, facilitates computer aided assessment, provides e-mail , chat, groupware, discussion forums, e-portfolios , multimedia tutorials, audio and video files and streaming and productivity tools (Microsoft Office, mind mapping etc)

A more recent definition tendered by JISC (2014) states that :

'... A Virtual Learning Environment is a collection of integrated tools enabling the management of online learning, providing a delivery mechanism, student tracking, assessment and access to resources'.

This definition provides greater scope to incorporate new technological innovation where the preceding definition specifies technologies thus imparting to it a limitation which the latter definition does not suffer the curtailment of. Therefore, this latter definition JISC (2014) was the working definition for VLE which will provided the basis of the research

2.2.2 VLE's as Computer systems

As seen in section 2.2.1 a starting definition of a VLE was that it consists of systems and tools which work together as a coherent whole to support teaching and learning. A standard definition of computer systems found in most textbooks and other sources as:

"..*components of hardware and software working together as a coherent whole"*

In many disciplines a system is defined as

"..components working together to the fulfilment of a common aim or objective"

Therefore, CSH and SSM, which have been disciplines devoted to the development of computer systems are both viable and pertinent perspectives through which to seek elements for the development of a conceptual framework for the evaluation of the management of VLEs/E-Learning.

2.2.3 Definition of E-Learning

The foregoing may give the perception that the provision of ICT is active and that learning is a passive response to this. An alternative view is to consider E-Learning, which may be defined as

> *' ..learning facilitated and supported through the use of information and communications technology (ICT).'* JISC (2012)

Other definitions of E-Learning include:

> *'.. use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration.'* EEC (2008)

This definition quotes 'new' multimedia technologies and it becomes a limitation over time when a specific technology is quoted in the definition. For example the new concept of cloud computing which is a virtualization and outsourcing of ICT infrastructure services but which cannot be described as a 'new multimedia technology'. Furthermore 'facilitating' learning may impart a hopeful optimism that bringing the technology to proximity to students might enhance the quality of learning but lends an air of uncertainty to the quality of the aspiration.

Another definition defines E-Learning as:

> *'.. the exploitation of interactive technologies to improve learning; enhance the quality of lecturers' teaching and to enable learners to achieve their potential.'* DEFS (2007)

Again this definition mentions 'interactive technologies' but what an 'interactive technology' constitutes is uncertain. In one sense it could be argued that all digital technologies have some element of interactivity. Therefore the term is unnecessary and confusing.

Further definitions include:

> *'.. the use of any form of information & communication technology (ICT) in direct support of learning (including provision of learning and course information materials, communications between learners and with staff, technology-supported assessment, support and advice) over the internet, via an internet or as standalone media.'* CU (2004)

> '.. *the application of digital communication technologies to facilitate learning and teaching, including learning support, services and blended learning, the mixing of campus-based and distance (remote) learning where a substantial part of the activity goes on in an on-line environment; flexible learning, learning delivered in varying time frames, paces and modes controlled by the learner; networked learning, learning delivered via mobile computing technologies (sometimes called m-learning).'* CU (2006b)

In addition to the above criticisms offered for the definitions quoted thus far, a far more systemic flaw is apparent and it may be argued that many of these definitions are tautological, as they use the term 'learning' as part of their explanation of the term 'E-Learning'. Despite this, and whilst the definitions vary, some common components are apparent, and the following initial definition for E-Learning can be derived from these views:

> *'E-Learning is the acquisition of knowledge facilitated by information and communications technologies.'*

The challenge with such a definition is that it is almost all-encompassing, and does not distinguish between the incidental facilitation of learning by ICT and the deliberate use of ICT to facilitate learning. A more specific definition, still derived from the above is as follows.

> *"E-Learning is the acquisition of knowledge explicitly facilitated by information and communications technologies."*

Whilst the term 'explicitly' may seem a small addition, it differentiates learning that occurs in an environment that happens to have ICT, and learning that occurs in an environment in which ICT has been purposively used to facilitate the acquisition of knowledge and therefore the second definition, using the term 'explicitly', was the one that was used for working purposes.

2.2.4 VLEs and E-Learning

From CU (2004) a VLE has been defined as:

> *"..extended ICT"*

and JISC (2012) :

'..designed to act as a focus for students' learning activities and their management and facilitation, along with the provision of content and resources required to help make the activities successful.'

and a derived definition of E-learning is:

> *".. the acquisition of knowledge explicitly facilitated by information and communications technologies."*

Therefore a definition of E-learning which clearly defines the juxta position between E-Learning and VLE may be derived as:

> *".. the acquisition of knowledge explicitly facilitated by VLE"*

In a later chapter KM was defined as:

> *'Knowledge management refers to the systematic organization, planning, scheduling, monitoring, and deployment of people, processes, technology, and environment, with appropriate targets and feedback mechanisms, under the control of a public or private sector concern, and undertaken by such a concern, to facilitate*

> *explicitly and specifically the creation, retention, sharing, identification, acquisition, utilization, and measurement of information and new ideas, in order to achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical, cultural, and societal constraints.'*
> Lehaney, Clarke, Coakes, & Jack (2004)

This definition specifically and clearly identifies the 'acquisition of knowledge' as a KM activity. The above two definitions (the derived definition of VLE/E-Learning and Lehaney, Clarke, Coakes, & Jack (2004) firmly establish the relationship between VLEs/E-Learning, KM and therefore KM as a possible avenue of contribution to the development of an evaluative framework which seeks to evaluate the fitness for purpose of a VLE. Furthermore, in a later section Dalkir (2011) is reported stating that there are certain advantages to adopting KM in organisations, these being that KM:

- Helps drive strategy
- Solves problems quickly
- Diffuses best practices
- Improves knowledge embedded in products and services
- Cross-fertilizes ideas and increases opportunities for innovation
- Enables organizations to better stay ahead of the competition
- Builds organizational memory

The application of KM to the problem domain and the subsequent development of a conceptual framework to evaluate the management of VLEs/E-Learning would also accrue these benefits to an organisation.

2.3 Contributions of KM, CSH and SSM to the development of Conceptual Framework

In chapter 4 the contribution of KM was considered in greater depth, however here the contribution of KM is summarised as:

- Use of Knowledge appositions of Know – why, know-what, know – who, know-when, know-where, know- how
- The use of tacit/explicit knowledge classification mapped across the knowledge appositions.

2.3.1 KNOWLEDGE MANAGEMENT

2.3.1.1 Introduction

In the previous section necessary definitions of VLEs, E-Learning were given, then definitions in terms of knowledge were derived. In this section, the field of Knowledge Management is considered. A full literature review of the subject would be an encyclopaedic venture, here, it is intended to selectively present a summary of the underlying philosophy of KM, in accordance with objective '3' stated in chapter 1.6 and specifically those elements that contributed to the development of a framework for evaluation. These elements were used in conjunction with elements derived from empirical work to produce a conceptual framework for the evaluation of the management of the development and implementation of VLEs in universities.

In this section the most often quoted authorities in KM are identified; a brief summary of important publications is given; knowledge is defined; different kinds of knowledge are distinguished; knowledge management is defined; the appositions of know-how, know-who, know-when, know-where, know-why and know-that will be summarized; the theoretical constructs centred on rationale, process definition and evaluation are traced. Furthermore the relationships with developed key theories of KM are drawn; the rationale underlying KM is investigated with reference to

- Information Economics (intellectual capital, knowledge economy, knowledge assets, knowledge clusters, knowledge spillovers);
- Strategic Management (core competencies, dynamic capabilities, dumbsizing, knowledge alliances, strategy, marketplaces, capabilities). It is to be understood that Strategic management is seen through the lens of KM and not in the wider context of discipline in its own right.

The Knowledge Management Process in terms of organisational culture, structure and behaviour is explored; the special relationship of KM and learning organisations is discussed and the evaluative perspective as instantiated in the measurement of knowledge with respect to risk management, benchmarking and knowledge equity is explored.

2.3.1.2 Identification of appropriate authorities

Since the commencement of this research, the knowledge base for KM has progressed. The author has deployed a piece of software (SW) called Publish or Perish, the function of which is to

broadly provide information about publications, citations and other performance metrics of expressed and published literature in any given field.

The software and its use is summarized in Table 13. The results of the use of the software can be summarized as follows:

- The most quoted work since 1945 was by Nonaka and Takeuchi (1995) the salient concepts of which are presented in the narrative below. However the search terms employed are explained in Table 13
- Alavi & Leidner (2001) presented a relevant, comprehensive, review of the state of KM upto 2001 and this has been summarized below but even though they are most oft quoted publication in the category of publications 2005 – 2012 and present a good well rounded summary of literature however, a more recent publication by Dalkir (2011) has been selected by the author to review because it is more recent still and because it also covers aspects of KM which are not as well explored in Easterby-Smith & Lyles (2011)

2.3.1.3 Knowledge as a firm specific phenomenon

It has long been understood that knowledge occupies a position at the top of a hierarchy Alavi & Leidner (2001) Lehaney, Clarke, Coakes, & Jack (2004) where data is the empirical entity which through subsequent processing, is transmuted into information, which is then further contextualised into knowledge.

Alavi & Leidner (2001) presents a succinct and comprehensive review which identifies important concepts in KM with the following perspectives:

- Knowledge in a firm, reporting on a variety of authors including Penrose (1959) Dretske (1981) Machlup (1980) Vance (1997) summarises the hierarchy of data, information and knowledge, presents an alternative view to the hierarchy and considers taxonomies of knowledge
- KM framework for the analysis of Information Systems (IS) and research issues centred upon knowledge creation, storage/retrieval and transfer are considered.

Alavi & Leidner (2001) surmises that knowledge is a firm specific phenomenon, and contends

- that it can be leveraged to attain and sustain competitive advantage;

- that knowledge is information contextualised, and that information is data rendered meaningful;
- that the alternative view to the latter is that knowledge has to exist in order for information and data to be identified
- that it can be considered from several different perspectives including
    - state of mind
    - an object
    - a process
    - a condition of having access to information
    - a capability

Furthermore these perspectives on knowledge predicate the light in which KM is considered.

Table 3 Knowledge perspectives and their implications

Perspectives		Implications for Knowledge Management (KM)	Implications for Knowledge Management Systems (KMS)
Knowledge vis-à-vis data and information	Data is facts, raw numbers. Information is processed/ interpreted data. Knowledge is personalized information.	KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information	KMS will not appear radically different from existing IS, but will be extended toward helping in user assimilation of information
State of mind	Knowledge is the state of knowing and understanding.	KM involves enhancing individual's learning and understanding through provision of information	Role of IT is to provide access to sources of knowledge rather than knowledge itself
Object	Knowledge is an object to be stored and manipulated.	Key KM issue is building and managing knowledge stocks	Role of IT involves gathering, storing, and transferring knowledge
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creation, sharing, and distributing knowledge	Role of IT is to provide link among sources of knowledge to create wider breadth and depth of knowledge flows
Access to information	Knowledge is a condition of access to information.	KM focus is organized access to and retrieval of content	Role of IT is to provide effective search and retrieval mechanisms for locating relevant information
Capability	Knowledge is the potential to influence action.	KM is about building core competencies and understanding strategic know-how	Role of IT is to enhance intellectual capital by supporting development of individual and organizational competencies

Table 3 summarises the:

- different perspectives of knowledge e.g. knowledge as an object ,
- their implications for KM e.g. building and managing knowledge stocks
- and the subsequent juxta position with KMS e.g role of IT in gathering, storing and transferring knowledge.

In dealing with knowledge in organisations and reporting upon work by many authors including Von Krogh (1998) Hackbarth (1998) : Alavi & Leidner (2001) surmises that :

- KM can be used to identify and leverage collective knowledge to sustain competitive advantage
- KM can increase innovation by
    - Making Knowledge visible
    - Creating a Knowledge intensive culture
    - Creating a collaborative knowledge infrastructure
- that the loss of key workers can reduce innovation

Knowledge management systems (KMS) are explored and are defined as systems to manage organizational knowledge to carry out KM activities with following applications:

- Coding/sharing best practice
- Creation of corporate knowledge directory/networks

Alavi & Leidner (2001) furthermore presents a framework for the analysis of Information Systems (IS) in an organization supporting the main KM activities of creation, storage/retrieval, transfer and application.

2.3.1.4 Knowledge creation based upon SECI model

Creation is based upon the Nonaka & Takeuchi (1995) model of SECI :

- Socialization –conversion of old tacit knowledge to new tacit knowledge
- Externalistion – conversion of tacit to explicit knowledge
- Communication – development of new explicit knowledge
- Internalisation – conversion of explicit to new tacit knowledge

Figure 3 The SECI Spiral model of KM

The following enabling conditions for organisational knowledge creation are posited:

- Intention – organisational aspiration
- Autonomy - Allow individuals to act autonomously and involved in cross functional self organised teams
- Fluctuation and creative chaos – to stimulate the interaction between the organisation and the external environment
- Redundancy – existence of information beyond immediate operational requirements; competing multiple teams on same issue; rotation of personnel
- Requisite variety – provide internal information diversity comparable to that which exists in the environment.

Figure 4 Knowledge creation modes

The figure illustrates the relationship between two individuals ‘A’ and ‘B’ and tacit and explicit knowledge

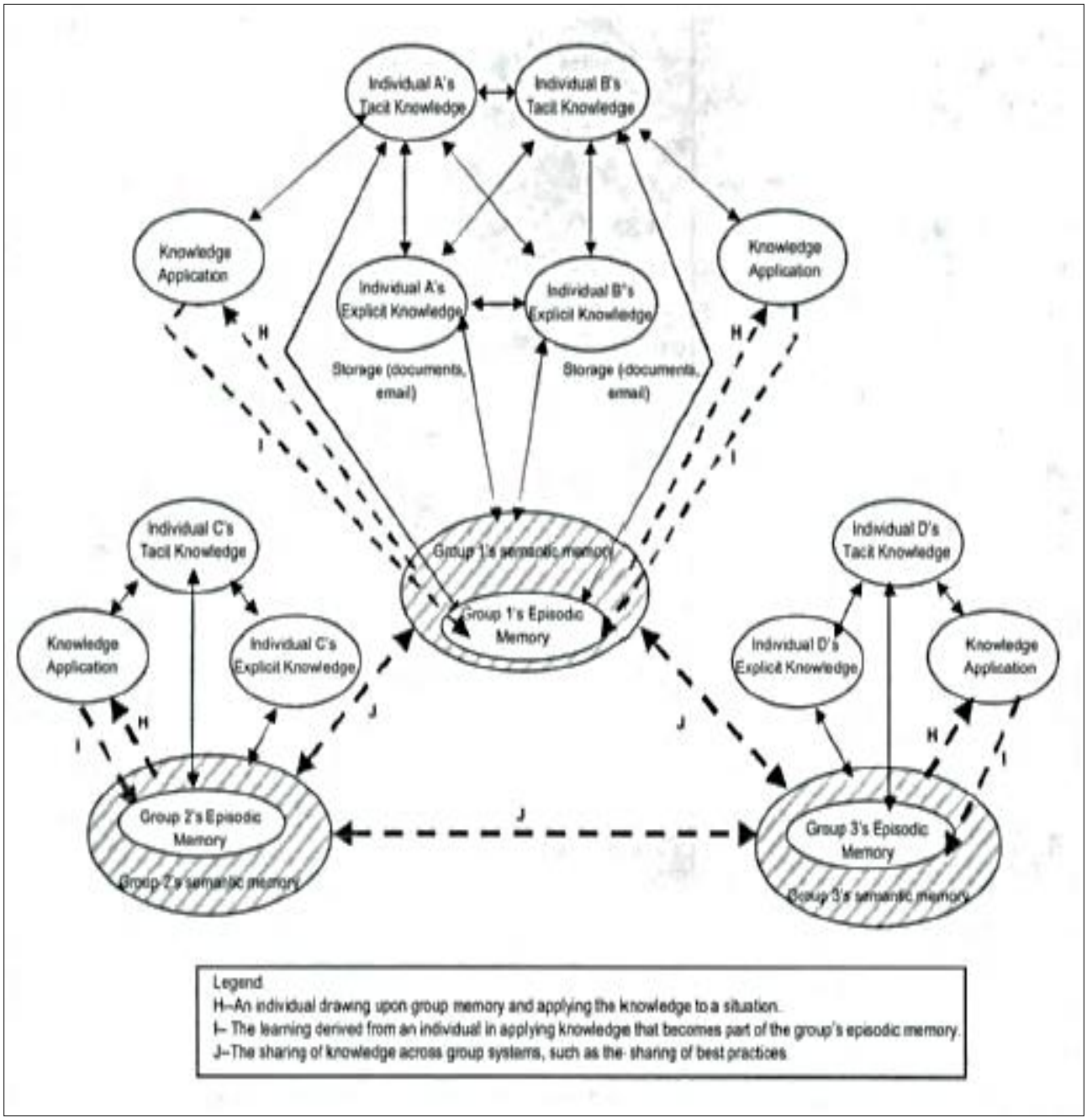
2.3.1.5 Knowledge Transfer

Figure 5 KNOWLEDGE TRANSFERANCE BETWEEN INDIVIDUALS AND GROUPS

It is surmised that knowledge is transferred:-

- between individuals
- between individuals and groups
- between groups and individuals
- intra group
- inter group
- between individuals/groups and external sources

Figure 6 The juxta position of transference individual/group/tacit/explicit/Semantic and episodic knowledge:



Storage and retrieval of knowledge is inextricably bound to organizational memory which has two

forms:

- Semantic, knowledge that is general, articulated and explicit
- Episodic, knowledge which is contextualised and situated .

The diagram summarises the juxta position of transference of individual/group/tacit/explicit/Semantic and episodic knowledge:

Organizational memory is stored in a Knowledge Management System (KMS) as written down procedures, databases. Advantage to storage is that it may facilitate change in light of knowledge of the past, but may also be impediment to change.

It is suggested that transferring knowledge confronts the problem of ascertaining where knowledge is needed in an organisation this is further exacerbated by the assertion that organisations are unaware what they know.

Echoing the work of earlier authors, as stated previously, Baskerville & Dulipovici (2006) draw a distinction between information and knowledge. Information is perceived as facts and data structured for a particular situation or condition. Knowledge is information but with truths, perspectives, concepts, judgments, expectations, methodologies and know-how and can be represented as information using appropriate notations e.g symbols, text and graphs, knowledge is, in essence, perceived as contexualised information.

Baskerville & Dulipovici (2006) posit combinational skills which can distinguish between static management techniques and dynamic techniques designed to

- promote knowledge based processes;
- distinguish between
    - technical knowledge and innovation research from tacit knowledge, personal skill, and organizational routine
    - and tacit knowledge from articulated (explicit) knowledge.

This allows the separation of management processes which encourage knowledge transfer.

They furthermore divide knowledge as professional knowledge and firm-specific knowledge thus enabling organisations to make decisions as to whether to make knowledge internally or buy in externally. Furthermore knowledge can be scientific, philosophical and commercial and goals of

the knowledge production process for each type of knowledge can be managed. They also observe that the distinction between knowledge and information becomes blurred according to the perspective of the perceiver.

Lehaney, Clarke, Coakes, & Jack (2004) provide a definition of KM as follows:

> *'Knowledge management refers to the systematic organization, planning, scheduling, monitoring, and deployment of people, processes, technology, and environment, with appropriate targets and feedback mechanisms, under the control of a public or private sector concern, and undertaken by such a concern, to facilitate explicitly and specifically the creation, retention, sharing, identification, acquisition, utilization, and measurement of information and new ideas, in order to achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical, cultural, and societal constraints.'*

It can be observed from the definition that KM involves the attainment of strategic aims. It is thought that the process that culminates in the development of strategic aims, in itself is an intrinsic component of KM Drew (1999). Therefore the definition of KM may be modified to incorporate the development of strategic aims, thus:

> '*.. to facilitate explicitly and specifically the creation, retention, sharing, identification, acquisition, utilization, and measurement of information and new ideas, in order* to develop and *achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical, cultural, and societal constraints*.'

Lehaney, Clarke, Coakes, & Jack (2004) posit that KM is a manifestation and corollary of the movement of western economies from manufacturing to the provision of services. There is also an increased responsiveness to change and a realization that a correlation exists between knowledge creation, retention and competitive advantage. It is also realized that the wealth of an organization is in the knowledge and its effective dissemination. Furthermore KM is a new combination , originally management was focused on finance, project management and corporate strategy and now the understanding of knowledge has evolved to see knowledge as an intangible but primary asset.

Lehaney, Clarke, Coakes, & Jack (2004) give examples of modern transactions which highlight the use of information as means of accessing a plethora of services. For example purchasing an holiday online. Following a set of processes online, including making payments, results in electronic confirmation which then allows boarding a plane, arrival at destination airport, travel from the airport to and occupation of accommodation. The contention is that having the correct information at the correct time allows the correct sequence of steps to be instantiated.

2.3.1.6 Two typologies of knowledge

Two typologies of knowledge are suggested. Echoing the work of others e.g Alavi & Leidner (2001) Baskerville & Dulipovici (2006) knowledge is distinguished from information which is clearly different from data. Data is perceived to be unstructured and not useful to support decision making. Information is structured in order to support decision making. Knowledge is obtained from experts, based upon expert experience and requires a higher understanding than information. Furthermore two forms of knowledge are posited, tacit and explicit. Tacit knowledge is that which is in the personal possession of individuals in an organization. Explicit information is facts and data organized in a structured way maybe in manuals of procedures and policies. Knowledge is characterized and predicated upon values, beliefs, perspectives, judgments and know-how in addition to the core data/facts.

Baskerville & Dulipovici (2006) further developing ideas presented both by Alavi & Leidner (2001) and Lehaney, Clarke, Coakes, & Jack (2004) suggest another typology based upon the knowledge inherited from the backgrounds of people involved in KM. Those people coming from a technology background, typically people with computing, IT and Management Information Systems (MIS) backgrounds will structure the IT and MIS systems. The other form of knowledge comes from people with a background in business, organizational behaviour, social science involved in assessing, changing, improving skills, behaviour of individuals, examination and adjustment of social systems.

2.3.1.7 Knowledge appositions

Developing the idea presented by Alavi (2001) that organisations may suffer the ignorance of not knowing 'what they know', Lehaney et al (2004) ask the question 'How do we know that we know?' They suggest that know-how, know-who, know-when, know-where, know-why and know-that are all manifestations of part answers to the above question. Specifically:

- Know-how, deals with useful knowledge which may be explicitly captured in policies/procedures or may be tacit and be found in the heads of personnel.
- Know-who, finding the right person to work in an organization, managers take early cognizance of the knowledge profile of the prospective employee.
- Know-when, carry out the correct process at the correct time.
- Know-where, the best location for commensurate knowledge, for example, silicon valley for computer technology.
- Know-why, contextual knowledge allowing responsiveness commensurate with exigencies of a given situation.
- Know-that, the basic sense of knowing.

Lehaney, Clarke, Coakes, & Jack (2004) identify knowledge sharing and communication as part of KM and that it has long been held that communication is very important in management theories. They suggest that formal and informal communication is important. Two perspectives are apparent

- the constructivist principle, which posits that 'new' knowledge is 'embedded' in preexisting knowledge
- that a cultural element in the presence or absence of tacit or explicit knowledge exists.

Lehaney, Clarke, Coakes, & Jack (2004) point out that there is a great difficulty in converting tacit knowledge to explicit. Tacit knowledge is based upon many factors including social conditioning, personal perspectives and world view. Tacit knowledge may be recognized and harnesses the organizations network of communications. There are also issues of notation to represent tacit knowledge.

Lehaney, Clarke, Coakes, & Jack (2004) suggest that Knowledge Management has evolved to address perspectives of rationale, the definition of the knowledge process and evaluation. The rationale is predicated upon two foundational disciplines, these being:

- information economics and
- strategic management.

The process definition is based upon organizational theories (culture, structure, behaviour and artificial intelligence). The evaluation of KM is rooted in quality management and organizational performance measurement.

2.3.1.8 Information economics

They also state that information economics is further divided into:

- Intellectual capital, the legal value of organizational knowledge or intangibles now a capital asset, which confer important strategic competitive advantage and is the difference between the book value of an organization and that which is paid for it.
- intellectual property , that which allows the measurement and management of knowledge and is the legal-ethical dimension of intellectual capital including copyright , patents and trade secrets

2.3.1.9 knowledge economy

- knowledge economy (KE) –
    - conceptualizes the product lifecycle of knowledge which is applied to the internal and external market place
    - allows organizations to decide whether to create internal knowledge or buy it in externally; to seamlessly combine internal and external knowledge
    - reduces complexity and risk in an organization resulting in coordination, standardization and adaptation of the resulting routines;
    - defines professional and commercial knowledge based upon four elements, these being, universal scientific knowledge, routinized skill based upon practical experience, arriving at judgments which can be used by experts and the ability decompose complex tasks into routines of simple tasks;
    - suggests that knowledge is a commodity incorporated into the value chain for internal and external consumption.
    - postulates a life cycle for KM consisting of
        - construction, the discovery and structuring of the class of knowledge;

  - embodiment, capturing the knowledge in a container of knowledge e.g a document;
  - dissemination, the process by which the knowledge is made available and
  - use, the realization of the commercial value of knowledge.

- knowledge assets , firm specific resources, used by someone other than the creator and based upon the evolving inputs and outputs of knowledge activities
- knowledge clusters and networks, knowledge clusters are formed when organizations come together in order to concentrate resources, develop knowledge and learning capital. These collaborate by sharing knowledge with other clusters to form knowledge networks. Intra cluster sharing is far more effective than inter cluster sharing, effectiveness declining commensurate with an increase in the network
- knowledge spillover, occurs with knowledge which spreads beyond originators and original intended users in knowledge clusters and networks . This diffusion of knowledge can be perceived as being for the common good with concomitant social advantages.
- continuity management, which is important to combat employee turnover whereby key personnel leaving with crucial knowledge can disadvantage organizations.

Baskerville & Dulipovici (2006) furthermore suggest that strategic management identifies knowledge as a resource which confers competitive advantage predicated upon competence based competition and dynamic capability and that there are several factors of importance in strategic management, these being;

- core competencies which are the products of organizational learning that arise slowly, the acquisition of new skills being an aspect of competition;
- dynamic capabilities centered on the ability of organizations to recombine resources to create new strategies.;
- inappropriate reengineering results in dumbsizing organizations with resulting reduction in R & D, deteriorated teamwork, crippled professional support and decreased creativity, dismantling the knowledge network;

- knowledge alliances which are strategic alliances focused on knowledge and are arranged between organisations to overcome deficiencies by creating mew knowledge, to challenge the established organisational dominant logic and using benchmarking both to measure knowledge strengths and weaknesses and spread good practice ;

- knowledge strategies developed and informed by participation in knowledge alliances, clusters, networks and spillovers;

- knowledge marketplaces which have evolved from trading knowledge as intellectual property, recruitment, consulting and research in virtual environments; knowledge capability which is developed, predicated upon knowledge assets and dynamic and absorptive capabilities. Knowledge assets can be purchased and with the simultaneous development of capabilities which can confer competitive advantage.

2.3.1.10 Perspectives upon which KM is predicated

Baskerville & Dulipovici (2006) suggest that another core perspective is the knowledge management process, the boundaries of which are fluid and hence difficult to manage. There are three organizational, theoretical perspectives, upon which KM is predicated, these being organizational:

- culture where knowledge is tacit or articulated and has meaning only in the cultural context. Cultural norms are based upon social norms which influence communication and knowledge sharing and affect individual behaviour. Shared knowledge culture yields a group experience. This culture can be perceived as a web of interrelated elements (articulations such as vision, mission, values, symbols, routines, rituals and myths). The connections of the web may be perceived as 'trust'. If trust is lost then the structural integrity is compromised. Central to the knowledge culture is commitment with concomitant allocation of resources. Minimizing bureaucracy enhancing informal communication keeping and adding to the middle management layer leads to greater innovation and creativity.

- structure and behaviour – structure is central to knowledge management. In the first instance a discrete KM functional area (akin to sales, purchasing etc) evolves. In parallel, knowledge constructions, embodiments, distributions and utilizations are articulated as part of organizational strategies. Rigid hierarchical management structures with unidirectional downward flow of information (M-Type) do not accommodate change readily and sustain

competitive edge by economies of scale and diversification of their value offer. Flat structures with a network management style (N-Type) and substantial middle management layer sustain competitive edge by specialization and have more capacity for knowledge management. The middle management layer tempers the strategic higher management imperative with the realities of what is achievable on the ground by creating, transforming and articulating knowledge.

Baskerville & Dulipovici (2006) suggest knowledge creation requires a high degree of

- organizational creativity (which is fostered by encouraging out of the box thinking: introducing a reward system: free time: creativity training: valuing dissent: lowering political barriers: creating champions and coalitions: assembling teams: increasing mobility of employ
- ees);
- innovation and diffusion;
- learning (requires practices for conversation, shared action, humility, compassion, wonder and understanding managers);
- memory (in historical, archived documents, cultural practices, routines, and structures).

Furthermore, they point out that knowledge is difficult to measure, two approaches are used, the first is based upon quality risk management which examines poor outcomes such as poor decisions, policies and strategies and secondly benchmarking, an outcome from participation in knowledge alliances allowing a comparison of KM structures, practices and strategies, with subsequent development of benchmarks.

2.3.2 Assumptions and advantages of KM

Dalkir (2011) a more recent extensive and comprehensive treatment of Knowledge Management reports several authors including Nonaka & Takeuchi (1995) ; Pasternack & Viscio (1998) ; Ruggles & Holtshouse (1999) and many others surmising that Knowledge Management has come to the fore in the last 20 years. Some KM practices were already in place prior to that even though they had not been formally acknowledged and is based upon a set of assumptions, these being:

- Using knowledge does not consume it.

- Transferring knowledge does not result in losing it.
- Knowledge is abundant, but the ability to use it is scarce.
- Much of an organizations' valuable knowledge walks out the door at the end of the day

KM is important because of:

- Gobalisation of business – multisite, multilingual and multicultural
- Leaner organizations – doing more and more faster and faster
- Corporate amnesia- business continuity is a problem, workers no longer working for only one organization
- Technological advances – allow faster turnaround time for work

Dalkir (2011) also suggests three eras of KM:

- first era, use of IT to find out 'what an organization knows?' this resulted in information overload
- second era, focus upon knowledge in people 'Who knows what we know?' lead to communities of practice and learning communities
- third era, content management and knowledge taxonomies,

Value of KM to organisations is that it:

- Helps drive strategy
- Solves problems quickly
- Diffuses best practices
- Improves knowledge embedded in products and services
- Cross-fertilizes ideas and increases opportunities for innovation
- Enables organizations to better stay ahead of the competition
- Builds organizational memory

Dalkir (2011) quotes Maynard Keynes in Wells (1938):

> " *these . . . directive people who are in authority over us, know scarcely anything about the business they have in hand. Nobody knows very much, but the important thing to realize is that they do not even know what is to be known.* "

Dalkir (2011) considers:

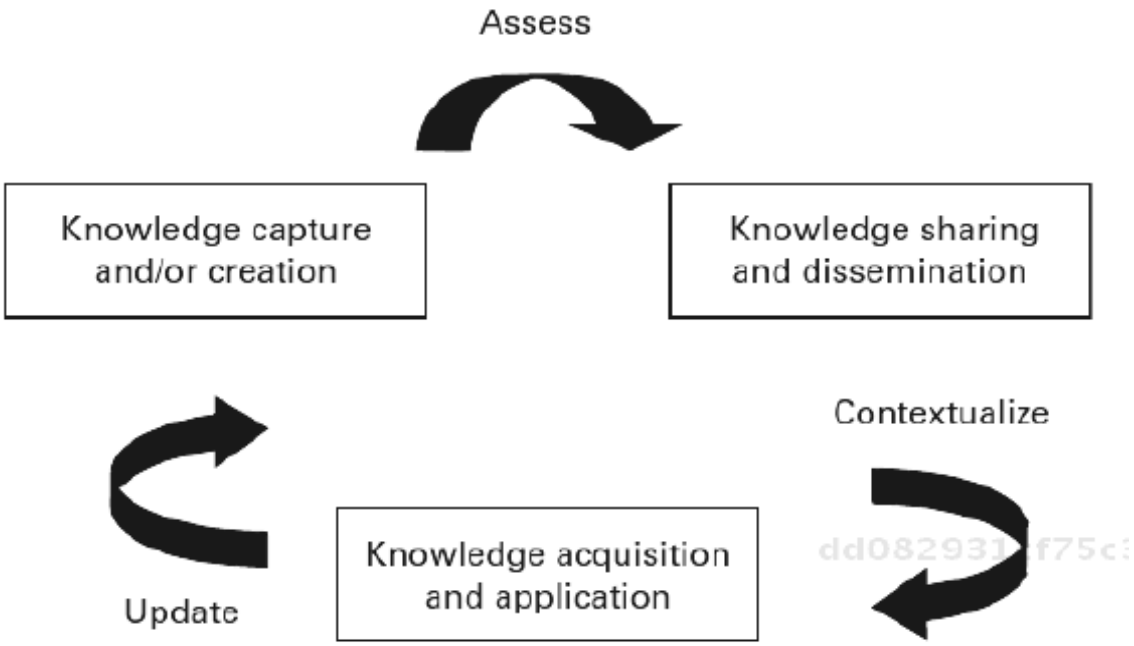
- The KM cycle
- KM Models
- Knowledge capture and codification
- Knowledge sharing and communities of practice
- Knowledge application
- The role of organizational culture
- KM tools
- KM strategy
- The value of KM
- Organizational learning and memory

2.3.2.1 The KM cycle

Dalkir (2011) reporting on a plethora authors reports on several KM cycles namely

Meyer & Zack (1996); Bukowitz & Williams (2000); McElroy (1999) (2003); Wiig (1993) Extracting commonalities an integrated KM cycle is suggested.

Figure 7 Integrated KM Cycle



The integrated cycle draws on elements from the works of Meyer & Zack (1996); Bukowitz & Williams (2000); McElroy (1999) (2003); Wiig (1993) and presents an iterative cycle which focuses upon the stage of Knowledge capture and /or creation where knowledge is obtained (predicated upon having identified both knowledge and knowledge sources), this is then assesses (critically evaluated for usefulness/completeness etc) then shared and disseminated. Value from knowledge shared is extracted by contextualisation and embedding subsequent to which further Knowledge is acquired and applied, it may be argued that contextualisation requires this phase to take place. Finally Knowledge acquired is updated iteratively.

Furthermore KM is now a primary factor in leveraging sustainable competitive advantage, and so certain changes to organisations have been enacted. Organisations have moved to the 'Knowledge Age' to companies who manage knowledge from industrial companies who made things . The direct consequence of this is that it is necessary for companies to learn from their experience and not reinvent the wheel and define KM:

..'Knowledge management represents a deliberate and systematic approach to ensure the full utilization of the organization ' s knowledge base, coupled with the potential of individual skills,

competencies, thoughts, innovations, and ideas to create a more efficient and effective organization' Dalkir (2011)

Other perspectives include Intellectual Capital Management (ICM) and Dalkir (2011) quotes Stewart (1997) describing intellectual capital (IC) as

'..organised knowledge to produce wealth'

This IC is found in intellectual assets which impart business value. However it may be argued that the Lehaney, Clarke, Coakes, & Jack (2004) definition includes elements of the definition which are missing from the latter namely the ICARSUM (Identification, creation, acquisition, retention, sharing utilisation and monitoring of knowledge) acronym.

The author presents a further addition to this definition which may be:

Knowledge Management represents a deliberate and systematic approach to the Identification, creation, acquisition, retention, sharing utilisation and monitoring of knowledge, coupled with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective organization'

It may be argued that this definition presents a more coherent whole and juxtaposes the activities of knowledge management both at an organisational and individual level.

2.3.2.2 KM Models

Dalkir (2011) summarises a variety of models included on the basis of a set of selection criteria:

- representing an holistic approach
- well critiqued
- field tested

On this basis the following models are presented:

- Von Krogh and Roos Model of Organisational Epistemology
- Nonaka and Takeuchi Knowledge Spiral model
- Choo sense making KM Model
- Wiig Model for building and using knowledge
- Boisot I-Space model
- Complex Adaptive System Models of KM
- The European foundation for Quality Management (EFQM) KM model
- Inukshuk KM Model
- Strategic Implication Models

- Practical implication models

2.3.2.2.1 Von Krogh and Roos Model of Organisational Epistemology

Adopting the connectionist approach Von Krogh and Roos Model suggests that knowledge resides both in individuals and an organisation and in the interactions between individuals. It is contended organisations demonstrate the fragility of KM predicated upon mindset of individuals, communications in the organisation, the organisational structure, the relationship between the members and the management of human resources.

2.3.2.2.2 Nonaka and Takeuchi Knowledge Spiral model

This was treated above (2.3.1.4)

2.3.2.2.3 Choo sense making KM Model

Figure 8 Overview of Choos (1998) KM

The model consists of three phases:

- Sense making – attempts to make sense of inflowing information. Dalkir (2011) reporting upon Weick (2001) develops the sense making component of the Choo model. It is reported that Weick (2001) proposes a theory of sense making in which chaos can be transformed into sensible and orderly processes. A loosely coupled system is defined as one which allows revision and reengineering without incurring damage to the whole system. An example given is that the human being is tightly coupled but that DNA is loosely coupled.
- Knowledge creation – transformation of personal knowledge between individuals through dialogue, discourse and story telling. Characterised by the knowledge vision of ''as is'' (current situation) and ''to be'' (future, desired state) widening the spectrum of potential choices in decision making.
- Decision making -

Each phase has an outside stimulus or trigger.

The Choo (1998) model how information is selected and fed into organisational actions

2.3.2.2.4 Wiig Model for building and using knowledge

Dalkir (2011) reporting Wiig (1993) summarises the latters work as follows: Wiig organises knowledge according to its use. Suggesting that humans store knowledge as semantic web which can then be accessed in different ways. Knowledge organised as semantic web demonstrates:

- completeness – availability of knowledge in a given source
- connectedness – the relationships between knowledge objects in semantic web, greater connections more useful the knowledge
- congruency – consistency between knowledge objects i.e facts, concepts, judgements, perspectives, values associative and relational links are consistent
- perspective and purpose – knowing something from a particular point of view or particular use.

Dalkir (2011) further reports that Chohan (2001) Von Krogh (1998) develops the 4th quadrant of Nonaka and Takeuchi's Knowledge Spiral and defines internalisation in greater detail and complexity beginning from lowest novice level " does not know he does not know", lacking awareness of the existence of knowledge and arriving at mastery with deep understanding of know-what; know- how and know-why.

Wiig (1993) furthermore is reported as defining knowledge three forms as

- public knowledge – explicit, taught, routinely shared
- shared expertise – proprietary knowledge assets held by knowledge workers in specialised work, embedded in technology – any arcane discipline with its own language, e.g theoretical physics
- personal knowledge – tacit knowledge , unconsciously

Four types of knowledge are posited:

- factual – quantifiable knowledge- charts, data, measurements etc
- conceptual – systems, concepts, perspectives
- expectational – judgements, hypotheses, expectations
- methodological – reasoning, strategies, decision making, learning from past strategies.

Yielding a KM matrix:

Figure 9 Wiig km matrix

2.3.2.2.5 Biosot I-Space KM Model

The Biosot I-Space model is predicated upon the definition of information as data from which an observer extracts on the basis of expectations and prior knowledge and knowledge as information further contextualised. Furthermore, the concept of an 'information good' as an asset, the effective dissemination or movement of which is dependant upon senders and receivers sharing a coding scheme, is developed. Dalkir (2011) reporting upon Boisot (1998) proposes that:

- the ease of diffusion of data is predicated upon how easily data can be structured and converted into information
- the degree of diffusion of data is proportional to how little structure needs to be applied.

Data is structured and understood through codification and abstraction. Boisot (1998) also points out that in converting tacit to explicit knowledge, certain nuances of meaning and content are lost, this latter is militated against by having face to face interactions (similar to the socialisation quadrant of Nonaka and Takeuchi SECI model).

Figure 10 Boisot I-space model

Codification of data is achieved through categorising into content categories. The fewer categories the more abstract the scheme (Figure 10). It is suggested that the more codified the scheme the easier to understand it becomes. However the act of content category creation may result in loss of content during the transition of tacit to explicit knowledge.

Furthermore I-Space KM model suggests that the activities of coding, abstracting, diffusing, absorbing impacting and scanning contribute to learning. It is posited that the following dimensions are mapped to certain KM activities:

- Codification – categorisation and classification
- Abstraction – knowledge creation through understanding and analysis
- Diffusion – information access and transfer.

The following figure demonstrates how I-Space model maps onto the social learning cycle:

2.3.2.2.6 Complex Adaptive Systems Models of KM

Dalkir (2011) reporting upon variety of authors including Bennet & Bennet (2004); Beer (1981); Snowden (2000) develops the idea of the intelligent complex adaptive system (ICAS) where an organisation is treated as a living entity. Viable Systems Model (VSM) Beer (1981) is an instantiation of this concept encapsulating principles derived from cybernetics utilising communication and control mechanisms to understand, describe and predict the activity of an autonomous or viable organisation.

ICAS consists of independent agents

- interacting with each other locally,

- combining together to self organise,
- without an overall authority directing the activity of each agent resulting in development of complex behaviour.

Snowden (2000) is reported in proposing that an

> *".. ICAS is used to create a sense making model that utilises self organising capabilities of a natural communities and identifies a natural flow of knowledge creation, disruption and utilisation"*

Furthermore it is contended that the tacit-explicit knowledge conversion is limited and that knowledge is categorised into known, knowable, complex and chaotic.

Dalkir (2011) reports Bennet & Bennet (2004) who suggest a symbiotic relationship between and organisation and its environment. They suggest

> *"..turning the living system metaphor into reality"*

They contend that an organisation is composed of living subsystems that:

- combine
- interact
- coevolve

These characteristics result in complex adaptive organisations with self organising components which maximise their impact by working in harmony and accordance to with commonly agreed rules and constraints with other similar components in the organisation and the external environment.

ICAS have 5 key processes:

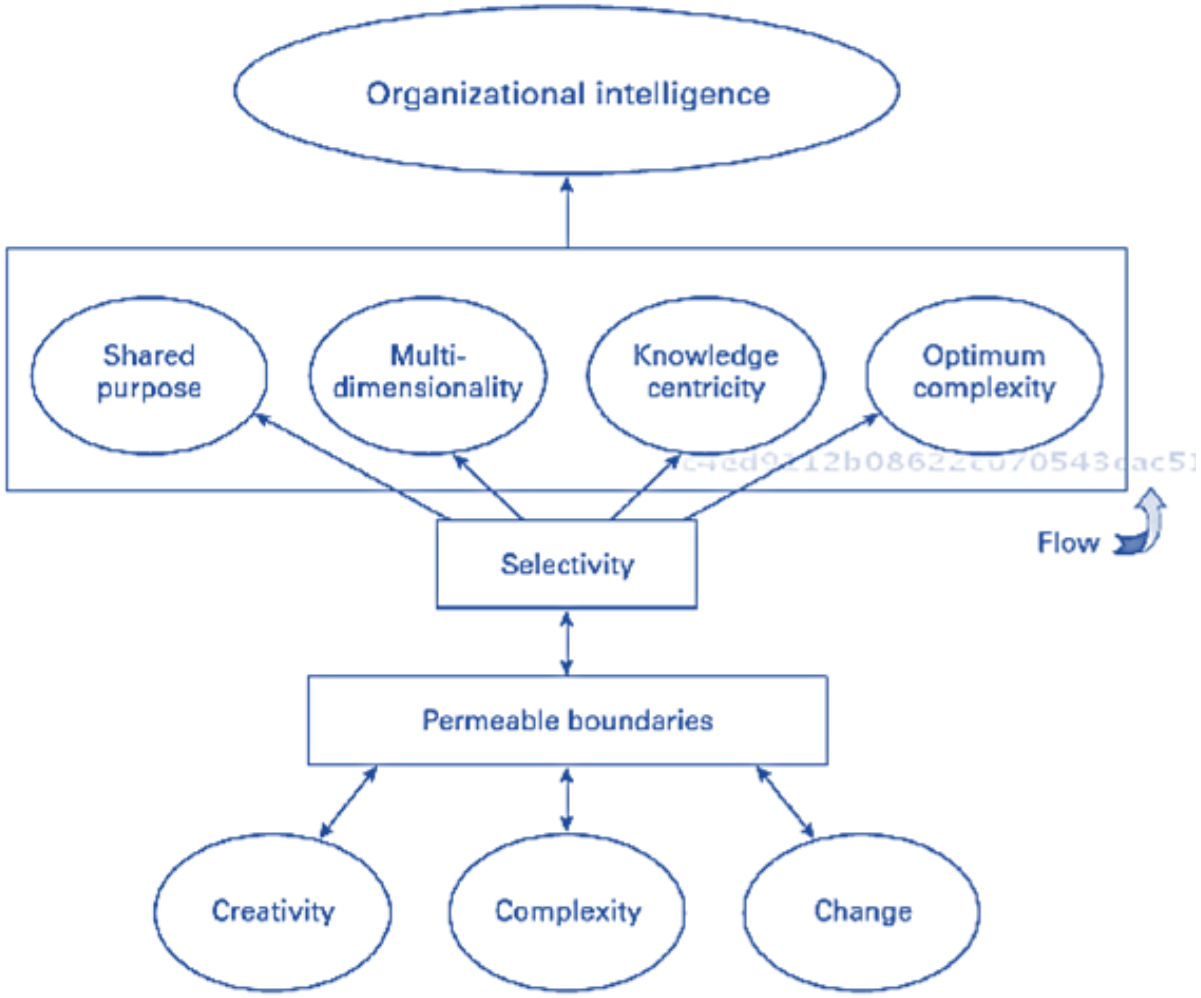
- understanding
- creating new ideas
- solving problems
- making decisions
- taking actions to achieve desired results

These processes are predicated upon the individual knowledge worker, participating in multiple networks (community of practice) to make tacit knowledge available. It is further contended that to survive and successfully compete organisations are compelled to demonstrate 8 emergent qualities (an emergent quality being one which occurs when the whole is greater than the sum of the component parts):

1. Organisational intelligence
2. Shared purpose
3. Selectivity
4. Optimum complexity
5. Permeable boundaries
6. Knowledge centricity
7. Flow
8. Multidimensionality

These are represented in diagrammatic form in Figure 12 below.

Figure 12 Overview of ICAS knowledge management model



1. Organisational intelligence – is the ability to innovate, acquire and apply knowledge to relevant situations
2. Selectivity – is the ability to discriminate information flowing into organisation and requires the following filters/contributory factors
    a. Shared purpose – to integrate and mobilise resources with continous two way communication
    b. Optimum complexity – attaining the balance between internal complexity required to contend with the external environment without relinquishing the structural integrity of the organisation – comparable to the Viable Systems Model VSM of relevant states

c. Permeable boundaries – required in order to build upon relevant ideas and information both inside and outside the organisation
d. Flow – enables knowledge centricity and facilitates continuity, coherence and organisational intelligence.
e. Knowledge centricity – the perceptual lens of knowledge management, the abstracting of an organisation in terms of knowledge.
f. Multidimensionality – analogous to development of human instinct – flexibility that yields people with competences, perspectives, cognitive abilities

2.3.2.2.7 The European foundation for Quality Management (EFQM) KM model

Dalkir (2011) reporting Bhatt (2000)(2001)(2002) presents The European foundation for Quality Management (EFQM) KM model suggesting that it represents KM embedded in traditional models of quality and excellence.

The following Figure 13 illustrates the EFQM KM model whereby the model is divided into enablers and Key Performance results. Enablers are leadership, people; policy and strategy; partnerships and resources and processes all working as a coherent whole and measured by key performance results namely people, customer and society. The KM is used to enhance organisational competence

Figure 13 The European foundation for Quality Management (EFQM) KM model

2.3.2.2.8 The Inukshuk KM model

A KM model produced Dalkir (2011) reporting Girard (2005) by the Canadian Government based upon elements derived from the SECI and other models.

Figure 14 The inukshuk KM model

Extracted elements are divided according to enablers Leadership, technology. Culture and process.

In summary knowledge has been defined as information with truths, perspectives, concepts, judgements, expectations, methodologies and know-how. KM has also been defined as the systematic organization, planning, scheduling, monitoring, and deployment of people, processes, technology, and environment, with appropriate targets and feedback mechanisms, under the control of a public or private sector concern, and undertaken by such a concern, to facilitate explicitly and specifically the creation, retention, sharing, identification, acquisition, utilization, and measurement of information and new ideas, in order to achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical,

cultural, and societal constraints. The distinction between data, information and knowledge has been drawn and two types of knowledge, tacit and explicit identified. The foundations of KM in a rationale predicated upon information economics (intellectual capital, intellectual property, knowledge economy (KE), knowledge assets, knowledge clusters and networks, knowledge spillover and continuity management) and strategic management (core competencies; dynamic capabilities; inappropriate reengineering; knowledge strategies; knowledge marketplaces; knowledge capability); in a KM process (based upon organizational culture, structure and behaviour) have been described. The underlying Knowledge Management cycles and most popular KM models have been discussed. The next section deals with a brief summary of salient concepts of Critical Systems Thinking.

2.4 Critical System Heuristics

2.4.1 Introduction

Critical Systems Heuristics (CSH) is framework of practice derived from systems thinking and practical philosophy. As stated previously since VLE/E-Learming can be thought of as 'computer systems' and CSH is a study of computer systems ergo it is an apposite discipline through the lens of which a valuable avenue of research has been yielded. This section deals with some of the basic terms used in CSH; boundary critique and the process of boundary critique; the conceptual framework of CSH and a model of cogent critical argumentation. It is to be noted that the primary author cited in this is Ulrich, who is the seminal worker in the field and the salient concepts of whose work have been adopted in the development of the evaluative framework. Ulrich has published consistently in this field from 1980 to 2010. He has been ranked as, 1st, 2nd, 3rd most cited author in the field. Other authors such as Midgley (1997), Flood & Romm, (1996) (2007), Reynolds (2007) (based upon rank) have interpreted and quoted Ulrich but their work imparts no new perspective to the salient concepts that add value to the task at hand.

2.4.1.1 Basic terms

Ulrich (2005) defines the terms fundamental to CSH. These terms are :

- Critical Systems Heuristics (CSH)
- Heuristics
- Critical
- Systems

- Boundary judgements
- Claims
- Merit

Ulrich (2005) contends that

- CSH enhances critical/reflective practice of people (decision makers and lay people)
- this critical discourse is supported by 'heuristic' questions and argumentation tools
- systems thinking provides a starting point for deriving the methodological requirements of CSH
- 'Heuristics' is derived from the Greek '*Heuriskein'* meaning 'the art of discovery', addresses the 'soft' ill defined qualitative issues which represent real world problems
- the term critical recognises that there is no single right way to decide on soft issues; that answers are predicated upon personal views, interest and values assumptions
- 'Systems' thinking influences CSH because systems thinking recognises that all problem definitions, solution proposals, evaluations of outcomes depend upon prior judgements of stakeholders about the 'whole' system and that for example improvement of a system can happen only if it is defined in the context of the entire relevant system.
- Boundary judgements:
    - are the underpinning judgements which define the parameters of the reference system according to which the problem definition, solution proposals etc are arrived at.
    - are used to determine which empirical observations and value considerations are either relevant and retained or relinquished
    - condition 'facts' and 'values' therefore assess the merits of a claim.
- during the course of system development , opinions are formed and problem solving, decision making, action and conflict resolution all take place. These processes yield claims which are assertions and suggestions to which relevance (meaningfulness) and validity (justifiability) are attached. Ulrich (2005) points out that examples of claims might include:
    - problem definition
    - an account of a problem
    - solution of a proposal
    - suggested measure of success
    - an assertion of moral rightness
    - claim to knowledge

- all of the above quoted claims are partial (selective) representing a part of the total superset of possible considerations, of serving some parties better than others and it is understood that no proposal, decision or action can be equally right for everyone concerned.
- that a claim is validated by a pragmatic criterion 'merit', For a claim to have merit it must be
    - grammatically, and semantically logical and coherent
    - relevant and acceptable to those concerned in light of likely real world consequences of adoption
    - clarified by answering the following questions:
        - what difference does it make in practice?
        - who will benefit and who not?
        - how are those do not benefit from the claim treated?
        - what is the underlying notion of improvement?
- the sum of fact and value constitute a reference system also known as 'relevant context'. In order to yield productive communication, clear and valid communication is necessary to establish a common reference system.

2.4.1.2 Boundary Critique

CSH supports Boundary Critique which is a systematic mechanism for critically evaluating boundary judgements and can two forms;

- reflective practice – using boundary judgements self critically
- emancipatory practice – using boundary judgements for those claims which have not been self critically evaluated by others.

It is understood that a claim (as described above and reproduced here for ease of reference for example problem definition; an account of a problem; solution of a proposal; suggested measure of success; an assertion of moral rightness; claim to knowledge) has selectivity/partiality attached to it. This partiality is twinfold in that the claim represents only a part of the whole totality of possibilities in existence and that it serves some people better than others. Boundary judgements draw out the claims entire selectivity (empirical and normative) in light of an agreed reference system.

2.4.1.3 Process of Boundary Critique

Ulrich (2005) presents a systematic process of boundary critique facing the following tasks:

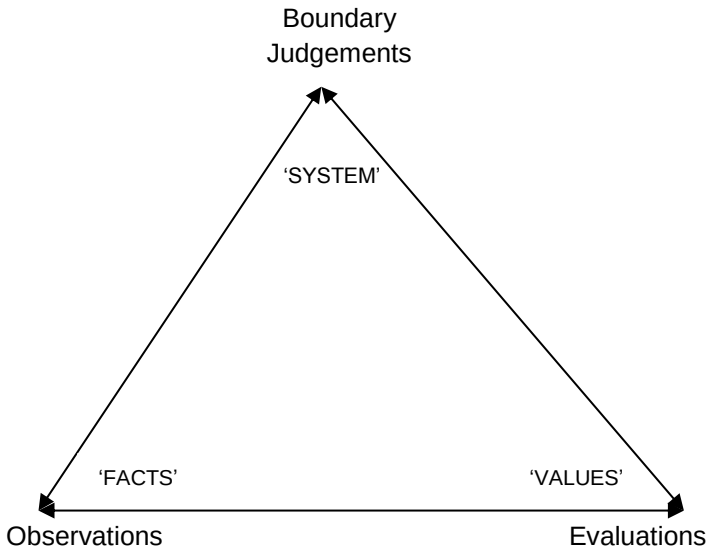
1. Bring to the surface and make explicit underpinning boundary judgements and identify the sources of selectivity that impact a claim
2. Examine those boundary judgements by answering the question 'what difference do they make to the way in which the situation is seen?'
3. To determine the reference system, give alternative answers to the boundary questions.
4. Seek to arrive at mutual understanding of the different stakeholders and their differing reference systems. If agreement is not forthcoming, there will be an improvement of understanding of the totality of the reference systems.
5. Challenge claims of parties who are uncritical of their own claims or impose them on the other stakeholders

Boundary critique is means of making transparent institutional processes of decision making and engendering a reflective boundary critical attitude which CSH proposes as follows:

- Problem situation/real word circumstances are perceived through reference system of underpinning boundary judgements
- Claims have self limiting nature,
- Boundary judgements of all concerned make all limitations of claims equal

The methodological core principle is embodied in an 'eternal triangle' in which boundary judgments, based upon observations and evaluations equivocate between 'system', 'facts' and 'values' as seen in Figure 15 below.

Figure 15 The 'Eternal Triangle' of boundary judgements, facts and values.



When a problem is defined, or a solution proposed or any other claim is raised (as outlined above) the relevance of some facts and norms are distinguished from others, these are contingent upon the reference system, when the boundary judgements are changed, the facts and norms change also. Hence an argumentative triangle is experienced

The triangle yields a systemic triangulation and stimulates answers to the following questions:

- What new facts come to light when the reference systems boundaries are moved?
- What new facts come to light when value judgements are modified?
- How are valuations perceived in light of a modified reference system?

2.4.1.4 The conceptual framework of CSH : Boundary categories and questions

CSH posits four boundary issues each with three types of boundary problems. Each boundary issue raises questions:

1. What aspects of issue are relevant and irrelevant?
2. Who is involved and not?
3. How are differences to be negotiated?

A boundary category is a form of boundary judgement, a place marker and a source of empirical and normative selectivity in need of critical reflection. Empirical selectivity is that which is observed

to be the 'is' case and normative selectivity is the what 'ought' to be the case. In both cases both facts and values are considered. When cross referencing the facts/values and the two forms of selectivity four perspectives for examining selectivity result in the following table:

Table 4 Four perspectives for examining selectivity

Perspective	***Empirical selectivity*** *('Is' mode)*	***Normative selectivity*** *('Ought' mode)*
'Facts'	**Actual mapping:** What 'facts' are considered relevant and which ones are left out?	**Ideal mapping:** What *'facts'* ought to be considered relevant and which ones should be left out?
'Values'	**Actual mapping:** What 'values' are considered relevant and which ones are left out?	**Ideal mapping:** What 'values' ought to be considered relevant and which ones should be left out?

The four fields of Table 4 combined form the reference system. In the development of the conceptual framework, the facts/values are encapsulated in the knowledge appositions and the is/ought paradigm deployed across all of the questions.

2.5 Soft Systems Methodology (SSM)

2.5.1 Introduction

Soft systems methodology (SSM) is a 'soft' approach to systems development, finding expression in the work of Checkland in the 60's and 70's. SSM has become such an established systems development methodology, that there are numerous sources referring to and embellishing it. The following section summarises the salient concepts encapsulated in the acronym CATWOE.

2.5.1.1 CATWOE

Checkland P (1999) summarise and develop the underlying concepts upon which SSM is predicated. The acronym CATWOE presents a particular and specialised perspective on systems

development. Historically systems development has been bifurcated into ‘hard’ and ‘soft’ systems development.

Hard systems development assumes that the problem domain in systems development can be treated in quantifiable and mathematical terms. It is further assumed that the representation of the problem domain can be encapsulated in notations with mathematical symmetry (leading in one extreme to notations such Z schema) and that the solution can be equally rigorously defined with the same degree of mathematical certainty.

Soft systems methodology antithetically assumes that problem domains are contingent upon a complexity with a variety of sources. Rooted in CSH summarised above, CATWOE is a technique advanced by Checkland initially in the 1970’s and subsequently refined in many publications over a period of 30 years.

Checkland P (1999)

explain that CATWOE specifically represents:

- C-Customer a role which is filled a by person(s) who are affected by the system.
- A-Actor a human transformative, agent who has an interaction with the system
- T-Transformation process or processes which act upon input information and effect a change upon it
- W-Weltenschaung – world view, which makes the T meaningful in context of the system
- O-Owner – person(s) who are empowered to stop T.
- E-Environment – elements outside the system which it takes as given

In chapter 4 the contribution of elements of CATWOE to influence the conceptual Checkland P (1999) framework is developed.

2.6 Drivers for the uptake of VLE's

2.6.1 Introduction

In this section drivers for the uptake of VLE/E-Learning are examined. A literature review identifies Governmental and sector wide drivers. The Case of CU identifies localised drivers. Drivers are categorised according to two schema. Firstly according to whether they are Strategic/Tactical or Operational drivers and secondly the People/Processes/Technology schema from Knowledge Management is used.

2.6.2 Definition of Drivers

As with the conduct of any form of research, a clear reference point needs to be established at the commencement of a project. The term 'driver' has been extant in the English lexicon as a commonly held term :

".. *as something that provides impetus or motivation, e.g. within an organization*"

Encarta (2013). It is to be noted that a common reference,Encarta, has been used because the term has become one which has entered common usage.

> *" An aspect of a business that effects a change on another aspect of the business. A driver is most commonly a factor that contributes to the growth of a particular business.*

Investorworld (2014)

This definition clearly imparts an accurate understanding of 'driver' and it is in the sense that the following section deals with that which provides impetus or motivation to adopt VLEs in the HE sector that 'driver' is used.

Pursuant to this definition, the following sections explore drivers from Government, the HE sector and case organization

2.6.3 Dearing Report

Dearing (1997) expects Universities to contribute by increasing and widening participation, particularly:

- from groups who are under-represented in Universities including people with disabilities and young people from semi-skilled or unskilled family backgrounds and from disadvantaged localities;
- offering opportunities later in life to those who missed out first time round;
- increasing their contribution to the economy and responsiveness to the needs of business;
- collaborating more closely and effectively with other institutions and with the world of work;
- exploiting new technology and flexible delivery so as to make themselves more accessible and ensuring that maximum use is made of its facilities through longer opening hours.

In view of the latter, a coherent, funded approach to the implementation of Information and Communication Technology (ICT) in Universities is recommended.

2.6.4 Twelve Key Drivers

The previous section dealt with drivers from a Government perspective, the following section reports on HE sector wide drivers.

Hammond (2003) reporting Brown, Davies, Franklin, & Smith (2002)(**Error! Reference source not ound.**) identified twelve key drivers for the uptake of VLEs in universities as:

1. widening access & student diversity
2. employability
3. quality and standards
4. increased IT and literacy of students
5. student expectations of ICT use
6. the earner-learner
7. increased provision of part time courses
8. globalization of learning
9. professionalism of teaching
10. staff shortages in key areas
11. staff handling larger groups
12. increased IT literacy of new staff

Furthermore three groups of factors which influence the uptake and use of Learning Technologies (LT) in UK universities are noted, these being :

a. a range of universities policy drivers
b. educationally relevant technological innovation in ICT
c. beliefs and expectations of stakeholders and society in general.

Therefore the factors that are attributed to have caused the uptake of VLEs in UK Universities are summarised in **Figure 16**

Figure 16 Factors For The Uptake Of VLEs In UK universities.

Factors	Explanatory Notes
• Educationally relevant technological innovation in ICT • Beliefs and expectations of stakeholders and society in general • Widening access and student diversity • Employability • Quality and standards • Increased IT and literacy of students • Student expectations of ICT use • The earner-learner • Increased provision of part time courses • Globalization of learning • Professionalism of teaching • Staff shortages in key areas • Staff handling larger groups and increased IT literacy of new staff	Hammond (2003) uses the term 'Factor', on examination it may be argued that these factors are drivers in that they have acted to stimulate the uptake of VLEs, therefore the term 'Factor' as used by Hammond will be replaced with the term Driver in future references to the substance of the article.

2.6.5 Summary of Drivers from Dearing and Hammond

Figure 17 Summary of Drivers from Dearing and Hammond

Drivers	Author

• increasing and widening participation, particularly:
  • returners to education
  • under-represented groups in Universities (disabled; young; semi-skilled or unskilled family backgrounds; disadvantaged localities)
• increasing involvement to needs of business, other institutions, with world of work
• exploiting new technology and flexible delivery to be more accessible and ensuring that
• maximum use is made of its facilities through longer opening hours.
	Dearing (1997)

• Educationally relevant technological innovation in ICT • Beliefs and expectations of stakeholders and society in general • Widening access and student diversity • Employability • Quality and standards • Increased IT and literacy of students • Student expectations of ICT use • The earner-learner • Increased provision of part time courses • Globalization of learning • Professionalism of teaching • Staff shortages in key areas • Staff handling larger groups and increased IT literacy of new staff	**Hammond (2003)**

In summary, this section has:

- outlined the development of VLEs in UK universities
- identified the factors which have stimulated the uptake of VLEs in UK universities
- related VLEs to E-Learning
- derived an initial working definition of E-Learning

The next section investigates the drivers for uptake of VLEs at CU, which is being used as a case study for this work in two ways. In the first instance, it provides a background setting to show the

development of a VLE and its implementation. In the latter part of this work, following the development of the framework that is intended to help evaluate the strategic and operational management of Virtual Learning Environments in UK universities, this case study staff are used to help evaluate the framework in a live setting.

2.7 The Virtual Learning Environment at Coventry University

2.7.1 Introduction

This section describes the background development and implementation of the VLE at CU using the latter as a case to examine how the governmental and sector wide strategy for the uptake of VLEs in UK universities is reflected in a specific institution.

CU's strategic aims; recommendations for the adoption of E-Learning; E-Learning strategic aims, value analysis and summary of the University's own institutional benchmarking exercise will be explored and the University's own E-Learning profile articulated.

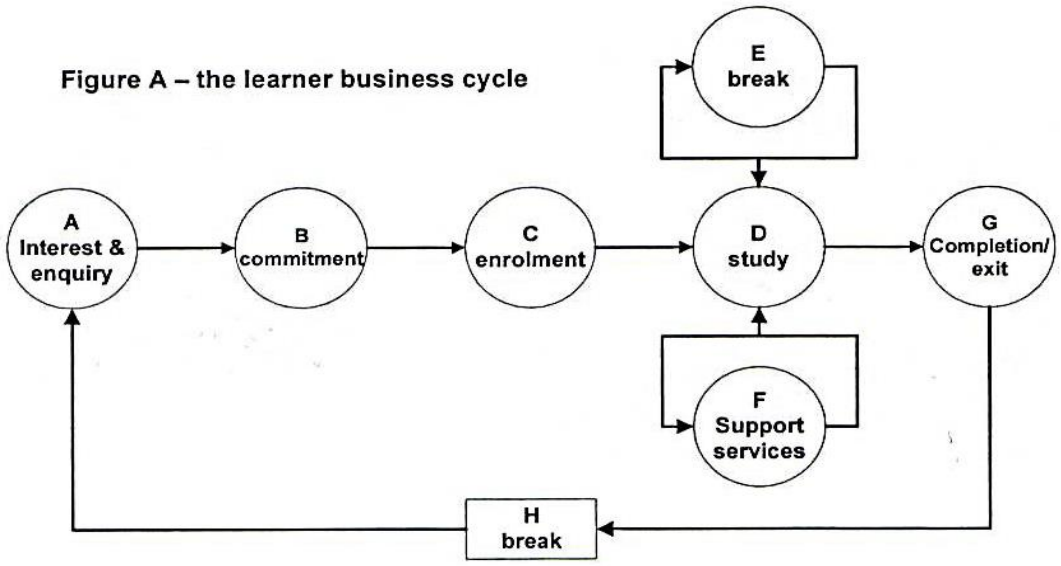
The CU (2004)was commissioned by CU in order to investigate the current state of E-Learning in universities in the UK from an educational, technological perspective and the relationship between E-Learning and CU. It identifies the important milestones of the VLEs' history at CU.

2.7.2 Strategic Aims for E-Learning at Coventry University

CU (200***3***)set out several strategic aims for E-Learning which were to, use electronic means to deliver courses with greater flexibility using distance and blended learning and increase part time provision. In effect the University sought to embed E-Learning technology in every aspect of the learner business cycle (Figure 18) which identifies the steps that a learner experiences in the engagement with the institution

- the learner finds a course of interest (a)
- decides to apply (b)
- enrols and makes payment (c)
- carries out studies (d), may use some or all of the support services (f), or might take a break (e)
- finally completing with an exit award (g). the cycle may again be invoked for a further engagement.

Figure 18 The Learner Business Cycle



2.7.3 E-Learning at Coventry University

CU (2002) aspired to E-Learning by:

- using the IT infrastructure and learning technology to attain excellence in teaching and learning and respond flexibly to students and employers needs by effective staff development
- research and evaluation
- use of the ICT infrastructure as a coherent whole, providing services to distance learners
- online assessment and registration
- development of multimedia online materials
- rewarding improved workload systems and seeking external recognition for E-Learning.

2.7.4 Issues of E-Learning at Coventry University

CU (2004) identifies several issues related to E-Learning, these are:

- a lack of awareness of the corporate vision at the implementation level
- an implementation plan which lacks coherence and a diversity of E-Learning technologies
- suggested improvements (these can be treated as drivers) were:
    - a clear vision and leadership
    - technologies to act as a coherent whole including supporting different students throughout the university experience
    - the identification and dissemination of good practice
    - expansion of E-Learning to accommodate Continued Professional Development (CPD) requirements
    - optimizing the distance learning offering
    - obtaining a complete picture of students' perception of E-Learning
    - developing innovative and exciting E-Learning materials to stimulate learning.

It is to be argued that these findings have identified new localised drivers.

2.7.5 Steps to embrace E-Learning at Coventry University

CU (2006) identified several steps towards embracing E-Learning. A director of E-Learning was appointed and a University E-Learning strategy was developed. The strategy promoted development of E-Learning with internal and external partners to improve the learning experience; to develop 24/7 learning and to improve the global competitive position of the University. A working definition of E-Learning was adopted:

> '.. *the application of digital communication technologies to facilitate learning and teaching, including learning support and services*.'

The above definition included

- blended learning (mixture of campus and distance learning),
- flexible learning (delivery with varying time frames and modes of delivery controlled by the learner) and
- networked learning (via mobile computing technologies also known as m-learning).

CU (2006a) states that E-Learning is either sustainable or disruptive.

- Sustainability is attained if a product or service is developed using the preexisting organizational resource. This kind of offering is useful in allowing for an incremental change but is subject to the law of diminishing returns and imparts limited competitive advantage.
- Disruptive E-Learning is achieved when a sea change is wrought, a complete replacement of the preexisting resource occurs.

At CU an E-Learning strategy is aimed at being sustainable by virtue of

> *'..Resolving the tension between implementing the sustaining features of E-Learning technology across a broad front and being innovative and different through the exploitation of the transformative possibilities is central to our E-Learning strategy.'*

Since CU has stated sustainability as a strategic aim, the possible measurement and evaluation of this is considered later. CU (2006) furthermore aspires to:

- richness (which is a term applied to the offering of highly complex and comprehensive information to learners traditionally in lectures to relatively few students)
- reach which is used to characterize the range of distribution of information, typically this means the numbers of students that can access information.

The greater the numbers of students the less 'rich' is the information. E-Learning technologies aspire to improve the richness experience of larger numbers of students. These can provide personalized advice on-line, diagnostic and progress tracking information, access to high quality learning materials and learning support which is not limited in geography and time.

Value is imparted at several levels including university, school, course team and individual staff and individual students. These are then mapped across capability, impact, metric, economic benefit and strategic fit.

2.7.6 Core Values at Coventry University

CU (2006b) has piloted a further measurement of outcome as part of an Higher Education Academy (HEA)/Joint Information Systems Committee(JISC) benchmarking project in which a set of underlying core values have been identified, these being:

- a plurality of missions (which recognizes the diversity of aims and missions in the HE sector)
- non-prescriptive (fitness for purpose), the measurement of success not against any absolute scale but against the organization's own methodology of adopting E-Learning
- leadership (examining the function of management and its effectiveness)
- continuous improvement which looks for mechanisms by which both major (step change) and incremental (gradual changes) are achieved and fact based management, to ensure that management decisions are based upon objective data and facts which are provided to support effective support decisions
- provide a summary description of the institutions current approaches
- identification of any performance indicators used and description of any reflective mechanism in place
- activities management and reporting
- main processes for appropriate delivery
- needs, interests and expectations of staff and students
- resources allocation and value for money achieved
- support of collaborations and partnerships
- evaluation and review and communication of outcomes.

CU (2006b) identifies local drivers for the uptake of E-Learning which are:

- generally enhancing the quality of teaching and learning
- increasing retention and completion
- keeping up with the competition
- facilitating collaboration with other institutions
- improved flexibility of delivery for on-campus students
- reducing teaching costs long-term
- increasing the volume of distance learning
- supporting local businesses and economic development
- improving provision for students with disabilities
- widening access to under-represented groups
- facilitating the transfer of students from further education
- safeguarding existing international student markets
- pursuit of new corporate clients
- safeguarding existing corporate clientsentry into new international student markets.

Figure 19: Drivers for the uptake of VLEs at Coventry University.

Drivers	Priority
Generally enhancing the quality of teaching and learning	4.30
Providing access for students unable to attend scheduled classes	3.80
Increasing retention and completion	3.70
Keeping up with the competition	3.60
Facilitating collaboration with other institutions	3.40
Improved flexibility of delivery for on-campus students	3.30
Reducing teaching costs long-term	3.30
Increasing the volume of distance learning	3.20
Supporting local businesses and economic development	3.10
Improving provision for students with disabilities	2.80
Widening access to under-represented groups	2.70
Facilitating the transfer of students from further education	2.70
Safeguarding existing international student markets	2.50
Pursuit of new corporate clients	2.50
Safeguarding existing corporate clients	2.50
Entry into new international student markets	2.40

The overall priority the institution gives to the drivers ('5' is a very high priority; '4' is a high priority; '3' is medium priority; '2' is low priority and '1' is very low priority). Table 1.2 shows that the most important driver for E-Learning uptake, at CU, is 'generally enhancing the quality of teaching and learning'. The management of E-Learning is not considered therefore a framework to evaluate management might impart hitherto unrealised benefit. There is a lack of consistency in the evaluation of E-Learning.

Evaluation has many definitions including:

` *"..to judge the value or condition of (someone or something) in a careful and thoughtful way"* Dictionary (2013)

"..*Evaluation is the systematic assessment of the worth or merit of some object"*

Trochim (2006)

"..is defined as the process of examining, that results in a measurement"

CU (2004)

There are several measurements apparent. Value analysis in the University's E-Learning strategy CU (2006b) identifies a grid (Table 16). According to the grid, value imparted is applicable at several levels which are university, school, course team, individual staff and individual students. These are then mapped across capability, impact, metric, economic benefit and strategic fit.

The benchmarking exercise CU (2006b) looks at a set of core values which are articulated as a set of instructions to explore E-Learning activities management and reporting:

- main processes for appropriate delivery
- needs, interests and expectations of staff and students
- resources allocation and value for money achieved
- support of collaborations and partnerships
- evaluation and review and communication of outcomes.

There is no correlation between the factors identified in the value analysis and the core values. This clearly identifies an area of inconsistency in the implementation of VLEs and their evaluation at CU.

2.7.7 Conclusion of Evaluation at Coventry University

Many of these drivers are not measured in a systematic, systemic, comprehensive, institution wide sense. It maybe concluded that there is no evaluation mechanism in place to measure the management of VLE/E-Learning and certainly no evaluation that seeks to reconcile the drivers to the outcome of implementation of VLE.

2.8 Classification of Drivers

2.8.1 Introduction

In this section an classification of drivers will be proposed with explanation of how drivers are classified according

- to whether they are Strategic/tactical/operational with a summary grid
- to the People/Processes/Technology paradigm with a grid to summarise the classification
- to which operational/tactical drivers belong strategic drivers

2.8.2 Explanation of driver classification

It can be argued that Drivers are the aspiration or raison d'etre of the VLE/E-Learning adoption. It is seen later that in Knowledge management there is the existence of Knowledge Appositions (Summarised by a variety of authors including Alavi & Leidner (2001) and Lehaney, Clarke, Coakes, & Jack (2004)) these are all part answers to the question 'How do we know that we know?'. 'Know – why and know-how are two of the appositions which seek to answer the 'How do we know that we know?' question. The author argues that drivers may be initially divided into strategy(S), tactical (T) or operational (O) levels. The S/T/O cascade is representative of levels of granularity that accompany a continuum that encompasses concept to implementation. A strategy is therefore a conceptualisation of vision/mission/strategic aims and objectives, in effect the 'why' question is encapsulated, the tactical is a further perceived practilisation of that conceptualisation (for example into yearly, quarterly, monthly objectives), more the 'how' that strategy is envisaged as being enacted . Finally operational refers to the project planning, monitoring, controlling at a more day to day management. On this basis most drivers for the uptake of VLEs/E-Learning would be expected to be more at strategic level. The 'why' question asks for the purpose of the VLE/E-Learning. In any evaluation it is prudent to check the practical implementation against the strategic aspiration. Figure 20 below illustrates the classification continuum

Figure 20 Classification continuum

Strategic/tactical/operational

Why	**How**
Strategy	**Operational**
Concept/Abstract	**Practical/real/concrete**

2.8.3 Classification of Drivers into Strategic/Tactical/Operational

In addition to the questions encapsulated in Figure 20:

- Is the driver a 'why' driver?
- OR is it a 'how' driver?

A further refinement, to the questions above, is to ask:

Can the driver be further reduced from strategic to tactical level? For example the driver 'Widening Access' is clearly a strategic driver and can be further reduced into targeting specific groups for example disabled students. A further practicalisation might be to increase online provision to disabled students which might lead to specialist hardware and software development and implementation. In effect the author posits that the placement of a driver on the S/T/Operational classification can be decided as to what is Strategic according to nature of the organisation and the nature of the drivers within that organisation. Table 18 summarises the classification drivers according to their Strategic/Tactical or Operational nature. The left hand column lists the drivers and the right hand column the nature of the driver. In the proposed framework this classification would assist in answering the know-why knowledge apposition, discussed in 4.1 later.

2.8.4 Classification drivers according to People/Processes/Technology

Another profiling classification is to adopt is the People, Process and Technology classification. This is a well known classification in Knowledge Management where elements of a system are balanced across people, processes and technology. Each cell in the grid below is populated by seeking the answers to the following questions

People

- Who is the main beneficiary?
- Who else is implicated in the driver?

Example

The driver 'Beliefs and expectation of society':

For the questions 'Who is the main beneficiary?'

A society is defined as :

> "... *An extended social group having a distinctive cultural and economic organization"*
>
> Princeton University (2012)
>
> "... *The totality of social relationships among humans. A group of humans broadly distinguished from other groups by mutual interests, participation in characteristic relationships, shared institutions, and a common culture. The institutions and culture of a distinct self-perpetuating group."*
>
> Farlex (2013)

It is to be noted that the references used here are online resources, but since the terms are of such common usage these resources are sufficient unto the task. Therefore in answer to the question 'Who else is implicated in the strategic driver?' society is a ubiquitious term which includes the dynamic of individual and the collective in a recursive loop. In this case society is both the beneficiary and participant. Therefore out of the People/Processes/Technology, the main category is for the driver 'Society', is 'people'.

2.8.5 Processes

Is the focus primarily an activity or set of activities which are to be instantiated in order for the driver to be achieved or realised?

2.8.6 Example

Employability

> *"..Employability refers to a person's capability of gaining initial employment, maintaining employment, and obtaining new employment if required."* Hillage & Pollard (1998)

Since it is the capability of a person to attain employment, then in order to attain to the capability a set of activities/processes has to undergone. It is arguably, therefore, a 'processes' driver.

The grid is populated by asking several questions:

- What is the primary focus of the driver?
- Is it a strategic driver, i.e is a 'why' activity or a 'how'?

2.8.7 Rationalised set of strategic drivers

Certain of the strategic drivers can be brought together as seen in Table 5. 'Widening access and student diversity' may be brought together with 'increasing participation'. The one arguably is a specific instantiation of the other. In this case in order to employ a VLE/E-Learning to widen access and increase student diversity, is increasing participation. In a similar manner Quality and Standards can be merged with 'Generally enhancing the quality of teaching and learning'.

The following (Table 5) summarises the above mapping of strategic drivers mapped against tactical/operational drivers.

Table 5 RATIONALISED STRATEGIC DRIVERS MAPPING TO TACTICAL AND OPERATIONAL DRIVERS.

<table>
<tr><td colspan="4">Operational/tactical drivers mapped to strategic drivers</td></tr>
<tr><td colspan="4">People</td></tr>
<tr><td colspan="2">Widening access and student diversity
• The earner-learner
• Staff handling larger groups (as consequence of widening access it is possible that staff would teach larger groups) people with disabilities
• young people from semi-skilled family backgrounds
• unskilled family backgrounds
• disadvantaged localities
• offering opportunities later in life to those who missed out first time round
• Improving provision for students with disabilities
• increased provision of part time courses
• Improved flexibility of delivery for on-campus students
• Facilitating the transfer of students from further education</td><td>Beliefs and expectations of stakeholders and society in general
• Obtaining a complete picture of students' perception of e learning
• Needs, interests and expectations of staff and students</td><td>Clear vision and leadership</td></tr>
<tr><td colspan="4">Processes</td></tr>
<tr><td>Employability
• increased responsiveness to the needs of business;
• increasing their contribution to the economy
• collaborating more closely with the world of work;
• Supporting local businesses and economic development
• Pursuit of new corporate clients
• Safeguarding existing corporate clients</td><td>Quality and standards (Generally enhancing the quality of teaching and learning)
• Main processes for appropriate delivery
• Resources allocation and value for money achieved
• Reducing teaching costs long-term</td><td colspan="2">Globalization of learning
• collaborating more closely with other institutions
• Optimizing the distance learning offering
• Support of collaborations and partnerships
• Facilitating collaboration with other institutions
• Increasing the volume of distance learning
• Keeping up with the competition</td></tr>
<tr><td>Professionalism of teaching
• Developing innovative and exciting E-Learning materials to stimulate learning
• Staff shortages in key areas
• Increasing retention and completion</td><td colspan="3">Evaluation and review and communication of outcomes
• The identification and dissemination of good practice</td></tr>
<tr><td colspan="4">Technology</td></tr>
<tr><td colspan="2">Educationally relevant technological innovation in ICT
• Exploiting new technology and flexible delivery so as to make themselves more accessible and ensuring that maximum use is made of its facilities through longer opening hours.
• A diversity of technologies to act as a coherent whole
• Increased IT and literacy of students</td><td colspan="2">• Student expectations of ICT use
• Increased IT literacy of new staff
• Expansion of E-Learning to accommodate CPD requirements</td></tr>
</table>

Table 5 maps tactical and operational drivers to strategic drivers.

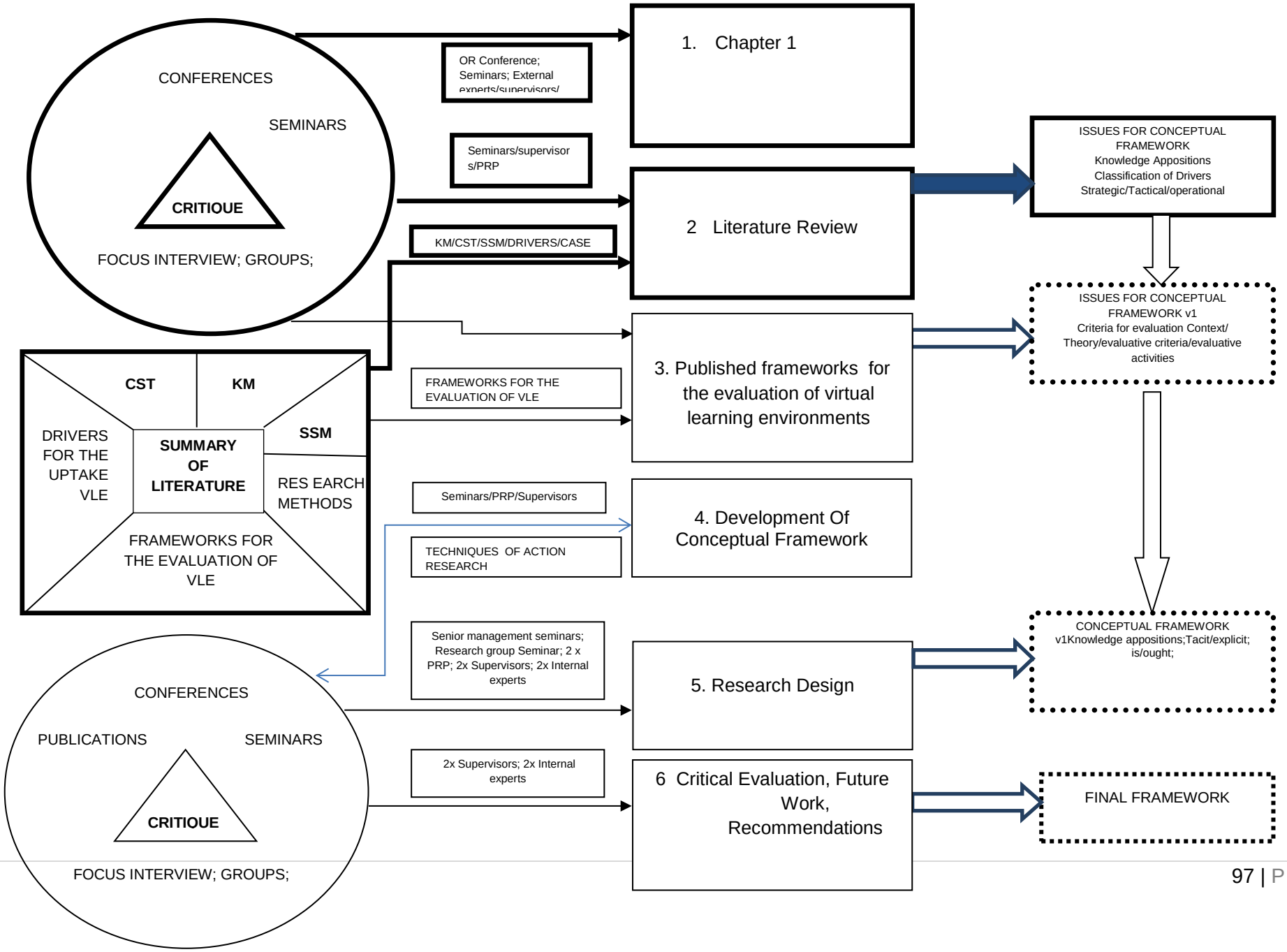
Strategic aspirations to VLE excellence at CU have not been successful. The implementation of the VLE and E-Learning has encountered failures. The application of KM principles and practice may be used to address these failures.

2.8.8 Position of Chapter 2 in research design

Figure 2.19 demonstrates the position of chapter 2 on the research trajectory. Building upon the concepts elucidated and adhering to the structure of dissertation outlined in chapter 1, chapter 2 yields the first set of elements that contribute to the development of the framework.

An extensive review of KM; drivers for the uptake of VLE's/E-Learning and a study of the case organisation CU has been presented. In summary this section has:

- outlined the development of VLE/E-Learning at CU.
- identified an inconsistency between the core values and value analysis designed to evaluate E-Learning at CU
- identified drivers for the uptake of VLEs/E-Learning
- identified drivers according to the People/processes/technology paradigm
- identified drivers according to strategic/tactical/operational categories
- rationalised the strategic drivers
- mapped strategic to tactical/operational categories


CONFERENCES
SEMINARS
CRITIOUE
FOCUS INTERVIEW; GROUPS;
OR Conference; Seminars; External experts/supervisors/
1. Chapter 1
Seminars/supervisors/PRP
2 Literature Review
KM/CST/SSM/DRIVERS/CASE
ISSUES FOR CONCEPTUAL FRAMEWORK
Knowledge Appositions
Classification of Drivers
Strategic/Tactical/operational
ISSUES FOR CONCEPTUAL FRAMEWORK v1
Criteria for evaluation Context/ Theory/evaluative criteria/evaluative activities
CST
KM
SSM
DRIVERS FOR THE UPTAKE VLE
SUMMARY OF LITERATURE
RES EARCH METHODS
FRAMEWORKS FOR THE EVALUATION OF VLE
FRAMEWORKS FOR THE EVALUATION OF VLE
3. Published frameworks for the evaluation of virtual learning environments
Seminars/PRP/Supervisors
TECHNIQUES OF ACTION RESEARCH
4. Development Of Conceptual Framework
CONCEPTUAL FRAMEWORK v1Knowledge appositions;Tacit/explicit; is/ought;
Senior management seminars; Research group Seminar; 2 x PRP; 2x Supervisors; 2x Internal experts
5. Research Design
CONFERENCES
PUBLICATIONS
SEMINARS
CRITIOUE
FOCUS INTERVIEW; GROUPS;
2x Supervisors; 2x Internal experts
6 Critical Evaluation, Future Work, Recommendations
FINAL FRAMEWORK

3 Published Frameworks for the Evaluation of Virtual Learning Environments

3.1 Introduction

In the previous chapter a working definition of E-Learning and the relationship between E-Learning and VLEs was explored. A definition of knowledge and Knowledge Management (KM) and the logical juxtaposition between management of E-Learning and Knowledge Management (KM) was established. The development of the factors which have stimulated the uptake of Virtual Learning Environments (VLE)s in UK universities and in the case organisation CU (CU) was summarised and a schema of classification according to the Strategic/Operational/tactical vs People/Processes/technology paradigm was proposed.

The following chapter deals with existing frameworks for the evaluation of Virtual Learning Environments (VLEs) specifically questions:

- that were asked when designing a training and learning programme
- based upon the application of engagement theory
- that were predicated upon the overall purpose of evaluation
- to cover twelve areas of VLE evaluation

Furthermore evaluation will be considered from different perspectives including evaluation criteria:

- based upon the Conversation Framework and Viable Systems Model, principles of evaluation,
- at Bournemouth and Keele Universities for evaluating VLE
- for technology and team interaction

Evaluation instruments, measures, metrics and set of objectives will be reported. An example of evaluation of a Managed Learning Environment (MLE) will be explored and a taxonomy for researching Virtual Projects Environments (ViPER) focusing upon VLEs will be summarised.

Several frameworks will be considered including a framework to evaluate

- different VLE evaluations

- E-Learning in vocational education training (VET)
- models of E-Learning
- opportunities for collaborative and independent student-centred learning

In addition a framework to capture knowledge creation and learned knowledge; a methodology for the analysis and evaluation of VLEs and the prevalence of the educational, cultural, technological, and technical aspects in these frameworks will eludicidated. Finally, the need to develop a framework that addresses the management of the development, implementation and evaluation of VLEs with a knowledge management perspective will be highlighted.

3.2 Existing Frameworks for the Evaluation of Virtual Learning Environments.

3.2.1 Evaluation questions based upon engagement theory

Kearsley & Shneiderman (1999) pose a set of evaluation questions are based upon the application of engagement theory. Engagement theory suggests:

- that learners are engaged in learning using active cognitive processes (creating, problem solving, reasoning, decision making, evaluation)
- that learners are intrinsically motivated by creating collaborative teams where learning activities occur in groups (e.g one minute in class exercise in pairs to multi team, multi year cross curricular year long project), are project based (selection of project, use of different activities and resources), have an outside, authentic, focus.

The evaluation questions are based upon the principles of :

- relate (communication, planning, management, social skills)
- create (problem definition, application of ideas)
- donate (making a useful contribution to e.g. campus group, community organisation, school, church etc).

A set of research questions are posed (as evaluative criteria) about

- how effective is engagement theory with curricula, disciplines, age groups
- the skills which are required for collaboration

- addressing individual differences
- student evaluation methods to be used
- the most important component of engagement theory for different aspects of learning
- the best form of preparation for instructors
- the nature of groupware to be used
- the ability of engagement theory to be scaled up for large classes running simultaneously in different institutions.

It can be seen that:

- the evaluation is based upon engagement theory
- stakeholders are learners
- there is a set of evaluative criteria

3.2.2 Evaluation framework based upon Conversation and viable systems theory

Britain & Liber (1999) (2004) in a seminal work, draw pedagogical evaluation criteria and present an evaluation model based upon theory. They define a Virtual Learning Environment (VLE) as one which encompasses a notice board, course outline, e-mail, conferences, class lists, student homepages, assignments, assessments, metadata, synchronous collaboration tools, multimedia repository, file upload area, calendar, search tools, book marking and navigation model. They report that evaluation based upon comparative functionalities of VLEs fails to address pedagogical issues. The Conversation Framework of Laurillard Laurillard (1993) and the Viable Systems Model of Beer (1981) are examined.

Britain & Liber (1999) acknowledge that the Conversation Framework is based upon Conversation Theory and that the teacher needs to accommodate a students' mental constructs about a topic and to target the goal of learning through teacher-student dialogue. The key characteristics of the Conversational Framework (Figure 2.1) are:

- discursive (teacher/student conceptions accessible to each other, must agree learning goals and provide feedback which can be acted upon by the student);
- adaptive (teacher focuses the dialogue)

- interactive (student must achieve the learning goal with feedback from teacher) and reflective (teacher helps student link actions to feedback given).

Interactions are assumed to take place through the VLE and suggest the evaluative framework shown in Figure -22. The framework depicts:

- the workflow between tutor and student during learning where the teacher presents / redescribes conception
- student presents / redescribes conception
- teacher setting up micro-world activities
- student interaction with micro-world activities
- the system providing feedback on the action
- student modifying actions in light of feedback.

Certain activities (centre) are interactive and take place through some medium. Other activities (right and left) are internal to either the student or the teacher. shows the Conversational Model used for evaluation.

Viable System Model (VSM) is used for a further evaluative framework focussing upon:

- resource negotiation how do learners negotiate their learning 'contracts' with their teacher?
    - a one off or a continuous process?
    - what are their mutual rights and responsibilities?
    - what is the currency of this negotiation?
- coordination:
    - can learners collaborate in creating their learning?
    - how can learners collaborate in creating their learning?
    - what provision is there that can prevent exploitation?

- monitoring:
    - does a teacher monitor whether learning is happening? (so that, if necessary, remedial action can be taken)
- individualization:
    - can each student find their own resources and advance their own learning independently of others?
    - can they contribute their discoveries to the group?
- self-organisation (what space or tools are available to let the learners organise themselves as a group, outside of the teacher's purview?)
- adaptation (is it possible for the teacher to adapt the course and its resources in light of experiences gained during its operations?).

Figure -22 The Conversational Framework

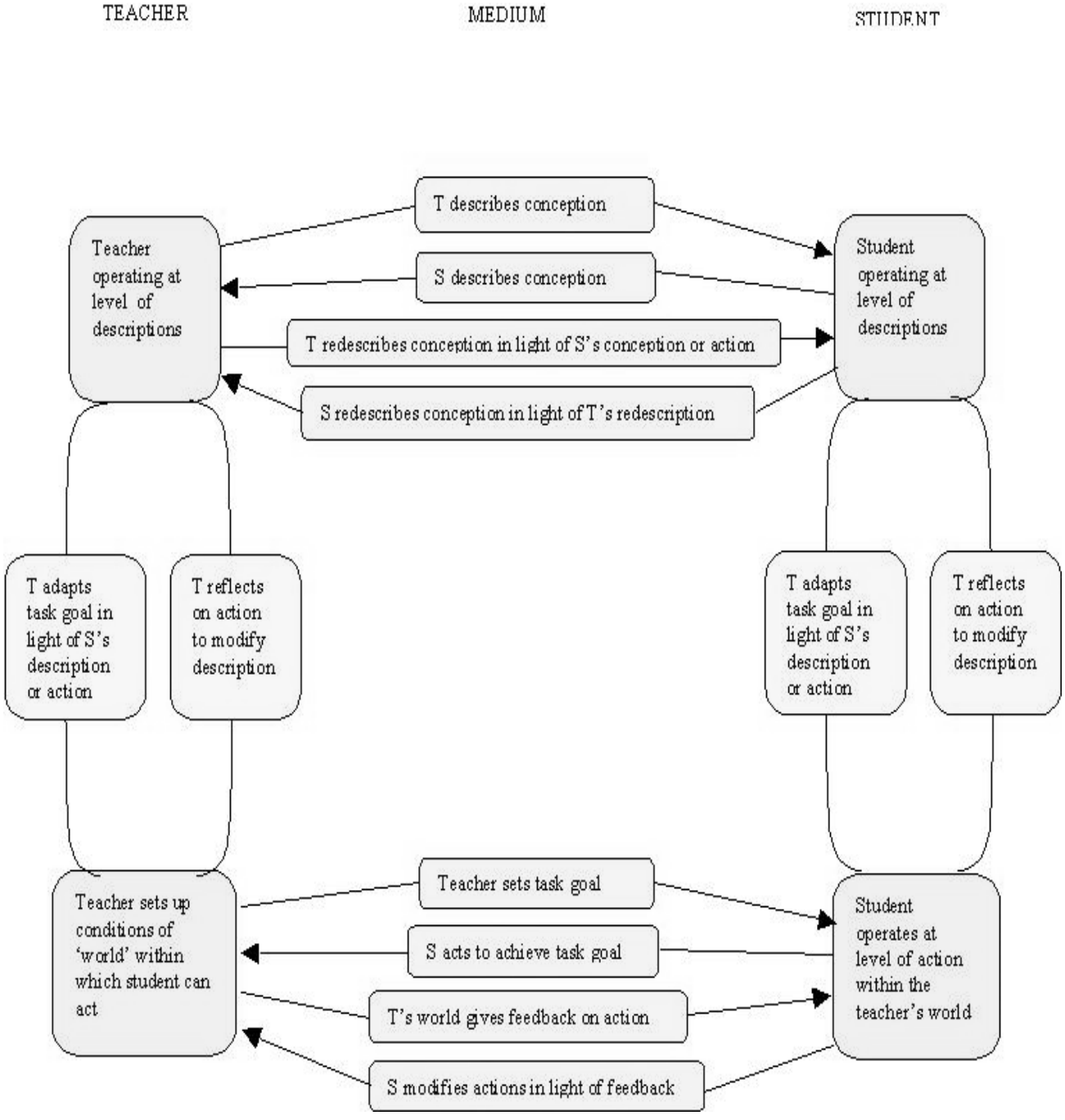


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Figure 23 AN EVALUATION FRAMEWORK FOR VLES USING THE CONVERSATIONAL MODEL.

	Tools	**Structuring**
Teacher Presents Conception	What tools does the teacher have to hand: Text, video, audio, images?	Can a teacher easily put together different multimedia formats for presentation of a conception? Can these be readily altered for re-presentation in a different way
Student Presents Conception	Can the student interact with the teacher through the system? Does the student have multimedia authoring capabilities? Even if text-only, how does the student communicate with the teacher?	Clearly the dialogue between student and teacher is at the centre of the conversational model and how this is visually structured for both tutor and student is very important. Conversations should be at the centre of activity in the VLE rather than pushed to one side.
Teacher sets up micro world	Multimedia authoring tools for creating course materials, embedded or linkable simulation programs, testing software such as quiz creation programs etc.	In a VLE the notion of micro-world can be applied at many different levels. The important point from the perspective of the conversational model is that it should be versatile enough to be adapted for an individual student on the basis of the ongoing conversational dialogue with that student.

Student interacts with micro world	See 3 above	Again we can see this notion of micro-world at various levels. We are looking for more from the student side than simply being able to view content.
Tutor provides feedback to the student	Can the tutor use the communications tools to provide feedback to the student in the context of the students' activities?	It might seem obvious that this would be true but the important point is that the feedback can be easily related to the action - i.e. any discussion thread should be linked to or embedded in the domain of actions.
Student modifies actions	Can the student return to the activities and modify their actions based on feedback received from the tutor?	

Viable System Model (VSM) is used for a further evaluative framework focussing upon

- resource negotiation how do learners negotiate their learning 'contracts' with their teacher?
    - a one off or a continuous process?
    - what are their mutual rights and responsibilities?
    - what is the currency of this negotiation?
- coordination:
    - can learners collaborate in creating their learning?
    - how can learners collaborate in creating their learning?
    - what provision is there that can prevent exploitation?
- monitoring:
    - does a teacher monitor whether learning is happening? (so that, if necessary, remedial action can be taken)
- individualization:
    - can each student find their own resources and advance their own learning independently of others?
    - can they contribute their discoveries to the group?
- self-organisation (what space or tools are available to let the learners organise themselves as a group, outside of the teacher's purview?)
- adaptation (is it possible for the teacher to adapt the course and its resources in light of experiences gained during its operations?).

3.2.3 Further developments of pedagogical framework predicated upon Conversation and Viable systems theory

Pursuant to their papers Britain & Liber (1999) (2004) note that there is a greater need to focus on teaching and learning especially:

- learning design and activity centered approaches with the development of an Educational Modeling Language (EML) a notational system for modeling units of study which has lead to the development of a learning design specification
- open interoperability standards, frameworks and architectures (development of e – learning architecture using open source components with standardized interfaces).

The Viable Systems Model (VSM) has been applied to levels of learning management which are supporting pedagogical innovation using:

- e-learning (module level)
- institutional management of programmes (programme level)
- students' management of their own learning (learner level).

3.2.3.1 Use of Conversational Framework

To use the conversational framework to evaluate a VLE there is a need to establish tools in the software to allow a dynamic interaction between dialogue and action in order to influence students' conceptions and actions. To evaluate VLEs using the VSM and conversational framework a set of questions are posed at the module, students' and programme level.

At the module level questions are asked about system tools for communication between teachers/students; teachers extending presentations during module time period; the model of teaching and learning interactions including whether a module is structured sequentially and/or hierarchically over time ; facilities to organise learners; types of learning activity are supported by the system, underlying pedagogical model(s) or approach(es) encouraged by the system; module rules made explicit to students; how well is learning progresses on module; the degree of learner independence (including finding and managing resources, owning file stores or repositories; talking to other students (other than in the main module discussion); creating their own discussions and learning activities involving peers; locating people with similar interests outside of their own module, course, year or institution; the extent to which it is possible for the

teacher to adapt the module structure once teaching is underway, and resources fragments of module structure people be added/changes/deleted.

At the student level questions are formulated about:

- student centeredness,
- facilities to assist in students organising themselves,
- current and completed work in modules,
- monitoring their own activities and Personal Development Planning (PDP).

At the programme level questions are asked about:

- whether the degree can be viewed at programme level
- rules for delivering a module can be specified
- performance of a module be monitored by managers
- programmes can be adapted from within the system
- whether teachers working on different modules can coordinate and assist one another.

3.2.4 Principles of evaluation

Oliver (2000) discovers principles of evaluation from the wider evaluation community and applied to learning technology. Evaluation is defined as

'The process by which people make value judgements…'

It is reported that there is paradigm debate between quantitative and qualitative evaluation. Quantitative evaluation is objective, supports generalisable conclusions, is reliable and has sample validity. Qualitative evaluation is flexible, sensitive with meaningful problem specific conclusions, relevant and non reductive. Furthermore it is contended that different evaluation methodologies are useful depending on the situation. (Patton, 1997) Utilization Focussed Evaluation is reported as being concerned with the process of evaluation helping people to do things.

It is reported that evaluation:

- is a collaborative process of mutual understanding

- is a continuous strategy for accommodating responsive, adaptive organisational structures
- is the development of a culture of reflective practice which allows the communication and building of knowledge
- has relative merits versus auditing.

It is concluded that:

- in learning technology evaluation there are people on both sides of the quantitative/qualitative paradigm debate
- the background of learning technologists is diverse (education, psychology, computer science etc) therefore a diversity of evaluation approaches is to be expected
- there is a move from fixed epistemological positions to a plurality of views
- a focus on utility of evaluation
- awareness of priorities setting the evaluation agenda including authenticity
- adoption of socio-cultural models of learning and practitioner based evaluation.

3.2.5 Taxonomy for researching Virtual Project Environments (ViPER)

Basiel (2001) presents a taxonomy for researching Virtual Project Environments (ViPER) and applies within the Quality Assurance Agency (QAA) guidelines (Table 6). The proposed taxonomy focusses upon:

- VLE set up using:
    - the student model which refers to:
        - the degree of remoteness of students from face – to – face (f2f) to complete distance learning
        - determining student location
        - competency in English, level of ICT expertise
        - the degree of VLE activity

- the conversion model (conversion of real life teaching and learning to a supported VLE as parallel model with one to one transference of real life activities)
- fixed model using a pre established pedagogical model addressing staff acceptance of the model and a stakeholder induction
- open choice model, supplies a set of virtual tools the combination of which may be instantiated differently for different pedagogical models
- online learning theory (telepistemology) is the application of learning theory applied to VLEs centred upon levels of learner autonomy and the ability of students to manage their own learning process (Table 2.3 shows the levels of autonomy in telepistemology)
- VLE construction with:
    - presentation of content (the conversion of concrete live face to face learning materials to web delivery)
    - methodology for communication
    - feedback (reaction of students to presented content) and assessment (quantitative results measured as norm referenced scores compared to others in the same group or criterion based which compares results with pre existing standard).

The ViPER taxonomy shows how properties of learning strategy, interactivity, and feedback thread together to form a learning environment.

Table 6: Levels of Autonomy In Telepistemology

ELEMENTS OF TELEPISTEMOLOGY	LEVELS OF AUTONOMY		
	High	Medium	Low
View of knowledge	product - external to student's mind	guided procedure - external to student's mind	internal process of knowledge construction
Learning theory	Behaviourism	Guided autonomy	Web-Constructivism and TAM
Knowledge types	Propositional (facts)	Procedural (skills)	Abstract (theory)
Instructional settings	Existing prior solution (concrete-enactive)	Mapped solution (representation-iconic)	Unknown solution (symbolic-theory)
Teaching & learning methodological design	Linear	Guided	Discovery
Student & teacher's roles	Teacher lead / passive student	Teacher lead / active student	Teacher is a moderator-constructive student-centred
Cognitive psychology type	Didactic / rote	Incremental / scaffolded operant conditioning	High level tools analysing, predicting…
Curriculum design	Set content: rigid, text-book presentation	Semi-open: content amended each term	Flexible content: dynamically amended by student's input & tutor's modifications

In summary it may be concluded that the above evaluative criteria identified are pedagogic and concentrate upon the student learning experience and do not evaluate the management of VLEs/E-Learning.

3.2.6 Questions based upon the overall purposes of Evaluation

Cook (2001) states that evaluation:

> *'.. is a process of asking pertinent and incisive questions'*

The questions in his paper are predicated upon the overall purposes of evaluation:

- how to integrate Learning Technology into teaching whether a particular resource is of use or to develop a resource of use
- types of evaluation
    - prefaced by a needs analysis:
        - assessment of current situation
        - strength and weaknesses
        - availability of suitable resources
        - potential users' attitude and skills
    - formative evaluation (the use of a prototype which provides a tangible form of needs analysis)
    - summative evaluation (occurs at the end of development to prove the success of the resulting resource)
    - integrative evaluation (how resources are used with other resources, focussing on users' opinion and level of use of resource)
- types of resources including tutorials (provision of complete learning experience without tutor intervention measured by accuracy and ease of use)
- technologies (when used in teaching and learning become learning technologies e.g. email and video conferencing success measured by how fit for purpose and effectively used)
- archives of reference materials (digital educational materials measured by quality of resource, accessibility, ability to match users' requirements)

- tools for authoring resources of tutorials (measured by ease of use and quality of resources produced)
- stakeholders including:
    - students (ease of use, enjoyability, usefulness for passing exams)
    - teachers (content of high quality for course)
    - developers (feasibility of and time to make changes required)
    - IT support (hardware requirements and impact on network)
    - managers (appropriateness for institutional strategy and impact on image)
    - funders (value for money)
- budget (in addition to travel, stationery etc, need to consider cost of tools for collection data).

A set of evaluation instruments to collect data are identified being:

- interviews:
    - small numbers of respondents
    - structured allow parallel data recording
    - unstructured give additional data
    - good as means of clarifying data from questionnaires
- focus groups:
    - useful for post test formative/summative assessment
    - discussion allow views to emerge
    - care in selection of members of groups
- questionnaires:
    - large numbers of respondents in less time
    - good for structured questions

  - can use open and closed questions
  - low response to be expected
- observations:
  - evaluation of users e.g. navigation
  - ease of learning of particular functions
- think alouds
  - user asked to explain thinking when engaged with system,
  - can be done in conjunction with observation
- system log data
  - software that keeps track of interaction between user and system, e.g. internet servers keep record of every page visited
- textual data
  - use of text based media, e.g. email or discussion boards,
  - where interaction can be printed off
- cost analysis
  - assessment of cost of production of resource to be evaluated
- pre and post testing
  - evaluation of impact of intervention on student learning,
  - dependant upon tools used and reliability as measures of student learning.

3.2.7 E-Learning Evaluation Measures

Dennen & Bonk (2002) summarise E-Learning evaluation measures as:

- formative evaluation
- summative evaluation
- contractual agreements with (CIPP model):

  - context
  - input
  - process
  - product evaluation
- objective orientated evaluation
- 5 levels of evaluation of:
  - self
  - course materials
  - curriculum
  - modules
  - learning transfer
- Kirkpatricks levels of evaluation:
  - cost benefit analysis,
  - time to competency,
  - time to market,
  - return on expectation,
  - accountability,
  - effectiveness,
  - impact,
  - organizational context,
  - unintended consequences (AEIOU)
  - consumer orientated evaluation.
  -

3.2.8 Processes for the evaluation of Managed Learning Environments (MLE)

Chohan (2001) examines the processes for the evaluation of Managed Learning Environments (MLE) carried out at Leeds University are summarised in order to ascertain which MLE to purchase. The term MLE is used infrequently to describe essentially a VLE. Section 2.2 identifies an MLE as one of the acronyms for a term which is used to describe the juxta position between digital technology and education. The identified processes are to determine the need for an MLE; to devise criteria to compare MLEs and to create shortlist of companies and invite them to demonstrate their envisaged solution and to write report to allow a decision to be made.

3.2.9 Objectives used in evaluation

Konrad (2003) identifies objectives to be used in evaluation specifically as:

- good course design
- a planned pedagogical approach
- staff development
- students to have
    - the discipline to meet deadlines
    - motivation for complete participation in learning activities
    - time to devote to course
    - ability to work alone and in teams
    - flexibility to deal with technological problems
    - be self starters
    - be able to learn from the printed word
    - manage their own time to set aside specific times routinely
    - be able to ask questions for clarification
    - have access to current technologies and good basic computer skills

The principles of good practice in undergraduate education are stipulated as being to:

- encourage contacts between students and faculty
- develop interaction between students
- use active learning
- give prompt feedback
- focus on time on task
- have high expectations
- respect pedagogical diversity
- be selective to ensure fitness for purpose

It is posited that learning experience and pedagogy needs to be central to the planning of the evaluation of E-Learning.

An evaluation structure reporting Kirkpatricks' four level model used for evaluation of is presented (Table 7). The shortcomings of the model are identified as a:

- lack of causal relationship between ascending levels
- lack of correlation between learner reactions and inability to measure learning or changed behaviour.

Table 7: Four Level Evaluation Model.

Level	Target	Evaluation goal
1. Reaction	Training	Initial endorsement by participants of the training measured by reaction questionnaires.
2. Learning	Learner on the course	That learning occurred because of the training, normally assessed by performance tests.
3. Behaviour	Learner on the job	That learning affected behaviour, or performance on the job assessed by observation and productivity data.
4. Results	Organization	That the training had the desired results in the organization, assessed by cost data, quality indicators and return on investment.

3.2.10 Framework for the evaluation of VLE evaluations

Dyson & Campello (2003) present a framework for the evaluation of different VLE evaluations. The framework considers:

- purpose of evaluation where the roles including:
    - formative
    - summative
    - illuminative
    - integrative and quality assurance
    - experiments as distinguished from evaluations
    - usability versus learning refers to approaches adopted by specific disciplines for example evaluation measuring students learning in educational context compared with the quality of interaction of participants as perceived by HCI/usability criteria
- methods:

  - evaluation of learning technologies is useful when carried out using experimental methods for interpreting results
  - process versus outcome, posits that the process of education is as important an evaluation measure as the outcome or product
  - qualitative versus quantitative (paradigm debate)
  - subjective versus objective, includes students perception of experience and objective measurement of learning carried out
  - expert versus user, use of usability heuristics to measure interaction against feedback from students

- measures these being usability heuristics; frequency of interactions, demonstrates the learning process; quality of interactions (frequency of contributions has shortcomings cannot differentiate between queries and comments, different topics, depth of debate) learner perceptions evaluated by clearly formulated questions including satisfaction, estimated amount of learning, tools' usefulness earning outcomes difficult to link with specific learning technology and evaluation of attainment of defined outcomes does not measure incidental learning. This framework is summarised in (Table 8)

  From the above it can be argued that the study of the evaluation of VLEs identifies different evaluative criteria including purpose of evaluation, methods and measures used and employed. The management of the development and implementation of VLEs has not been considered, the focus of evaluative frameworks is primarily pedagogy and pedagogical implications.

Table 8: Framework For Distinguishing Between Evaluation Studies Based On Their Purpose And The Methods Used.

			Purpose			
			Specificity/study design		*Discipline/focus*	
			Evaluation	Experiment	Usability	Learning
Methods	*Stages*	Process				
		Outcome				
	Type of data	Qualitative				
		Quantitative				
		Subjective				
		Objective				
	Participants	Expert				
		User				

			Measures				
			Usability heuristics	Frequency of interactions	Quality of interactions	Learner perceptions	Learning outcomes
Methods	*Stages*	Process		✓	✓	✓	
		Outcome	✓			✓	✓
	Type of data	Qualitative	✓		✓	✓	
		Quantitative		✓		✓	✓
		Subjective	✓		✓	✓	✓
		Objective		✓			✓
	Participants	Expert	✓				
		User		✓	✓	✓	✓

3.2.11 HCI and Educational Metrics as Tools for VLE Evaluation

Hinze-Hoare (2003) suggest that the problem of evaluating VLEs is that it is done:

'.. with a lack of a clear objective assessment framework'.

In order to address this problem, a set of metrics for Human Computer Interaction (HCI)/usability are derived, using the following criteria:

- familiarity
- consistency
- forward error recovery
- subsitutivity
- dialogue initiative

- task migratability
- responsiveness
- customisability

These culminate in an HCI index and an educational index called the EDI index based upon

- collaboration,
- control,
- culture,
- reflection and reinforcement.

It can be concluded that the metrics are primarily about the interaction of user and machine but do not consider the evaluation of the management of VLEs/E-Learning.

3.2.12 Criteria for Evaluating VLE (Media 2)

BU (2004)The following evaluative criteria are identified:

- ease of use of VLE (called media 2 at Bournemouth University)
- current levels of usage by staff and students
- the use and impact of specific learning resources within Media2
- the effects of teaching and learning from staff and students perspectives.

3.2.13 Framework for E-Learning

Conole (2004) presents a set of questions to cover the following areas are proposed:

- approach to E-Learning (development of representation of E-Learning domain)
- metrics (identification and development of metrics to measure E-Learning)
- user requirements (methodological elicitation of user requirements)
- evaluation (processes for monitoring, feedback and control)
- the learning process
- the learner (methods to determine degree of online learning)
- pedagogical models and practice

- capturing experience
- ideas and practice
- intended and actual use
- reuse and assessment.

3.2.14 Evaluation of E-Learning in Vocational Education Training

Kuusinen (2004) considers the evaluation of E-Learning and ICT supported learning in vocational education training (VET). (Although the focus is upon VET certain aspects of evaluation maybe relevant and possibly contribute to the development of a conceptual framework for the evaluation of the management of the development and implementation of the VLEs.).

Kuusinen (2004) describes evaluation as:

- the acquisition of information for interpretation to form an overall picture of advantages and disadvantages of the process under scrutiny.
- technocratic (fulfilling the role of an external judge)
- participatory.

Furthermore the following are included:

- evaluation research
- evaluation of E-Learning which is assessing
    - the learning
    - production
    - change process
    - resources
    - investments
    - time resources
- concepts including technological skills which is

    - know-how in networking
    - web reading skills specifically mastering the web browser
    - information retrieval
    - constructing web documents
- verbal modes of action including
    - communications
    - communication dialogue to share understanding,
    - discussion
    - interaction
- facilitator of discussion
- learning environments including:
    - contextual or real learning environment, based upon
        - learning through actions
        - activity
        - the solution of real life problems
    - open learning environment,
        - a flexible method of learning with no clear curricula
        - process centredness
        - use of different types of teaching methods
        - networking with real life environments
        - students leading learning with a focus on learners' own activity and self directiveness
- network based learning (NBL) environment central to which:

- is the use of internet technologies with repository of lectures slides and materials
- is real time information and communication
- is using technologies to support self-study,
- is development of virtual classroom including
- are contexts of NBL (with complex regulatory factors for collaborative learning) encompassing the cultural context where
  - NBL dialogue requires novel routines (not learnt in non NBL dialogue where unfinished thoughts are left unspoken) to allow learning and understanding,
  - institutional (or organizational use) refers to concepts, assumptions and modes of action which have emerged during history of the organisation and inter- individual contexts
- learning which may have different meanings according to context, i.e. NBL based upon communication using ICT, or teaching how to study learning using materials from the internet or on a network

- support in education including teacher support (where teachers may have roles of evaluator, educator and advisor guiding learners indirectly, directly with clear instructions or working in partnership with the emphasis on problem solving)
- peer support for which online discussions may be used and may require teacher participation. This is more effective if learners work in small groups in which
  - advantages include:
    - shaping discussions
    - promulgation of new ideas
    - provision of security and clarity
    - motivation of members
    - increasing perseverance

        - develop a group spirit
    - disadvantages include:
        - students having to wait
        - creeping
        - triviality
        - all members cannot concentrate on all phases of the project, differences in thought have to be accommodated and implementations have to be based upon compromise

- computer assisted support (CAS) is accomplished by the use of specially constructed software. CAS allows students to learn skills which can be assessed, and special needs learners can be provided with specialised support where learning labs with tutors are set up and where tutors become confidants of students
- community in learning resulting from participation in online discussions. The discussion may be constrained by a lack of net skills,
    - the knowledge gained may be constructed through a dialogue (opening a train of thought, formulating clear questions but with a lack of non verbal communication)
    - representing a constructivist conception of learning where social interaction creates understanding. The teacher is required to provide clear guidance as a facilitator

3.2.15 Models of E-Learning

Franklin (2004) summarizes models of E-Learning as being:

- business models (even though the article does not mention the source of these models, they are derived from Timmers business models for E-Commerce and include brokerage, advertising , infomediary , merchant , manufacturer , affiliate, community, subscription, utility)
- cost benefit model which focuses on costs of academic development and delivery, instructional designer, course director/project manager, programmer, tutor, support staff

- resource allocation model specifically computing, library, overheads , other non staff costs , student numbers , module/programme fee
- evaluation
    - types (formative, summative, illuminative, integrative, QA audit)
    - purposes (control based upon compliance (pre defined objectives, processes and outcomes achievement), surveillance which is checking compliance with interventions as necessary and patterning (use of language to raise awareness of values of project))
    - understanding (educating the educator)
    - for action (providing appropriate information to enable decision making)
- a model with the following phases managing purpose, stakeholders (including institution, department, course team, students and external authorities), techniques, meta evaluation
- models of E-Learning development by:
    - the Institute for Higher Education (IHEP) Franklin (2004) reporting upon IHEP (2000) which suggests
        - professional incentives to develop courses
        - institutional rewards for effective teaching
        - a technology plan
        - electronic security to secure validity of information and a centralised development and support for infrastructure
    - American Council for Education (ACE) Franklin (2004) reporting ACE (1997) which identifies
        - learning design to fit the context of learning
        - learner support with fully accessible modes of delivery
        - organizational commitment

        - demonstrable learning outcomes and technology to support learning
    - Franklin (2004) (reporting upon Open/Distance Learning Quality Council (ODLQC)) specifies teaching, learning and planning stages
    - Franklin (2004) (reporting upon QAA (2004) identifies
        - system design
        - academic standards
        - quality assurance in management of programme delivery
        - student development
        - support
        - communication
        - representation and assessment, encompassing review and planning as major foci

It is further concluded that:

- the iterative lifecycle for E-Learning is necessary
- evaluation, which has to lead to action, has to be within the life cycle with dependencies
- other models of life cyles are partial and limited.

It may be argued that although the proposed E-Learning life cycle model incorporates institutional strategy, it does not evaluate the management of the development and implementation of VLE and specifically not from a knowledge management (KM) perspective. It may be possible to implicate the e-learning life cycle in the evaluative framework under development.

3.2.16 Framework for evaluation of opportunities for adult learners

Walker (2004)) presents a framework for the evaluation of the degree to which adult learners are provided with opportunities for collaborative and independent student-centred learning. Three stages of evaluation are recognised as:

- precourse design which includes intent of course with

- strategic justification for online delivery,
- clear statement of objectives and learning outcomes to be communicated to adult learners in order to increase awareness and motivation
- assessment methods which should
    - be appropriate to course content,
    - reward online participation,
    - enable learners to self direct to deeper levels of understanding
- have course content which
    - is meaningful,
    - is memorable,
    - is motivational,
    - has a mix of media,
    - is coherent and consistent and
    - is at a level appropriate to students' needs;
- have an interface with the following characteristics:
    - navigable,
    - customisable,
    - aesthetic and address disability issues
- demonstrate interactivity between:
    - students
    - student and teachers
    - students and content and encourage collaboration

  - has support (existence of which is to be clearly communicated to learners and address educational, technical and personal needs
  - assessment of students needs (pre testing to determine educational and computer literacy, checking students perceptions of course outcomes and compare with teachers)

- formative evaluation identifies
  - students reactions (questionnaires, happy sheets, online diaries used as part of course content and employing usability heuristics)
  - learning (assessment easier against clearly stated learning outcomes and measures, determining the learning taking place, using diversity of assessment methods including quizzes, written work, demonstrations, confidence logs, quality/quantity of interaction and contributions of students should reflect mastery of subject and appropriateness to learning)
  - participation (encourage with clear criteria for online participation and mechanisms for monitoring and formal assessment at end)
- summative evaluation determines whether outcomes are mapped to objectives (strategic intentions to be evaluated, objectives stated at commencement of course and assessment to measure learning against objectives);
  - support (end of course questionnaires, interviews, tutorials used to evaluate educational, personal and technical provided)
  - participation (assessment of quality of contributions, online diaries, blogs, logging of use and reflection piece at end of the course)
  - transfer of behaviour (occurs with retention of knowledge when students' constructively engaged on learning and is assessed in coursework)
  - student satisfaction using end of course questionnaires, online diaries, blogs, reflection pieces and interviews)

It may be concluded that Walker (2004)) is focussed upon the evaluation of individual learning and course design but does not include the management of the development or implementation of the VLE.

3.2.17 A framework to capture knowledge creation

It has been advanced by the author that Knowledge management (KM) is a field which may yield a useful perspective in the development of a framework to evaluate the management of VLEs/E-Learning. Another Author, Piramuthu (2005), having established the juxta position between E-Learning and knowledge creation, develops a framework to capture knowledge creation and learned knowledge of students over time in an intelligent tutoring system called Intelligent Multiagent Pedagogical System (IMAPS) Framework. The framework uses the following attributes including:

- nature of student requests (per lesson plan or adhoc)
- amount of time spent per lesson
- amount uninterrupted time spent per lesson
- number of times student went back over covered material in that session
- frequency of help requests; average time spent on given ‘page’ during lesson plan.

The framework is intended to monitor the students’ progress.

3.2.18 Methodology for analysis and evaluation of VLEs

Ivanova & Smrikarov (2006) describe a methodology for analysis and evaluation of VLEs.

Figure 24 Methodology for VLE Evaluation and Analysis.

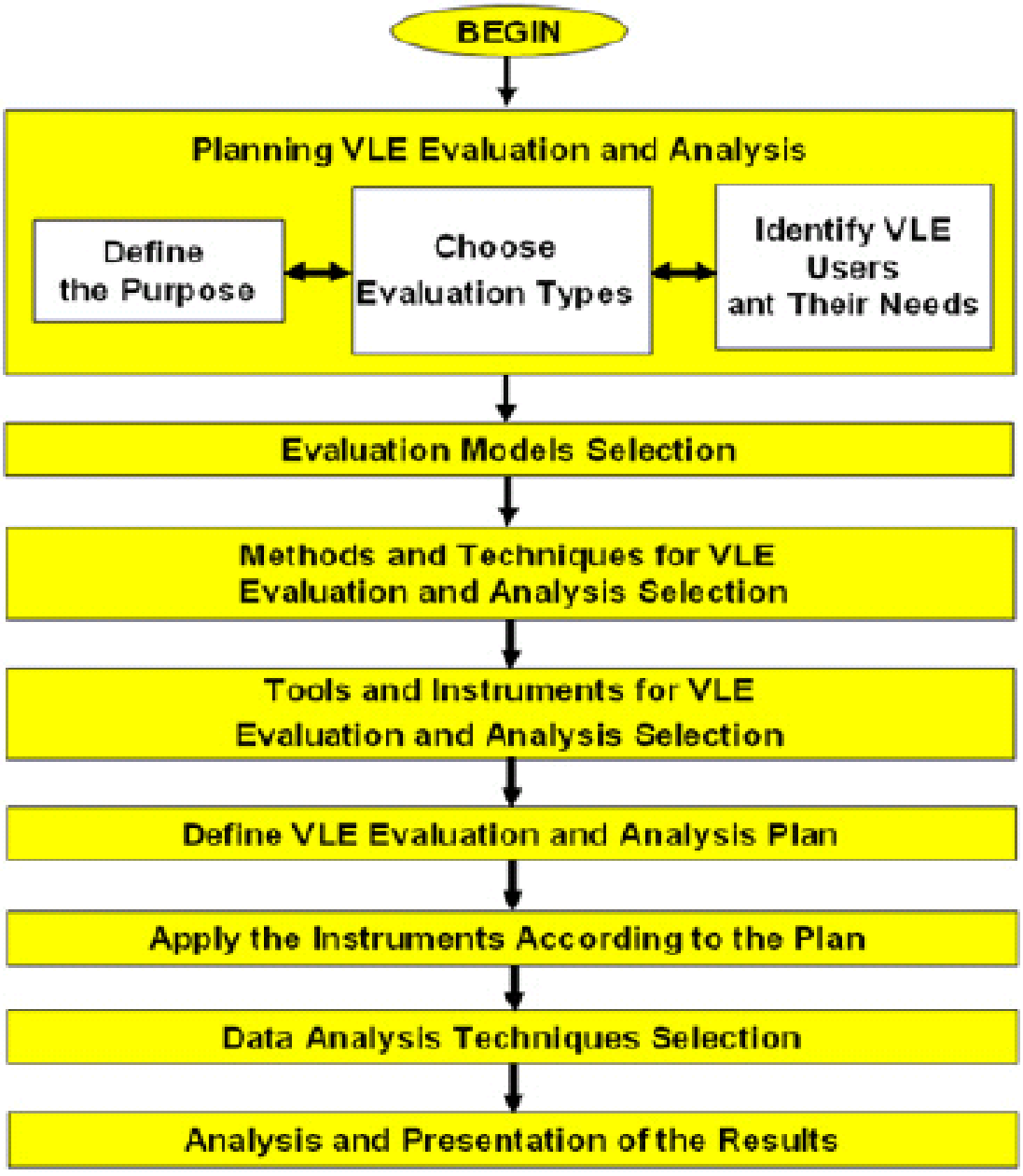


Figure **24 Error! Reference source not found.** consists of:

- planning VLE evaluation and analysis (defining the purpose with regards to needs analysis (diagnostic))
- development (formative) or monitoring (summative) purposes)
- evaluation types being:
    - needs analysis (assessment of current situation)
    - formative
    - summative and integrative
- identifying needs of users (teachers, web programmers, system administrators, managers);
- evaluation models including:
    - cybernetic model for evaluating VLEs, connoisseur model (highly subjective requiring evaluator to appreciate, perceive, criticize)
    - qualitative evaluation (providing experts judgements on basis of observations made)
    - goals free model (observes outcomes and infers intended objectives)
    - conversational framework model based upon mapping the interaction between teacher and student
    - methods and techniques including interviews, focus groups, questionnaires, textual data, system log data
    - tools and instruments for VLE evaluation and analysis (evaluation matrix which allows the selection of the most appropriate data collection methods for questions identified in previous stages
    - motivational orientation scale used to ascertain student motivation
    - anecdotal record form used to capture non statistical experiential data

- flashlight online aids in the selection of questions from a database of 500 possible questions
- web based survey tools allows focus on content without the distraction of design considerations for web based surveys
- Google analytics provides information including visitors types, visitors interaction with website, identification of navigational bottle necks, keyword usage).

An example evaluation and analysis plan includes the period of analysis, number of unique users, unique visitors tracking, new and returning visitors, visitors geo location, referring visitors source, content performance, navigational analysis, web based parameters, visitors speed connection. The results of the evaluation and analysis plan are analysed recognising the central role of quantitative and qualitative data.

The model does not consider evaluation of the management of VLEs/E-learning from a KM perspective.

3.2.19 Evaluation Criteria based upon faculty staff requirements

Birch & West (2006) identify ICT competency of academics, motivation to participate, developing competency and confidence, teething problems and support required as evaluative criteria used to evaluate a VLE (webct) at Keele university are explored.

It is concluded that VLEs are flexible and :

- continued support is required including ongoing staff development
- an increase in ICT resources is required
- significant effort is required to change staff and student behaviour and production of VLE materials is time consuming.

3.2.20 Evaluation criteria for interaction between technology and teams

Starke-Meyerring (2006) posit the following evaluation criteria for technology and team interaction :

- team and technology integration
- communication channels
- ability of students to learn about impact of technology on communication and collaboration

- students control of web space
- tracking drafts and designs of documents
- equality of access
- shared partnership identity
- share learning environment with communication behaviour of stakeholders
- privacy of students
- classroom context

3.3 Tabulated summary of existing frameworks

From the foregoing it may be argued that the literature may be divided into two main categories, those which deal with evaluation of VLE/MLE/E-Learning and those which dwell upon critical appraisal of those evaluations of VLEs. There are two types of framework:

- Those which deal primarily with VLE/E-Learning evaluation directly, these being:
  - (Ray, 2008); Britain & Liber (1999) (2004); Kearsley & Shneiderman (1999); Chohan (2001); Bournemouth University (2004); Walker (2004); Piramuthu (2005); Ivanova & Smrikarov (2006)); Birch & West (2006); Starke-Meyerring (2006)
- Those which deal with evaluation of evaluation. i.e step away from direct evaluation and look at meta evaluation. These being:
  - Oliver (2000) ; Basiel (2001); Cook (2001); Bonk & Dennen (2002) ; Hinze-Hoare (2003); (Konrad, 2003); (Dyson & Campello, 2003); (Kuusinen, 2004); (Franklin, 2004); (Conole, 2004)

3.3.1 Evaluation of VLEs/E-Learning

Several authors investigate the evaluation of VLEs/E-Learning. However a schema for classification of these extant frameworks, which accommodates the different activities does not exist. As a step forward towards the development of a framework to evaluate the management of VLEs/E-Learning, a classification schema which seeks to summarise the extant frameworks may yield useful insight. To this end the author proposes a set of classification criteria, derived from the extant frameworks these being:

- author
- title

- purpose
- theory
- context
- stakeholders
- evaluative criteria
- Evaluative activities/processes
- Management activities/processes

Table 21 classifies and summarises the extant frameworks according to the propose schema. The following sections define the parameters of the headings of the schema and how the classification has been carried out.

3.3.1.1 Author and title

The author and title are self explanatory.

3.3.1.2 Purpose

The category is self evident since without a clearly articulated purpose, it is difficult to pursue any meaningful study/research. The purpose stated in the following table is either one which is clearly stated by the author or it is arguably deduced.

3.3.1.3 Theory

Most of the frameworks considered refer to an underlying pedagogic/evaluative theory. In one sense this lends support to the contention that evaluative frameworks focus primarily upon evaluating the pedagogic efficacy of the VLE/E-Learning. The framework to be developed as the outcome of this research is to be informed by developments in the field of evaluation and therefore these criteria may influence the framework. Furthermore in some cases the authors have clearly identified a formal theory, for example Britain & Liber (1999) predicates the framework on conversation theory and viable systems theory. In other cases the researchers advance a set of underlying principles which are to be used by to support the evaluation or the development of evaluation for example Konrad (2003) stipulates the principles of good practice in undergraduate education as being to:

- encourage contacts between students and faculty;
- develop interaction between students;
- use active learning;
- give prompt feedback;

- focus on time on task;

These have been placed in the theory column because they underpin the evaluation suggested.

3.3.1.4 Context

This category has emerged as the instantiation of a particular theory for example the instantiation of conversation theory in Britain & Liber (1999) (2004)

3.3.1.5 Stakeholders (SH)

The group of people, explicitly identified in the framework either targeted by the framework or with an interest in it. For example in Britain & Liber (1999) (2004) students and teachers.

3.3.1.6 Evaluative criteria (EC)

These are the identified measures of performance for example in Starke-Meyerring (2006) team and technology, integration and communication channels are criteria to be measured. This focusses upon the 'what' of measurement. It is to be noted that not all authors have clearly identified ECs and the author has placed ECs according to the categorisation of the original researchers or by arguing that ECs could be implied or reasonably identified. Section 3.3.1.9 presents a summary listing of evaluative criteria. In the developed framework EC are to be used in the 'know what' criteria (section **Error! Reference source not found.**) in the ought' category in order to provide a comparison of evaluative criteria proposed by other frameworks.

3.3.1.7 Evaluation Processes/activities/Instruments/carried out (EP/A)

The modus operandi, how the evaluation has been carried out, items are placed in these categories in the first instance if the original researchers have categorised specific items as processes, or the author has placed them there if they can be reasonably argued to be in that category.

3.3.1.8 Management activities/processes

Some authors have identified management activities, primarily at the module and possibly programme level for example (Britain & Liber, 1999)

3.3.1.9 Listing of Evaluative Criteria

1. Effectiveness of engagement
2. collaborative skills
3. degree of addressing individual differences
4. appropriate components for different aspects of learning
5. Text, video, audio, images
6. one off or continuous process
7. resource negotiation
8. mutual rights and responsibilities of teacher/student
9. currency of negotiation
10. self-organisation
11. space or tools are available to let the learners organise themselves as a group, outside of the teacher's purview?
12. adaptation
13. coordination:
14. Monitoring
15. individualization:
16. system tools
17. module time period for presentations
18. module structure over time sequentially or hierarchically
19. facilities to organise learners,
20. types of learning activity supported by the system,
21. how well learning progresses on module,
22. degree of learner independence
23. whether the degree can be viewed at programme level
24. students' management of their own learning (learner level).
25. student centeredness,
26. facilities to assist in students organising themselves,
27. view current and completed work in modules,
28. monitor their own activities and
29. Personal Development Planning (PDP).
30. effectiveness of engagement theory with curricula, disciplines, age groups?
31. skills required for collaboration;
32. addressing of individual differences
33. evaluation methods to be used
34. most important component of engagement theory for different aspects of learning
35. best form of preparation for instructors;
36. the nature of groupware to be used
37. ability of engagement theory to be scaled up for large classes running simultaneously in different institutions
38. student location,
39. competency in English,
40. level of ICT expertise,
41. degree of VLE activity,
42. methodology for communication, feedback (reaction of students to presented content) and assessment
43. levels of learner autonomy, using
44. the ability of students to manage their own learning
45. Integration of Learning Technology
46. development of usefull resources
47. strength and weaknesses,
48. availability of suitable resources,
49. potential users' attitude and skills
50. evaluation –success of outcome
51. how fit for purpose
52. how effectively used
53. quality of resource success measured by
54. how fit for purpose
55. how effectively used
56. measured by
57. quality of resource
58. accessibility
59. ability to match users' requirements
60. accessibility
61. ability to match users' requirements
62. navigation
63. ease of learning of particular functions
64. ease of use
65. enjoyability,
66. usefulness for passing exams
67. content of high quality for course
68. feasibility of and time to make changes required
69. hardware requirements
70. Impact on network
71. appropriateness for institutional strategy
72. impact on image
73. value for money);
74. budget(in addition to travel,
75. interaction between user and system
76. textual data
77. cost of production of resource
78. impact of intervention on student learning
79. cost benefit analysis
80. time to competency
81. time to market
82. return on expectation
83. (AEIOU)

84. accountability
85. effectiveness
86. impact
87. organizational context
88. unintended consequences and consumer orientated evaluation
89. purpose of evaluation
90. quality of interaction of participants as perceived by HCI/usability criteria;
91. usability heuristics;
92. frequency of interactions,
93. quality of interactions
94. learner perceptions
95. tools'
96. usefulness;
97. learning outcomes
98. learning technologies
99. usability (HCI index)
100. familiarity
101. consistency
102. forward error recovery
103. subsitutivity,
104. dialogue
105. initiative,
106. task
107. migratability,
108. responsiveness,
109. customisability
110. EDI index
111. collaboration
112. control
113. culture
114. reflection
115. real time information and communication, using technologies to support self study, development of virtual classroom);
116. controls and drivers
117. institutional strategy and capacity
118. external collaboration/ partnerships
119. regional agenda
120. infrastructure;
121. professional bodies
122. processes
123. course design
124. course development
125. teaching
126. learning.
127. computer assisted support
128. pre course design includes
129. intent of course
130. strategic justification
131. clear statement of objectives
132. assessment methods
133. course content
134. meaningful
135. memorable
136. motivational
137. have mix of media
138. to be coherent and consistent
139. level appropriate to students' needs
140. interface
141. Navigable
142. customisable
143. aesthetic and address disability issues
144. interactivity
145. between students
146. student and teachers
147. students and content
148. encourage collaboration
149. support
150. existence of support to be clearly communicated to learners and address educational, technical and personal need
151. assessment of students
152. determining the learning taking place
153. using diversity of assessment methods
154. confidence logs
155. quality/quantity of interaction contributions
156. assessment of quality of contributions
157. student satisfaction using
158. nature of student requests (per lesson plan or adhoc)
159. amount of time spent per lesson
160. amount uninterrupted time spent per lesson
161. number of times student went back over covered material in that session;
162. frequency of help requests;
163. average time spent on given 'page' during lesson plan.
164. textual data,
165. system log data;
166. ICT competency of academics
167. motivation to participate
168. developing competency
169. confidence,
170. teething problems
171. support
172. team and technology integration
173. communication channels
174. ability of students to learn about impact of technology on communication collaboration
175. students control of web space
176. tracking drafts and designs of documents
177. equality of access
178. shared partnership identity
179. share learning environment with communication
180. behaviour of stakeholders
181. privacy of students
182. classroom context

From the foregoing literature, it is apparent that there are many papers that address VLEs, and within these there are some frameworks, but they are different in nature and scope to that proposed for development in this work.

There are many frameworks that consider the educational evaluation of VLEs. For example, a framework for the pedagogical evaluation of VLEs, but the framework does not address the managerial issues of implementation and evaluation of strategy compared with operations. It focuses on the functionality of VLEs, and, the ways in which such functionality assists (or not) in pedagogy. Other educationally-based papers address VLEs in the school sector or are USA-based.

Some papers address culture, but these are limited in scope and focus on specific aspects of VLEs. An example is of culture in sharing and creating knowledge, but this is at a course/module level rather than about sharing a strategic vision that is seen through to implementation across an organisation. Other papers address the technological aspects of VLEs, but do not consider implementation in the wider organisational and cultural sense. Another paper goes some way to engaging in the issues that contribute to the aim and objectives of this research, and the paper recognises that the technical aspects of VLEs are only as valuable as they are enabled to be within social and political constraints.

Furthermore it may also be concluded from the above that the framework development proposed in this research is about the mix of technical, social and political aspects that contribute to the successful implementation of VLE strategies in UK universities. Whilst the literature has many examples of papers that deal with VLEs and some that have frameworks of one kind or another, there appears to be nothing published that addresses the evaluation of the management of the development and implementation of VLEs in the way this proposed framework is intended.

In this chapter a review of the published literature has yielded a summary of possible issues, elements or criteria that might be instrumental in the development of a conceptual framework.

In particular a classification schema has emerged which identifies purpose, theory, context, evaluative criteria, evaluative processes, management activities. In the developed framework this schema is incorporated into the various questions.

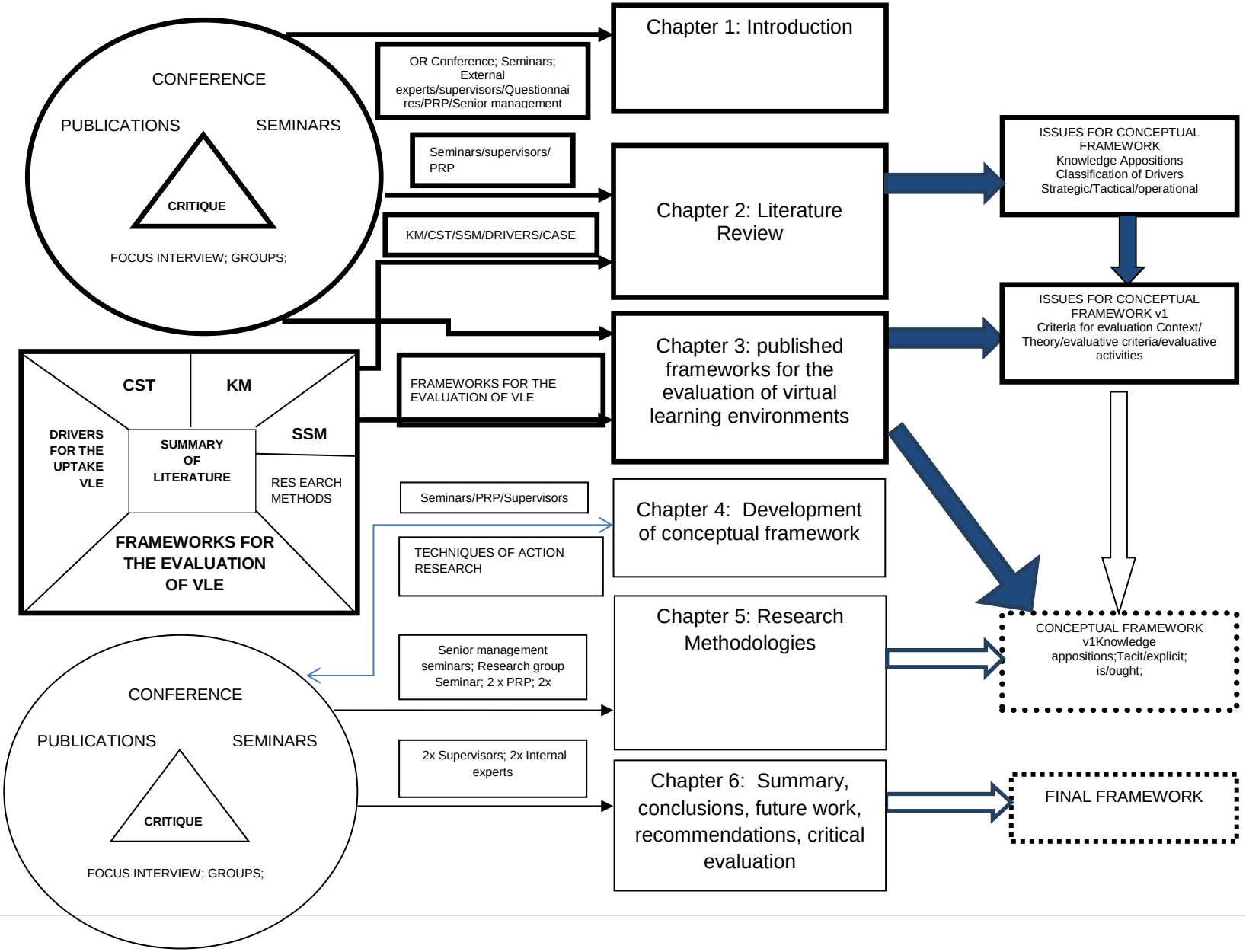
3.3.2 Position of Chapter 3 in the research trajectory

Figure 25 below maps the current state of progress along the intended research trajectory. In chapter 3 it can be seen that the literature review of Drivers, KM, CSH, SSM has been carried out and exposed to critique through :

- an OR conference,
- seminars,
- external experts,
- supervisors and a
- PRP.

Research philosophies and methodologies will be considered in the next chapter. The application of Research Action in the development of the conceptual framework is to be demonstrated along with the mechanisms used for critique and scrutiny.

Figure 25 POSITION OF CHAPTER 3 IN RESEARCH TRAJECTORY



4 DEVELOPMENT OF CONCEPTUAL FRAMEWORK

4.1 Introduction

The previous chapter considered KM, CSH and SSM. The definitions for each discipline were tendered and then a summary of the current state of knowledge for each was explored. Furthermore elements salient to the development of a conceptual framework were extracted and identified. All work leading to and development of the framework was exposed to critique in accordance with the requirements of the Action Research philosophy.

In the preceding chapters different criteria that may be used in an evaluative framework have emerged. In the following sections a conceptual framework will be derived based upon the contributions from the following:

- Fitness for purpose
- Knowledge Management (KM)
- Critical Systems Heuristics (CSH)
- Soft Systems Methodology (SSM)
- Literature on Drivers for the uptake of VLE/E-Learning
- Literature review on Evaluation of VLEs/E-Learning

4.1.1 Fitness for purpose

Fitness for purpose is a well understood paradigm in many disciplines which is accepted as a mechanism for evaluation and is applied to varying degrees of rigour in many aspects of modern life. It is an obvious starting point for any evaluative activity. It is the intention of this research to progress on the basic question of whether VLE/E-Learning is fit for purpose. The purpose of evaluative frameworks is arguably to be found embedded in the drivers for the uptake of VLEs/E-Learning. No framework seeks to evaluate these drivers in a systemic and systematic whole organizational sense. Extant evaluative frameworks focus primarily upon the pedagogic efficacy of VLE and management primarily at the module level. To this extent the fitness for purpose question is partially fulfilled, but a coherent, whole institutional/organisational framework is unavailable, specifically current frameworks do not seek to

- reconcile the drivers that have stimulated the uptake of VLEs/E-Learning,
- identify explicitly the problems encountered with management of VLE development and implementation in the wider institutional/organisational context
- consider the extant frameworks

- evaluate the management of VLEs

Therefore it may be concluded that the evidence in literature is based upon the frameworks primarily focussed on the experience of pedagogy and demonstrates a significant omission in the evaluation of the management of the development and implementation of VLEs. The case organisation CU specifically supports this gap in a single organisation.

4.2 Contribution of Knowledge Management (KM)

4.2.1 The KM perspective

In chapter 1 it was suggested that elements from KM could make a valuable contribution towards identifying possible elements in an evaluative framework. In order to progress this reasoning, the juxta position between E-Learning and KM was specified and E-Learning was defined with a knowledge management perspective as:

> *'E-learning is KM explicitly and specifically supported by a VLE.'*

4.2.2 Contribution of KM specifically to the derivation of elements for the conceptual framework

Having established the logical juxta position of E-Learning and KM, it is argued that certain concepts in KM may yield valuable elements in an evaluative framework. These concepts are:

- KM embodies the 'know -?' appositions. Lehaney, Clarke, Coakes, & Jack (2004) ask the question 'How do we know that we know?' They suggest that know-how, know-who, know-when, know-where, know-why and know-that are all manifestations of part answers to the above question.
    - Know-why, contextual knowledge allowing responsiveness commensurate with exigencies of a given situation. – Here it is argued that this could be used in an evaluative sense and the question seeks to determine knowledge which allows for why a thing is being responded to. For example in evaluation the purpose of a proposed course of action. (see below 4.5.1)
    - Know-who, finding the right person to work in an organization, managers take early cognizance of the knowledge profile of the prospective employee. In the evaluation it is to identify the stakeholders (see below 4.5.5)

- Know-when, carry out the correct process at the correct time. (see below 4.5.4**Error! Reference source not found.**)
- Know-where, the best location for commensurate knowledge, for example, silicon valley for computer technology – in an evaluation sense it is argued that wherever the VLE/E-Learning is instantiated.(See below 4.5.3)
- Know-how, deals with useful knowledge which may be explicitly captured in policies/procedures or may be tacit and be found in the heads of personnel – It is advanced here that the term 'useful' is instructive, it may be the knowledge that allows the know-why to be practicalised .i.e. the actual processes in place. (See below 4.5.5**Error! Reference source not found.**)
- Know-that, the basic sense of knowing – it is argued here that this sense of knowing is a perception which is arrived at through the application of the other appositions.
- Even though Lehaney et al (2004) do not specify know-what as an appropriate apposition, it is argued here that from the perspective of evaluation, this apposition might yield valuable insight. Therefore know-what is further added to the above appositions.

- The question that Lehaney et al (2004) seek to answer 'How do we know that we know?' the basis of the above appositions is not the question to be answered in the evaluation sense. Evaluation is based upon the paradigm of 'fitness for purpose' and therefore the question is to ask 'Is it fit for purpose'
- KM supports the People, Processes, Technology triangle.
- KM recognises two forms of knowledge these being tacit and explicit knowledge.

Tacit knowledge being that which is retained by people and explicit knowledge being that knowledge which is found codified in manuals, books and other notational repositories. The contribution of this will be illustrated in **Error! eference source not found.**.

4.3 Contribution of Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) HAS/CSH/SSM perspective

In this section the definition of a Human Activity System and the characteristics of a system according to Systems Theory are considered. It is reported that a Human Activity System (HAS) is defined as a

"...linked set of activities which constitute a purposeful whole"

In Currie, Galliards and Galliards (2009)

That according to Systems Theory a system is characterised by the following properties:

- a mechanism by which the system responded to the environment
- occupation of a position in a layered hierarchy of systems
- an emergent property, where the whole is greater than the sum of the component parts.

This is the central basis of the Soft Systems Methodology (SSM)**.** A VLE arguably fulfils the criteria for the definition of an HAS above and may be construed as a

"...linked set of activities which constitute a purposeful whole".

It is also posited that :

"E-learning is KM explicitly and specifically supported by a VLE"

It is also argued that an emergent property is that in which the resultant whole is greater than the sum of the components parts, according to a central tenet of systems theory. In this case E-Learning is proffered as the emergent property from the VLE supporting KM. This establishment of the logical and reasoned juxta position of E-Learning, KM, VLE and CSH supports the use of these perspectives in the development of an evaluative framework.

4.3.1.1 CSH – Ulrichs Boundary Analysis

Ulrich (2005) contends that Critical Systems Heuristics (CSH) are the central tenet of Critical Systems Heuristics (CSH). CSH is a concerted systematic and systemic determination of a reference system or framework of reference that is the basis upon which decisions are made about and in a system. This is carried out through a process of called Boundary Analysis and which in turn is rooted in the following concepts:

- critical reflection

- heuristics
- systems thinking
- boundary critique

Ulrich has determined that since people are involved in a system each person has an individual perception about the system. This perception leads to an individual perspective. In any human system, there are many people and therefore pursuant to Ulrichs reasoning, the author suggests that this could be represented in mathematical notation as 'n' individual perspectives. Each individual perspective represents an individual framework of reference (FR). The resultant sum of individual FRs maybe represented Σ IndFR. It maybe suggested that this Σ IndFR actually represents a Group FR and therefore Σ IndFR = GpFR. In CST, it is this Group FR that is being sought and determined. It is thought that this group FR determines the 'Rules' or Heuristics according to which decisions may be influenced.

Ulrich (2005) furthermore contends that for any real world situation where a system is considered there are four issues to be examined:

- Power – who has the power to make a decision
- Motivation –
- Knowledge
- Legitimisation

For each issue there are 3 boundary categories, a boundary category is an issue of selectivity, :

- Stakeholder
- Concern
- Difficulty

Superimposed upon the above is the consideration of Is/Ought. This seeks to draw the distinction between the reality of an issue (is) and the aspiration (ought).

This principle of Is/Ought is applied to the questions as seen in the Figure -4-36 Emergent elements of conceptual framework

4.3.1.2 CATWOE

Soft Systems Methodology (SSM) Checkland (1974) is a systems development methodology based upon the inclusion of people and their perspectives in the development of information systems. A particular, central acronym found in SSM is CATWOE. This identifies the main elements to be considered in systems development from the SSM perspective. A VLE has been argued previously to constitute an information system. Since SSM is used to develop information systems then it is argued that CATWOE may be legitimately deployed to yield a different perspective on the development of an evaluative framework.

CATWOE represents:

- C- Customer
- A-Actor
- T-Transformation
- W- Weltenshauang
- O-Owner
- E-Environment.

The components of CATWOE contributed certain aspects of the conceptual framework these being:

- C/A/O – are arguably stakeholders which can assist in identification of the know-who question
- T- is any activity which can allow information to be modified and therefore will assist in seeking the answer to the know-how question.
- Weltenshuang/Environment can be argued to be the result of the cumulative effect of the application of the other activities in CATWOE. The contribution of CATWOE to the framework is seen in

Figure 29

4.4 Contribution of Literature Review and of Drivers for the uptake of VLE/E-Learning

The following section summarises the contribution of the literature review of drivers for the uptake of VLE/E-Learning and also Evaluative criteria to the development of the Conceptual Framework

4.4.1 Contribution of Review of Drivers for the uptake of VLE/E-Learning

From chapter 1

- People, Processes and Technology ()
- Grids were constructed to:
    - rationalise strategic drivers
    - map strategic drivers to tactical/operational ones **Error! Reference source not ound.**
    - It can be seen that there are 10 Strategic Drivers divided across People, Processes and Technology.

Table 9: Rationalised Table of Strategic Drivers mapping to tactical and Operational drivers.

<table>
<tr><th colspan="3">Operational/tactical drivers mapped to strategic drivers</th></tr>
<tr><td colspan="3">People</td></tr>
<tr><td>Widening access and student diversity

• The earner-learner
• Staff handling larger groups (as consequence of widening access it is possible that staff would teach larger groups)
• young people from semi-skilled family backgrounds
• unskilled family backgrounds
• disadvantaged localities
• offering opportunities later in life to those who missed out first time round
• Improving provision for students with disabilities
• increased provision of part time courses
• Improved flexibility of delivery for on-campus students
• Facilitating the transfer of students from further education</td><td>Beliefs and expectations of stakeholders and society in general

• Obtaining a complete picture of students' perception of e learning
• Needs, interests and expectations of staff and students</td><td>Clear vision and leadership</td></tr>
<tr><td colspan="3">Processes</td></tr>
<tr><td>Employability
• increased responsiveness to the needs of business;
• increasing their contribution to the economy
• collaborating more closely with the world of work;
• Supporting local businesses and economic development
• Pursuit of new corporate clients
• Safeguarding existing corporate clients</td><td>Quality and standards (Generally enhancing the quality of teaching and learning)
• Main processes for appropriate delivery
• Resources allocation and value for money achieved
• Reducing teaching costs long-term</td><td>Globalization of learning
• collaborating more closely with other institutions
• Optimizing the distance learning offering
• Support of collaborations and partnerships
• Facilitating collaboration with other institutions
• Increasing the volume of distance learning
• Keeping up with the competition</td></tr>
<tr><td>Professionalism of teaching
• Developing innovative and exciting E-Learning materials to stimulate learning
• Staff shortages in key areas
• Increasing retention and completion</td><td colspan="2">Evaluation and review and communication of outcomes
• The identification and dissemination of good practice</td></tr>
<tr><td colspan="3">Technology</td></tr>
<tr><td colspan="3">Educationally relevant technological innovation in ICT

• Exploiting new technology and flexible delivery so as to make themselves more accessible and ensuring that maximum use is made of its facilities through longer opening hours.
• A diversity of technologies to act as a coherent whole
• Increased IT and literacy of students
• Student expectations of ICT use
• Increased IT literacy of new staff
• Expansion of E-Learning to accommodate CPD requirements</td></tr>
</table>

4.4.2 Contribution of literature review on evaluative criteria of VLE/E-Learning

From Chapter 1 it was posited that several categories emerged from the investigation in the literature on the extant evaluative frameworks of VLE/E-Learning. These were

- Purpose,
- Theory,
- Context
- Stakeholders
- Evaluation Criteria,
- Evaluation Processes/Activities.

The contribution of these categories is seen in Figure 31. In this Table, it can be seen that the various categories are mapped across to the knowledge appositions:

- Purpose – Why
- Theory – What – as identified previously preexisting frameworks are predicated upon either a pedagogic theory or an evaluative theory. The what question targets and focuses upon any underlying pedagogic theory that is explicitly or tacitly followed by an institution.
- Context –What - is similar to weltenshaung from CATWOE (seen below) – In any theory, there is a practicalised context, it is possible that Context may a category that emerges from the answers to all the other questions.
- Stakeholders – Who – the people who have or are influenced by the VLE
- Evaluation criteria – What - explicitly stated criteria defined by the organisation
- Evaluation Processes – How

4.4.3 Emerging Domains for framework – major contribution to knowledge

The author posits, as the major contribution to knowledge the following emerging domains for the framework (**Error! Reference source not found.**) derived from M, Literature on Drivers, Literature on evaluative frameworks, CST, SSM. These domains are:

- People domain included Stakeholders
    - one of the emergent criteria from literature review on evaluation of VLE/E-Learning
    - customers; actors and owners (CATWOE - see below)

- People from the People/Processes/Technology paradigm of KM

- Processes domain called ACTION domain including:
  - activities (Evaluation of VLE/E-Learning frameworks)
  - transformations (From CATWOE)
- Knowledge domain from KM (see below):

It is furthermore contended that the knowledge to action paradigm also follows the classification criteria used for categorising Drivers (Figure 26) reproduced here demonstrates a movement of abstract to practilisation.

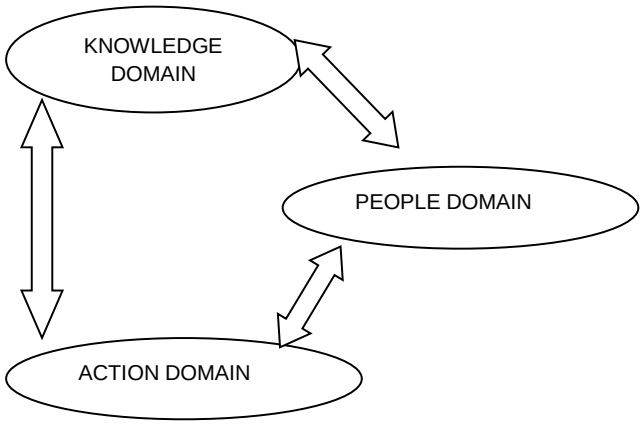
Figure 26 Classification continuum

4.4.3.1 Strategic/tactical/operational

What	How
Strategy	**Operational**
Concept/Abstract	**Practical/real/concrete**

The following Emergent domains follow this pattern of knowledge to action.

Figure 27 Emergent domains of proposed conceptual framework



It is argued here that the knowledge domain represents the know-what of the knowledge questions identified above (know-why, know-what, know-where, know-who and know-how) The Action domain focuses on the know-how.(Figure 28) low illustrates the clustering of the Know questions around the emerging domains.

- The knowledge domain maps to the know-why, know-what, know-where categories, these being
    - emergent categories from literature of purpose, theory and context are all conceptualisations seeking to place the evaluation in an intellectual context.
    - definition of E-Learning, a VLE specifically and explicitly supporting KM. The focal point being knowledge which is managed i.e identified, created, shared, acquired, retained, utilised and monitored.
- The people domain – know-who. From
    - the literature on evaluative frameworks, stakeholders, have been identified,
    - SSM, CATWOE – different types of stakeholders
- The action domain – know how.

Figure 28 KM perspective on emergent framework

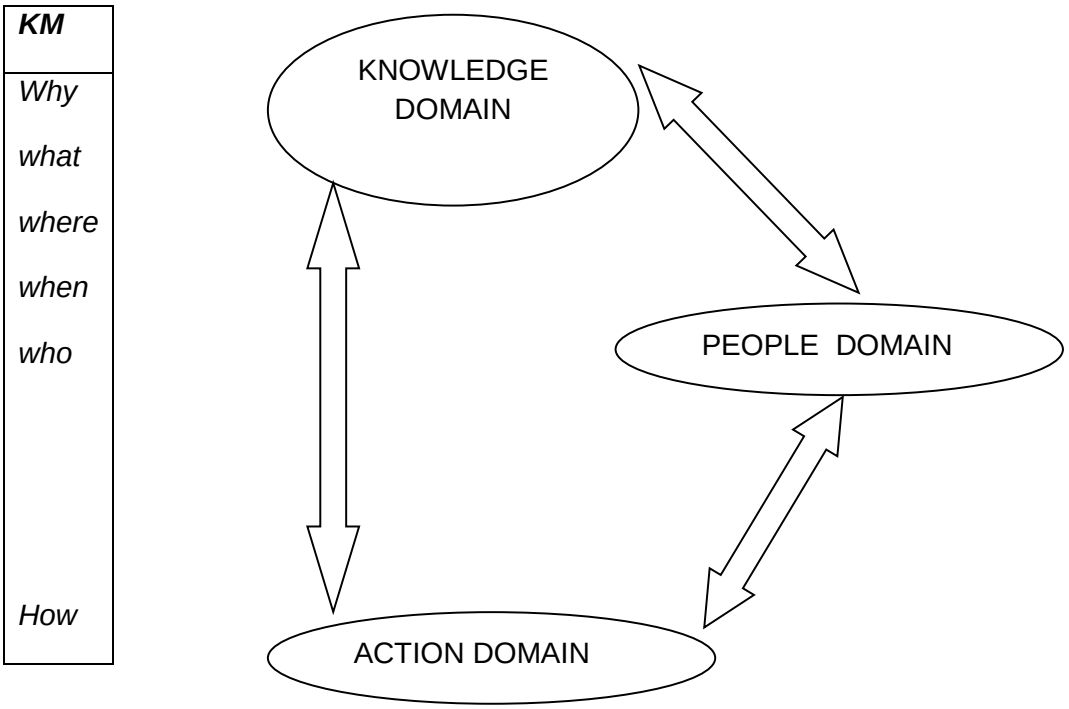


Figure 29 Emergent Domains with Literature review and SSM contributions

Emergent Domains	KM	Emergent Criteria	Sources
KNOWLEDGE DOMAIN	Why	Drivers	Literature review on drivers (4.4.1)
		Purpose:	Categories derived from literature on evaluative frameworks 4.4.2
	What	Theory Context: Evaluative Criteria	Categories from literature on evaluative frameworks 4.4.2
		worldview	CAT**W**OE
	where	Location;	
PEOPLE DOMAIN	who	Stakeholders;	Categories from literature on evaluative frameworks
		Actors; Customer; Owner	**CA**TW**O**E
ACTION DOMAIN	How	Evaluative Activities	Categories from literature on evaluative frameworks
		Transformations	CA**T**WOE

Figure 30 Emergent elements of conceptual framework v1

<table>
<tr><td>Contributions of sources----------></td><td>KM – TACIT/ EXPLICIT</td><td>KM- PEOPLE/ PROCESSES/ TECHNOLOGY</td><td colspan="2">SSM
CATWOE</td><td>LIT REVIEW DRIVERS</td><td colspan="2">LITERATURE REVIEW</td><td>ULRICHS BOUNDARY ANALYSIS IS/OUGHT</td></tr>
<tr><td>QUESTIONS</td><td rowspan="7">TACIT / EXPLICIT
Spread over all the questions</td><td></td><td></td><td rowspan="7">WELTENSCHAUNG / ENVIRONMENT</td><td></td><td colspan="2"></td><td rowspan="7">IS/ OUGHT
Asked over all of the questions</td></tr>
<tr><td>WHY</td><td></td><td>DRIVERS</td><td>PURPOSE</td><td rowspan="6">Context</td></tr>
<tr><td>WHAT</td><td>TECHNOLOGY</td><td></td><td></td><td>EVALUATIVE CRITERIA (EC)</td></tr>
<tr><td>WHERE</td><td></td><td></td><td></td><td></td></tr>
<tr><td>WHEN</td><td></td><td></td><td></td><td></td></tr>
<tr><td>WHO</td><td>PEOPLE</td><td>ACTOR/ OWNER CUSTOMER</td><td></td><td>STAKEHOLDERS</td></tr>
<tr><td>HOW</td><td>PROCESSES</td><td>TRANSFORMATION</td><td></td><td>EVALUATIVE ACTIVITIES</td></tr>
</table>

4.4.4 Categories for the framework

In response to the results of the focus group and the further natural evolution of the framework further contributions from KM can also be seen in Figure 30. The natural evolution of the framework and to further instantiate the Classification Continuum alluded to above (Figure 26) Please note that the rationale for the use of KM, SSM, and CSH have been reasoned in earlier sections of the submission.

It can be seen that from KM in addition to the 'know ' appositions the concepts of Tacit and Explicit knowledge and the People/Processes/Technology triumvirate are also mapped to the know appositions. Tacit and explicit knowledge are mapped across all of the questions. It is advanced here that tacit and explicit knowledge have been identified as generic, ubiquitous categories of knowledge which are consistent with different aspects of organisations. Therefore, for example, when considering the why question as in the drivers, there are those drivers which have been clearly enunciated by workers in the field and from which organisational drivers have materialised, however, there is recognition that individuals within the organisation may well have their own drivers. This may be understood in the wider context of organisations in general. For example when computer systems are changed or upgraded in organisations one factor which hinders an effective, efficient optimal solution is the inability to take into consideration the perspectives of the stakeholders.

It is this dilemma that drew Ulrich (1987) to consider Boundary Analysis and Checkland (1984) Soft Systems Methodology. In order to accommodate the perspectives of stakeholders, the Is/Ought paradigm of Ulrich has been encompassed in the formulation of the framework and arguably informs all the questions, therefore for example for the why question, why/'is' (see below question 1.1 in Figure -4-36) demonstrates the establishment of the reality on the ground and the 'ought' allows both an examination of the modus operandi in the literature with competitors and/or the aspirations of the organisation itself.

From the literature on evaluative frameworks, the categories which have been mapped across the questions are purpose, context, stakeholders, evaluative criteria, evaluative/management activities (see 4.4.2**Error! Reference source not found.**). Here it is to be noted that context is ike weltanschauung and environment is an understanding that emerges from the answers to all of the questions.

From SSM and Checkland & Scholes (1999) CATWOE yields Customers, Actors, Transformation, Worldview, Owner, and Environment. These are distributed across the 'Know' questions.

- Customers, Actors, Owners are all people, stakeholders and therefore the 'who' in the 'know-?' questions.
- Transformations are processes or the 'how' and constitute the Action end of the spectrum.
- Worldview is an holistic quantity, and it is argued here that it emerges a whole as a result of answering all of the other questions.
- Environment is another holistic quantity and arguably is the result of all the others.

4.4.4.1 Further Categories

In addition to the above categories as identified in: a further set of categories is added in order to further practalise the framework.

These are proposed to be:

- Questions – this is self-explanatory, these are the instantiations of questions which are based upon KM (see above). Within this the is/ought mode is sought (4.4.2: 4.4.3 :4.4.4). Referring to **Error! Reference source not found.** the 'why' / ought is spread across the hree people, processes, technology triumvirate.
- Arguably, the author suggests that the 'people' drivers can be inserted into the 'know who/ought':
    1. Know – why: seeking to determine aspirations/purpose/goal/objectives/drivers 4.5.1)
    2. Know-what: incorporating technology/environment/weltenshaung/context/evaluative criteria (4.5.2)
    3. Know –who: identification of stakeholders especially Customers/Actors/Owners comparing those from literature (4.5.5)
    4. Know – when: important chronological events, timelines, etc (4.5.4)

5. Know – where: geographical locations of VLE: relative position in layered hierarchy of systems.

6. Know – how: the action end of the spectrum of knowledge to action, focussing upon processes/activities in the development and implementation of VLE/E-Learning.

- Sources – these specifically seek to determine the tacit and explicit sources of knowledge

- Outcomes – It is reasoned that any activity conducted should have a demonstrable outcome by which it is possible to measure the degree of completion or success of a task or course of action undertaken.

4.4.4.2 Characteristics of proposed framework

It is to be noted that the framework is designed to be a tool which is:

- Diagnostic/evaluative – allowing a status of the organisation to be ascertained in the 'Is' mode

- Aspirational – in the ought mode, the framework stimulates a vision to emerge

- Iterative – there are several iterations of application of questions envisaged, as part answers to each question yield information for each, other question.

- It is not intended to be prescriptive and seeks to determine the present modus operandi of the VLE/E-Learning in an organisation and also allows for exploration for further strategic/operational development.

Figure 31 Emergent elements of conceptual framework v2

QUESTIONS				**SOURCES**		**OUTCOMES**
	ID NO	**IS**	**OUGHT**	**TACIT**	**EXPLICIT**	
WHY DRIVERS/PURPOSE	**1**	**4.5.1.1** Why/Is	**4.5.1.2** Why/Ought	**4.5.1.3** Why/Tacit	**4.5.1.4** Why/Explicit	**4.5.2.5** Outcomes
WHAT **TECHNOLOGY/EVALUATIVE CRITERIA**	**2**	4.5.2.1 What/Is	**4.5.2.2** What/Ought	**4.5.2.3** What/ Tacit Sources of knowledge	**4.5.2.4** **WHAT / EXPLICIT SOURCES OF KNOWLEDGE**	4.5.2.5 What/ Outcome
WHERE	**3**	**4.5.3.1** Where/Is : 3.2 Where/ought		**4.5.3.2** **TACIT : 3.4 EXPLICIT**		**4.5.3.3** Outcome
WHEN	**4**	**4.5.4.1/4.2 WHEN/IS AND WHEN/OUGHT**		**4.5.4.2** **WHEN TACIT/EXPLICIT SOURCES**		**4.5.4.3** **WHEN OUTCOME**
WHO; **STAKEHOLDERS**	**5**	**4.5.5.1** Who/is	**4.5.5.2** Who/ought	**4.5.5.3** Who/tacit	**4.5.5.4** Who/explicit	**4.5.5.5** Who/outcomes
HOW **PROCESSES /TRANSFORMATION EVALUATIVE ACTIVITIES**	**6**	**4.5.6.1** Know – how is	**4.5.6.2** Know – how ought	**4.5.6.3** Know – how tacit sources of knowledge	**4.5.6.4** Know – how explicit sources of knowledge	**4.5.6.5** Know – how Outcomes

4.5 Example Questions

4.5.1 Know-Why

4.5.1.1 Why/Is

Know-why, contextual knowledge allowing responsiveness commensurate with exigencies of a given situation. – Here it is argued that this could be used in an evaluative sense and the question seeks to determine knowledge which allows for why a thing is being responded to. This question seeks to determine the raison d'etre of the VLE/E-Learning i.e why is it envisaged. Organisations employing such a framework are obliged to clarify the motivation for initiating a VLE/E-Learning. Furthermore this includes the element derived from literature as 'purpose' and in asking the question the organisations own localised drivers are made explicit.

4.5.1.2 Why/Ought

The ought is the comparator with 'is'. This has two functions,

- the first being to allow the comparison with the drivers from literature (as summarised in table above) a version of competitor analysis but rooted in academic literature The table demonstrates 10 strategic drivers divided across three categories of People, Processes and technology.

- secondly to identify aspirations which have not been covered thus far.

4.5.1.3 Why/Tacit

It is understood that within Knowledge Management, tacit and explicit are forms of knowledge. Tacit knowledge is that which is not captured in explicit notation and is generally held as being in possession of individuals. It is tacit knowledge that forms a significant component of the overall intellectual capital of an organisation.

This question seeks to identify those people and processes which are not explicitly stated. For example it allows the opportunity to scrutinise actual extant processes. It has long been held in the field of systems thinking that organisations operate in a wider environment which consists of a complex interplay of factors (socio-economic, ethical, legal etc) and which is in a continual state of change. Formal explicit notations within organisations cannot reflect those changes synchronously or in perpetuity. To overcome this, tacit processes evolve in order to bridge the gap.

In terms of seeking to identify the sources of tacit knowledge of the 'why' question i.e purpose/drivers, the process by which the purpose and drivers are arrived at is being explored.

4.5.1.4 Why/Explicit

Here the formal people, processes, technology by which 'purpose' and 'drivers' are arrived at are being identified. This could identify the organisational organs e.g. Board of Governors, Senior management team, E-Learning organisational units etc.

4.5.1.5 Outcomes

A definitive measureable list of

- Drivers/purpose for the VLE
- Tacit sources of knowledge
- Explicit sources of knowledge

4.5.2 Know-What

Even though know-what is not specified as an appropriate apposition as a part of the appositions to answer the question 'How do we know that we know?', it is argued here that from the perspective of evaluation of the management of the development and implementation of VLE/E-Learning it is prudent to identify and specify 'what' exactly is being evaluated. This apposition might yield valuable insight. Therefore know-what is further added to the above appositions.

4.5.2.1 What/Is

This focuses upon what:-

- pedadogic theory (if any) upon which the VLE/E-Learning is based
- Evaluative Criteria have been identified?
- Is the Technology used to support the VLE/E-Learning
- Is the Emergent property of the VLE/E-Learning – this is an opportunity to abstract benefits where the whole effect is greater than the sum of the components parts – it may be argued that E-Learning is the emergent property i.e E-Learning takes place, this

may lead to drilling down further and asking augmentary questions as to what the definition of E-learning is within the organisation

- Weltenshaung , worldview emerges. Arguably this category emerges as a part of the the answers to the rest of the questions
- Is the environment – as for Weltenshaung

4.5.2.2 What/Ought

As for 1.3

- to allow the comparison with literature (as summarised in table above) a version of competitior analysis but rooted in academic literature i.e:
    - Examining the pedagogic theories used by others in the sector
    - Checking the list of evaluative criteria from literature
    - Review of Technology
- to identify any factors which have not been covered thus far.

4.5.2.3 What/ Tacit Sources of knowledge

As for 1.3 Identification of all people and processes which are involved.

4.5.2.4 What / Explicit sources of knowledge

As for 1.4 above Identification of all explicit people/processes/technology used for each heading identified in 2.1:

- Pedadogic theory
- Evaluative Criteria
- Technology
- Emergent property of the VLE/E-Learning
- Weltenshaung –worldview emerges
- Environment

4.5.2.5 What/ Outcome

What set of deliverables could be arrived at? The organisation is encouraged to arrive at a set of deliverables for each of the items identified in 2.2 – 2.4.

4.5.3 Know- where

Know-where, the best location for commensurate knowledge, for example, silicon valley for computer technology Lehaney et al (2004) In an evaluation sense it is argued that there are two possible perspectives to this question that are to be considered:

- Geographical location of VLE – i.e physical deployment of VLE in the institution
- Relative position of VLE in the hierarchy of organisational systems (derived from the systems theory expostulated above)

4.5.3.1 Where/Is : 3.2 Where/ought

Know-where, the best location for commensurate knowledge Lehaney et al (2004) for example, silicon valley for computer technology – in an evaluation sense it is argued that the where refers to wherever the VLE/E-Learning is instantiated within the organisation.

Where/Is is self explanatory, the question stimulates the organisation to take stock of the system both geographically and in systems terms. No framework examined thus far considers this perspective.

Where/Ought provides the opportunity for the organisation to identify possible best practice, it may stimulate the collection of data in the sector.

4.5.3.2 Tacit : 3.4 Explicit

Identification of sources of tacit and explicit knowledge

4.5.3.3 Outcome

Measurable deliverables that organisation may decide to use.

4.5.4 Know-when

Carry out the correct process at the correct time. Lehaney et al (2004)

4.5.4.1/4.2 When/Is and When/Ought

- This may yield a historical perspective focussing upon when the VLE was developed/implemented, with timeline and important milestones
- When is the evaluation to take place?

- Nothing in the literature to compare the 'when' with.

4.5.4.2 When Tacit/Explicit sources

As for 1.3/1.4: 2.3/2.4: 3.3/3.4: 4.3/4.4 i.e Identification of major players/processes in development and implementation

4.5.4.3 When Outcome

Decide how this is to be measured.

4.5.5 Know-who

Know-who, finding the right person to work in an organization. Lehaney et al (2004)

4.5.5.1 Who/is

Stakeholders including Customers, Owners, Agents in the organisation.

4.5.5.2 Who/ought

Comparison of stakeholders in literature. Any others not covered in the 'is' mode.

4.5.5.3 Who/tacit

N/A

4.5.5.4 Who/explicit

As for 1.4/2.4 – explicit sources of identification of stakeholders?

4.5.5.5 Who/outcomes

As for 1.5/2.5 – how can completion of this question be measured e.g definitive list of stakeholders, names, position, job descriptions.

4.5.6 Know- how

Know-how, deals with useful knowledge which may be explicitly captured in policies/procedures or may be tacit and be found in the heads of personnel – It is advanced here that the term 'useful' is instructive, it may be the knowledge that allows the know-why to be practicalised .i.e the actual processes in place. Lehaney et al (2004) . The concept of tacit and explicit knowledge has been spread across all the questions. It was argued earlier that tacit/explicit knowedge is embedded in each question, for example:

- Know-why – those drivers which are explicitly stated can be accessed through the relevant documents (national policy papers, sector wide publications, institutional

documents etc..). Tacit drivers may be established by questionnaires, interviews with appropriate stakeholders (those people identified in the 'know-who' questions.

4.5.6.1 Know – how is

This seeks to ascertain how the evaluation of management of VLE is carried out within the organisation. Are their evaluative activities carried out? what are they?

4.5.6.2 Know – how ought

What evaluative activities should be in place? What evaluative activities have been determined from the literature?

4.5.6.3 Know – how tacit sources of knowledge

What sources of tacit knowledge about evaluation might exist?

4.5.6.4 Know – how explicit sources of knowledge

Are there explicit notational repositories of evaluative activities. Books, manuals, electronic resources?

4.5.6.5 Know – how Outcomes

As\Above – decisions about measureable outputs from evaluation

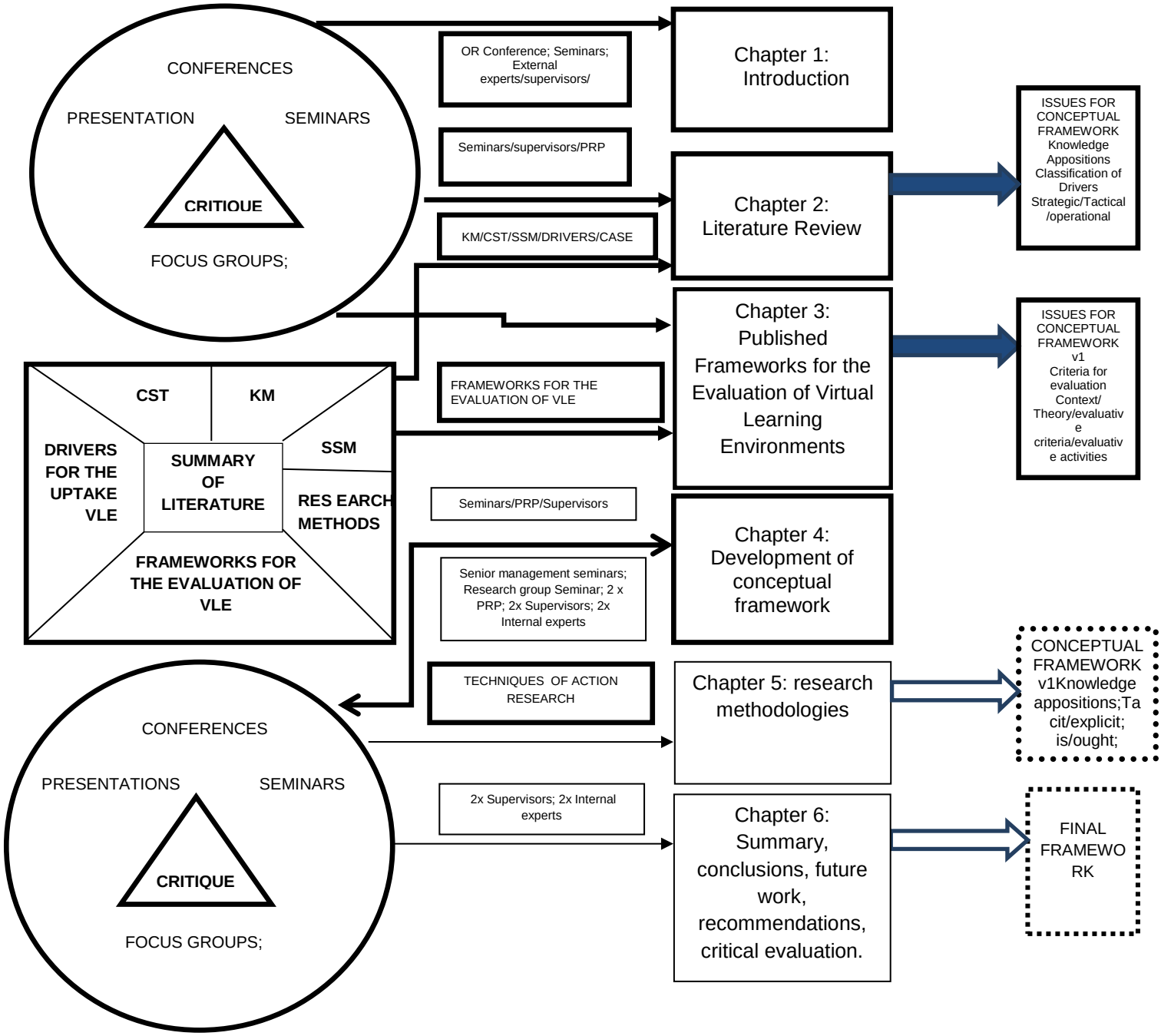
In this chapter elements from the fields identified in chapters 2/3 (KM;CSH;SSM) were specifically identified. KM contributed the know appositions; the processes/people/technology; concepts of tacit and explicit knowledge. From CSH the 'is'/'ought' juxta position was extracted. From SSM the acronym CATWOE. From the literature review on drivers for the uptake of VLEs/E-Learning (classified according to Strategic/tactical/Operational; People processes and technology);review of evaluative frameworks the concept of Purpose, Theory, context, stakeholders, evaluative criteria, evaluation processes and management activities/processes, were extracted and derived. Several artefacts chartered the pathway of the evolution of the framework Each artefact was subjected to scrutiny in adherence with Action Research .The resulting Frameworkv3 is the product of the research, the consequences of which will be discussed in the next chapter.

4.6 Position of chapter 4 in the Research Trajectory

Figure 37 illustrates the position of chapter 4 in the research trajectory. The final framework has been arrived at through iterative development as shown in Figure 1. Chapter 4 has drawn together all the previous chapters and research activities and artefacts to arrive at the proposed framework. Chapter 5 will focus upon research methodologies.

As outlined in previous chapters the research trajectory is a sequential representation of an iterative process. In chapter 4 the evolution of the final version (v2) of the framework has taken place. This process has been spread over the time elapsed in completing chapters 2 – 4. For example the first nascent ideas of a framework began to manifest in the literature review of chapter 2/3 and as such were encapsulated in the Issues for the conceptual framework. Subsequent developments have been captured and reported upon in chapter 5.

Figure 32 POSITION OF CHAPTER 4 IN RESEARCH TRAJECTORY



5 RESEARCH METHODOLOGIES

5.1 Introduction

In the last chapter, research and research design were summarised. Justification for the adoption of the Action Research paradigm was tendered. In this chapter, the major contribution to knowledge will be demonstrated. The research question was posed at the outset:

> *'What criteria can be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, operational and tactical development and implementation of VLEs/E-Learning in UK Universities?'*

This chapter will critically review different research philosophies Saunders & Tosey (2012) including research approaches, strategies, choices; time horizons; techniques and procedures. Subsequently the choice of Action Research will be will evidenced. Furthermore the instantiation of Action Research Costello (2011) is detailed.

5.2 Important terms

Research has many terms an definitions associated with it. The most commonly used terms include Research paradigm, philosophy, methodologies, methods, strategies, qualitative and quantitative, choices, time horizons, techniques and procedures. Most of these terms are used in Saunders work which represents an accepted set of definitions. However where a term is not used in the Saunders Research onion, it has been explored below.

5.3 Research purpose

What criteria can be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, operational and tactical development and implementation of VLEs/E-Learning in UK Universities?'

5.4 Research Assumption

The research is based in the HE sector in the UK. It is contended that the reality under investigation is a socially constructed reality, it is malleable, dynamic, rich, complex, where the stakeholders both affect the reality and are in turn affected by it. The act of observing

this reality will have an effect on it, therefore the researcher will impact the researched phenomenon.

5.5 Research paradigm

The term research paradigm is used extensively in the research literature. It is not found on the Saunders research onion.

A seminal work by Kuhn (1996) defines a paradigm as

"..universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners"

Further specifying:

- *what* is to be observed and scrutinized
- the kind of *questions* that are supposed to be asked and probed for answers in relation to this subject
- *how* these questions are to be structured
- *how* the results of scientific investigations should be interpreted
- *how* is an experiment to be conducted, and *what* equipment is available to conduct the experiment.

Other authors have different perceptions of the term. Foucault suggests that there are mindsets of age and paradigm is described as

"..a matrix of beliefs and perceptions"

Foucalt (1977)

The author suggests that these definitions employ key words including

- patterns,
- achievements,
- world view and
- matrix of beliefs.

It is possible to suggest that term 'belief system' may be the phrase which embodies most closely the commonalities of these definitions. Therefore for the purposes of this research the term Paradigm will represent 'belief system' as a cumulative which embodies the commonalties identified above.

5.6 Saunders Research onion

A set of concentric circles are used to illustrate (**Error! Reference source not found.**)

- research philosophies (positivism, realism, interpretivism, objectivism, subjectivism, pragmatism, functionalist, interpretive, radical humanist, radical structuralist)
- research approaches (deductive, inductive)
- research strategies (experimental, survey, case study, action research, grounded theory, ethnography, archival research)
- research choices (mono method, mixed methods, multi-method)
- time horizons (cross sectional, longitudinal)
- techniques and procedures (data collection and analysis)

5.7 Research Philosophies

The term research philosophy has many definitions and is occasionally used interchangeably with paradigms.

A definition of research philosophy Saunders & Tosey (2012) Saunders (2011)

> ***"..****Overarching term relating to the development of knowledge and the nature of that knowledge in relation to research"*

A further definition (Collins, 2010)

> *"..The term 'research philosophy' relates to the development and nature of knowledge."*

In addition to the above, Saunders (2011) suggests that the nature of the research philosophy adopted is predicated upon the nature of the problem domain and the assumptions of the nature of reality held by the researcher(s) and categorise research philosophies into :

- epistemology
- ontology

- axiology

Each of these reflects the assumptions about the nature of reality, as held by researcher(s).

Figure 33 Saunders Research Onion.

5.7.1 Epistemology

Epistemology focuses upon the acceptability of knowledge in a field of study and is characterised by three positions/philosophies:

1. Positivism
2. Realism
3. Interpretivism

Research philosophy according to Saunders (2011)

5.7.1.1 Positivism

Positivism is predicated upon the central assumption made by researchers that reality under investigation is independent of the observer where the research methodology is highly structured and replicable; is value free; leads to the generation of law like hypotheses which, on the basis of data collected, can be supported, part refuted or refuted completely.

5.7.1.2 Realism

Realism, similar to positivism, contends that reality is independent of the mind, predicates a scientific approach to the development of knowledge and is further divided into direct and critical realism.

- Direct realism posits that what one sees is what one gets; that that which is perceived through the senses is the truth and objects making up that reality exist independent of the mind.
- Critical realism further refines the contention and advances that what one experiences is sensations, images of things but not the real thing itself. This may be illustrated by considering an advertisement in which a sign might appear to be standing but is in effect laid out on the ground (i.e. televised cricket matches). It is further suggested that there are two steps in the experience, the image and the reality it represents and the mental processing that goes on. Knowledge of reality is based upon social conditioning and cannot be understood independent of the social context in which it operates is dynamic and therefore ever changing.

5.7.1.3 Interpretevism

An ever changing reality, constituted by the interactions of social actors (those involved with the situation under scrutiny, including the researcher) is the basis of Interpretevism. Social actors adopt different roles, interacting with each other and with the complex rich reality they co create. Actors then present interpretations of this reality as they perceive it.

Researchers investigate the reality and the interactions of the social roles played by social actors in the organizational setting .

5.7.2 Ontology

Ontology is concerned with the nature of reality, where epistemology dealt with the nature of truth. Ontology is further divided into objectivism, pragmatism and subjectivism.

5.7.2.1 Objectivism

Objectivism posits the existence of a social reality which exists independent of social actors. Consequentially therefore managers have specific roles with prescribed explicit duties, where a subset 'management reality' exists independent of managers.

5.7.2.2 Subjectivism

Subjectivism follows the interpretive school of thought it posits that social reality is created on the basis of the perception of social actors and their actions. A cycle of perception exists. Social actors interact with one another, in a myriad of ways, they then carry out a set of actions both individually and collectively, this results in a socially created reality. This reality is then perceived through the lens of an individual worldview and this perception fuels continuing interactions and actions which then continue to feed into an ever changing reality. Researchers in this research methodology study the reality behind the reality. examining the reasons behind the actions of individuals.

5.7.2.3 Pragmatism

Pragmatism contends that the most important factor to consider when choosing a research methodology, is the research question itself. The resultant mixed methods would be a combination of research methods which treat the research problem as a continuum where appropriate action is taken at the appropriate juncture.

5.7.3 Axiology

Axiology is based upon the assumption that every aspect of research is based upon a personal value system from the formulation of the research question, selection research methods and subsequent application to the continuing research trajectory. Saunders (2011) include Burrell & Morgan (1979) work on social theory, namely Functionalist, Interpretive, radical structuralist and radical humanist, these are mapped against subjectivism, objectivism radical change and regulation (Figure 34). It can be seen that the term paradigms is again used interchangeably with philosophy.

The matrix is based upon four questions about organisations:

1. is reality given or a product of the mind?
2. Is experiencing something the only way to understand it?
3. Can humans exercise free will or are their actions determined by their environment
4. Is understanding best achieved through the scientific method or through direct experience?

The four paradigms of the matrix are

- Functionalist Paradigm (objective-regulation) – rational explanations of human nature, rooted in positivism.
- Interpretive Paradigm (subjective-regulation) – an individual's point of view understanding a subjectively created world and underpinned by a spiritual nature.
- Radical Humanist Paradigm (subjective-radical change) – human consciousness is dominated by ideologies which create a barrier to true consciousness and true human fulfilment
- Radical Structuralist Paradigm (objective-radical change) – radical change is built into societal structures, characterised by fundamental conflicts generating change through political and economic crises.

In the case of this research and the development of the conceptual framework the nearest paradigm would be the Interpretive paradigm. The nature of reality under study is assumed to be a subjective construction and open to influence by the act of studying it.

Figure 34 Paradigms of organisational change

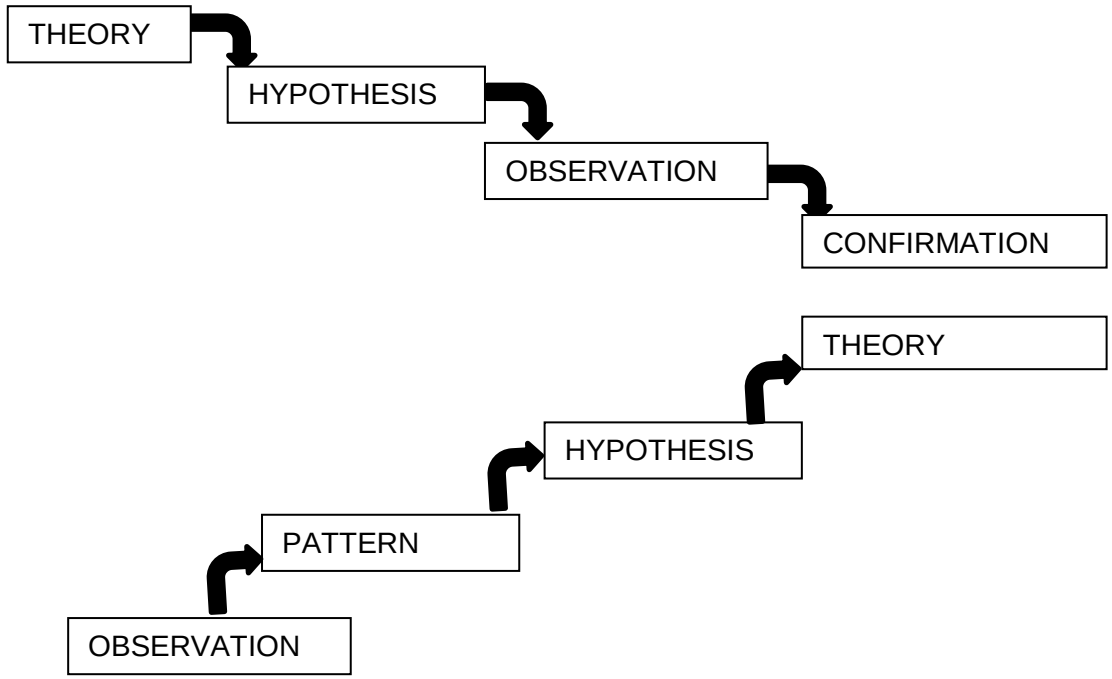
RADICAL CHANGE, CONFLICT, DOMINATION

5.8 Research Approaches

There are two approaches, the deductive and inductive. The term 'approach is by no means a universally accepted appellation given to the deductive and inductive. Gray (2009) uses the terms deductive/inductive reasoning. The deductive approach is associated with the positivistic research philosophy as outlined by Saunders (2011) Gill & Johnson (2010) suggest that a hypothesis is established by using a theory and data is collected to support or refute it.

Ridenour, Newman & Benzm (2008) suggest that the inductive approach is associated with the Interpretive Research Philosophy and allows subjective qualitative reasoning. Trochim (2006) suggests that the Inductive approach is based upon observing a phenomenon, establishing a pattern, leading to tentative hypothesis resulting in the formulation of a theory. Furthermore Trochim (2006) suggests a diagram to show the juxtaposition of the deductive vs inductive approach

Figure 35 Deductive vs inductive approach



5.9 Research strategies

According to Saunders (2011) there are several research strategies these being experimental, survey, case study, action research, grounded theory, ethnography, archival research. Some authors use these as research approaches.

5.9.1 Experiment

Is associated with natural sciences, draws causal links between variables, and involves control groups and exercise of controlling variables. Examples include medical research when testing for the efficacy of drugs.

5.9.2 Survey

A set of questions designed to elicit information from people. Marsden & Wright (2010) suggest that

> "*Surveys are systematic and standardised to collect information on individuals, households, organisations, or larger entities through questioning systematically identified samples.*"

The method consists of four core activities:

1. Sampling using representative samples of populations the observed characteristics of which provide unbiased estimates.

2. Inference: statistical inference allows generalisation of sample statistics to estimate population parameters
3. Measurement: Asking the correct questions and deploying correct strategies for writing questionnaires seeking to elicit reliable answers Glaser (1992)
4. Analysis, multivariate data analysis enable s estimation of complex statistical relationships among many variables.

5.9.3 Case study

(Oxford English Dictionary) defines a case study as:

> *"a process or record of research into the development of a particular person, group, or situation over a period of time"*

And also:

> "*..a particular instance of something used or analysed in order to illustrate a thesis or principle"*

According to Swanborn (2010) a case study is

> *"..is an appropriate way to answer broad research questions by providing a thorough understanding of how the process develops an open question, to be answered by complementary case studies."*

Therefore it can be seen that a case study is record of research, of the development of a situation, to illustrate a thesis or principle. The case study in the research at hand is the development and implementation VLE/E-Learning at CU.

5.9.4 Action research

Action research will be dealt with in greater detail later in the chapter. Suffice it to say that action research is the strategy chosen for this research.

5.9.5 Grounded Theory

Grounded Theory is based upon the work of Strauss(1987) and Glaser (1992) and is defined as a systematic research methodology involving the discovery of theory through analysis of data. Saunders uses the term research strategy whereas Strauss and Glaser use research methodology. It is an example of the inductive and deductive approach on the Research onion, as identified in Figure 35 below.

There are four stages of analysis:

1. Codes – identifying anchors that allow the key points of the data to be gathered.
2. Concepts – collections of codes of similar content allowing grouping of data
3. Categories – groupings of concepts that are used to generate a theory
4. Theory - Collection of explanations that explain the subject of research

Grounded theory is a viable alternative to Action Research as the research strategy to be deployed in the development of the conceptual framework. However the research design of this research strategy is that it is too prescriptive. Only some aspects of the stages are appropriate to the study at hand.

5.9.6 Ethnography

Ethnography is defined as :

> "..the scientific description of the customs of individual peoples and cultures"
>
> (American Ethnography Quasimonthly)

Malinowski (1922) suggests:

> "*..Ethnography has a goal, of which an Ethnographer should never lose sight. This goal is, briefly, to grasp the native's point of view, his relation to life, to realise his vision of his world. We have to study man, and we must study what concerns him most intimately, that is, the hold life has on him. In each culture, the values are slightly different; people aspire after different aims, follow different impulses, yearn after a different form of happiness. In each culture, we find different institutions in which man pursues his life-interest, different customs by which he satisfies his aspirations, different codes of law and morality which reward his virtues or punish his defections. To study the institutions, customs, and codes or to study the behaviour and mentality without the subjective desire of feeling by what these people live, of realising the substance of their happiness—is, in my opinion, to miss the greatest reward which we can hope to obtain from the study of man."*

An anthropological perspective, studying cultures through participant observation. However there is no overt understanding that the act of observation may change the observed behaviour. However, the definition aspires to live the experience of the observed.

Lévi-Strauss (1963) avers

> "..*Ethnography consists of the observation and analysis of human groups considered as individual entities (the groups are often selected, for practical and theoretical reasons unrelated to the nature of the research involved, from those societies that differ most from our own). Ethnography thus aims at recording as accurately as possible the perspective modes of life of various groups."*

Another anthropological perspective, which focuses upon observing different cultures.

Hobbs (2006) suggests

> *"..A research method located in the practice of both sociologists and anthropologists, and which should be regarded as the product of a cocktail of methodologies that share the assumption that personal engagement with the subject is the key to understanding a particular culture or social setting. Participant observation is the most common component of this cocktail, but interviews, conversational and discourse analysis, documentary analysis, film and photography, life histories all have their place in the ethnographer's repertoire. Description resides at the core of ethnography, and however that description is constructed it is the intense meaning of social life from the everyday perspective of groups members that is sought."*

A wider remit than the previous definitions with the inclusion of a social setting. However ethnography does not accommodate the bias of the observer with the same embedded systemic and systematic fashion as Action research.

5.9.7 Archival research

Is primary research seeking out evidence from original records which may be in archive repositiories or in the custody of organizations. Different from secondary research which is conducted in libraries or online and other primary research such as empirical investigation as fieldwork or experiment.

5.10 Research Choices and Techniques

These occupy two polarities those of Quantitative and Qualitative Methods.

5.10.1 Quantitative research

Quantitative research is the result of collecting numerical data to explain a particular phenomenon and is rooted in the epistemological philosophies, with the underlying assumption that reality under consideration is independent of the observer (e.g. Positivist).

5.10.2 Qualitative research

Qualitative research is an umbrella term encompassing a wide range of methods, such as interviews, case studies, ethnographic research and discourse analysis. This is predicated upon the axiological viewpoint, where the underlying reality may be changed by the perceivers. Can be also thought of as Subjective open to personal interpretation.

Saunders suggests the existence of another layer of the onion, namely 'Choices'. These include

- Mono method
- Mixed methods
- Multimethod

The fundamental question that researchers are faced with, according to Saunders (2011) is whether to use quantitative or qualitative research method or a mixture of the two. If a single quantitative, mono method, data collection method is used with the appropriate associated analysis (e.g. a questionnaire with statistical analysis) or a single qualitative this results in mono method design (e.g. in depth interviews, analysed as narratives). Alternatively multimethod quantitative design where more than one technique can be used (e.g a questionnaire and structured observation) or multimethod qualitative design (e.g in depth interviews and diary accounts).

Mixed methods combines qualitative and quantitative data collection techniques and analysis procedures (e.g. begin with qualitative data collection and analysis such as series of focus groups to help determine the breadth of possible factors) and follow with quantitative data collection and analysis such as determine the relative frequencies of the factors determined in qualitative technique. This is a simple mixed method design. A more complex mixed method design might be use of quantitative analysis technique to analyze qualitative data quantitatively e.g. comparing statistically the frequency of occurrence of different concepts in in depth interview transcripts.

5.11 Time Horizons

Two types of time horizon are identified, the selection of which is predicated upon whether the research is undertaken to answer a question at a particular time a 'snapshot' which is called a cross sectional or a study over a period of time is called a longitudinal time horizon. The study for this research is cross sectional and even though has taken place over a period of a number of years it represents 'snapshot' in time for the development of the conceptual framework

5.12 Research methods

5.12.1 Applied research

In following the layers of the Research Onion the research applied to the research trajectory is outlined as follows.

Table 10: Selection of Appropriate Application of research methods

Layer of onion	Paradigm/Belief System	Possible choices	Chosen
Philosophy	Epistemology: acceptability of knowledge in a field of study	1. Positivism: reality under investigation is independent of the observer where the research methodology is highly structured and replicable; is value free; leads to the generation of law like hypotheses which, on the basis of data collected, can be supported, part refuted or refuted completely.	Reality under consideration is not perceived as being independent of the observer
		2. Realism: Reality is independent of the mind,	As for choice '1'
		3. Interpretivism: An ever changing reality, constituted by the interactions of social actors	Chosen, the underlying reality is assumed to be changeable and the act of observation can change the observed behaviour.
	Ontology: nature of reality	4. Objectivism: social reality which exists independent of social actors	As for choice '1'
		5. Subjectivism: follows the interpretive school of thought it posits that social reality is created on the basis of the perception of social actors and their actions	Similar to Interpretivism, but focuses upon the perceptions of social actors and their actions, has merit and the research could be construed as subjectivist, the idea of act of observation changing the observed reality falls within this remit.
		6. Pragmatism: most important factor to consider when choosing a research methodology, is the research question itself	Has some merit in the research conducted and maybe argued to be provide a perspective on the selection of action research.
	Axiology: every aspect of research is based upon a personal value system from the formulation of the research question, selection research methods and subsequent	7. Functionalist: rational explanations of human nature, rooted in positivism.	As for choice '1'
		8. Interpretive: an individuals point of view understanding a subjectively created world and underpinned by a spiritual nature.	The reality under study may fall within this purview, however the underpinning spirituality of the social actors is not considered in dependant of the perceptions of the person.
		9. radical humanist: human consciousness is dominated by	N/A – the study underway is not considering the

	application to the continuing research trajectory	ideologies which create a barrier to true consciousness and true human fulfilment	nature of human consciousness, it is focussed upon the juxta position of people and a socially created reality which is malleable the nature of which will change by the act of observing.
		10. Radical structuralist: Radical change is built into societal structures, characterised by fundamental conflicts generating change through political and economic crises.	Study is studying the nature of change, simply accommodating it in the course of the study by the application of Action Research.
Research approaches:		11. Deductive: A hypothesis is established by using a theory and data is collected to support or refute it.	Not used in this research because action research lends itself to some aspects the inductive method.
		12. Inductive: observing a phenomenon, establishing a pattern resulting in the formulation of a theory namely that the fields of KM/SSM/CSH are appropriate fields to draw from in order to construct an evaluative framework.	**This approach used for research in several areas. In** • **the identification of Drivers for uptake of VLEs/E-Learning, classifying them into strategic, tactical operational categories.** • **Identification of evaluative criteria according to people, processes technology** • **Identification of salient elements from the contributory fields of KM, SSM and CST.**
Research strategies:		13. Experimental: Is associated with natural sciences, draws causal links between variables, involves control groups and exercise of controlling variables	N/A – the field under study is not a 'natural science' the.
		14. Survey: Is associated with natural sciences, draws causal links between variables, involves control groups and exercise of controlling variables	Used questionnaires to support the need to develop an evaluative framework.
		15. Case study: record of research, of the development of a situation, to illustrate a thesis or principle.	Research on the uptake of VLE/E-Learning in CU
		16. Action research: Based upon the axiological	**This is the research strategy chosen for the study.**

		philosophy and accommodates the predicted change in a socially constructed reality created by the actors involved. (5.12.2)	**Following the Plan, Act, Observe, Reflect iteration (see later for details)**
		17. Grounded theory: The discovery of theory through analysis of data(5.9.5)	Elements of this theory have been deployed, but it is too prescriptive for the development of conceptual framework.
		18. Ethnography: ..*the practice of both sociologists and anthropologists, and which should be regarded as the product of a cocktail of methodologies that share the assumption that personal engagement with the subject is the key to understanding a particular culture or social setting. (5.9.6)*	N/A – the study under consideration is a familiar reality. The author works in the HE culture and has great deal of the tacit understanding that ethnography generally tries to uncover. Furthermore the application of Action research accommodates personal engagement .
		19. Archival research: Is primary research seeking out evidence from original records which may be in archive repositiories or in the custody of organizations. (5.9.7)	Studied university documents
Research choices		20. mono method, mixed methods, multi-method (5.10)	Use of Mixed method. Quantitative Questionnaire with qualitative evaluation. (archival; survey; case study and AR)
Time horizons		21. (cross sectional, l) (5.11)	
Techniques and procedures (data collection and analysis)		22. Quantitative/Qualitative.	Survey (Qualitative questions, quantitative data analysis) ; Seminars;; Expert panels: Conferences

Referring to Table 10 the yellow highlighting identifies choices made In choosing the research philosophy, approach, strategy,choices; time horizons and Techniques and procedures (data collection and analysis). The author views research methodologies place upon a continuum of reality. At the one end Reality is perceived as being an Independent, absolute entity, capable of being discovered, by the application of the scientific method. This is a Modernist perspective and in the Saunders (2006) onion is the basis of the positivist philosophy; deductive approach; experimental strategy.

5.12.2 Action Research

An extension of the axiological philosophy is action research. Costello (2011) presents a comprehensive treatment of the subject, answering the question 'what is Action Research?', Costello cites various authors (including but not limited to Frost (2002); GTCW (2002b) ; Bassey (1998)) including :

> *" Action research is a process of systematic reflection, enquiry and action carried out by individuals about their own professional practices "*

Costello (2011) reporting (Frost, 2002)

> *"Action research is a term used to describe professionals studying their own practice in order to improve it"*

Costello (2011) reporting (GTCW, 2002a)

> *"Educational action research is an enquiry which is carried out in order to understand, to evaluate and then to change, in order to improve some educational practice"*

Costello (2011) reporting (Bassey, 1998)

> *"Action research combines a substantive act with a research procedure; it is action disciplined by enquiry, a personal attempt at understanding while engaged in a process of improvement and reform*

Costello (2011) reporting (Hopkins, 2008)

> *"Action research . . . is applied research, carried out by practitioners who have them- selves identified a need for change or improvement"*

Costello (2011) reporting (Bell, 2005)

> *"Action research is a flexible spiral process which allows action (change, improvement) and research (understanding, knowledge) to be achieved at the same time* "

Costello (2011) reporting Dick (2002)

> *Action research is . . . usually described as cyclic, with action and critical reflection tak- ing place in turn. The reflection is used to review the previous action and plan the next one*

Costello (2011) reporting Dick (1997)

> *"[Action research] is an approach or an umbrella term, which . . . has proved to be attractive to educators . . . because of its emphasis on practice and problem-solving over a particular period of time"*

Costello (2011) reporting Burgess, Sieminski, & Arthur (2006)

"Action research] is both a sequence of events and an approach to problem solving"

Costello (2011) reporting Coghlan & Brannick (2005)

Action research is intended to combine a strong and rigorous research activity with a respect for participants knowledge and understanding. It therefore brings together theory and practical knowledge, to test each other with the purpose of developing practice

O'Brien (1998) tenders a another definition

> *"Action research...aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration of researcher and client, and thus it stresses the importance of co-learning as a primary aspect of the research process."*

The author concurs with the Costello conclusion that there are a diverse range of definitions and furthermore supports the following derived from those above stated definitions:

1. *"'Action research is referred to variously as a term, process, enquiry, approach, umbrella term, sequence of events, flexible spiral process, activity, and as cyclic.*
2. *It has a practice-oriented, problem solving emphasis.*
3. *It is carried out by individuals, professionals, practitioners and educators. It involves being respectful of participants knowledge and understanding.*
4. *It brings together theory and practical knowledge.*
5. *It involves rigorous applied research, systematic, critical reflection and action.*

6. *It aims to improve educational practice.*
7. *Action is undertaken to understand, evaluate and change.*
8. *Research involves gathering and interpreting (or analysing) data, often on an aspect of teaching and learning.*
9. *Critical reflection involves reviewing actions undertaken and planning future actions."*

Costello (2011) advances the above basic model for Action Research. Other authors have extended and refined this process. The author has employed this basic model of action research in the research design.

O'Brien (1998) presents an excellent overview of Action Research in which he defines AR; explores the AR process; outlines the underlying principles of AR; places it in a research paradigm; maps out history of AR and considers tools used in AR ; identifies the role of the action researcher and then presents three case studies.

In addition to the definition, quoted above, O'Brien (1998) also tenders the Action Research process as Plan, Action, Observation, Reflection.

The author has adopted this basic approach in the research design pursued in this research and avers that it may be argued that the researcher is both participant and observer and that the act of researching a phenomenon influences it.

5.13 Research methodology applied

In Figure 1, a research design was presented, in this section the action research paradigm as instantiated in this research is discussed. The following aspects of the instantiation of AR are detailed specifically the:

- rationale for its adoption (Why AR?)
- stakeholders (Who was involved?)
- the Instantiation (How AR?)
- juxta position to bias (How bias was accommodated)
- validation of the both the process of research undertaken and the results of the research

5.13.1 Why AR?

The research is based in the HE sector in the UK. It is contended that the reality under investigation is a socially constructed reality, it is malleable, dynamic, rich, complex, where the stakeholders both affect the reality and are in turn affected by it. The act of observing this reality will have an effect on it, therefore the researcher will impact the researched phenomenon.

5.13.2 Stakeholders

The Stakeholders of the VLE/E-Learning include:

- Board of Governors (who have the executive power to set strategic vision for VLE/E-Learning
- Senior management Team (who instantiate the management of the implementation of the VLE/E-Learning)
- Middle management (Heads of departments)
- Academic and support staff
- Students

5.13.3 How AR? The application AR

In order to apply the action research strategy, action research requires a continuous process of critique and follows the basic action research cycle:

- Plan
- Act
- Observe
- Reflect

These steps follow an iterative cycle. In the research design tendered in Figure 1, the four components to the research iterate with summary of literature and are subject to critique. This critique is carried out by as many of the stakeholders as possible. This scrutiny has been embedded in the process of the research. There are two processes which have been subjected to this critique:

- The addressing of the research question
- The pursuance of the PhD process

The resultant product is represented by the outcomes column, which in iteration one yield issues for the conceptual framework (CF) , in the second iteration yields CFv1, in the third iteration CFv2 and then finally the Final CF.

5.13.4 Action Research applied to Addressing the research question

Figure 1 research design summarises the various artefacts of the research trajectory and the scrutiny to which they were exposed. In following the Research Action cycle outlined above (Plan, Act, Observe, Reflect) each stage of research/chapter has been subjected to scrutiny according to the action research paradigm as outlined in the mapping at the end of each chapter:

- Chapter 1 - Figure 2

- Chapter 2 - Figure 21
- Chapter 3 - Figure 25
- Chapter 4 - Figure 32
- Chapter 5 - Figure 37
- Chapter 6 - Figure 38

5.13.4.1 Mechanism of scrutiny applied to support Action Research (accommodating bias)

At every stage of the research design one or more of the following techniques of exposure have been used:

- Expert knowledge –
    - Supervisory Team –The process of the PhD has undergone certain radical changes in that
        - the original Director of Studies (DoS)moved onto pastures anew and was replaced by a new DoS
        - The second supervisor was Dean of Faculty of Engineering has remained in post and has lent a measure of stability and is now the Deputy Vice Chancellor of the University.
    - External experts –
        - Visiting professor from Queensland University
        - External industry expert
    - Internal :
        - 6 Senior lecturers
        - Reader of KM
        - Professors of Engineering (x3)
        -
- Seminars:
    - Senior Management Team at CU
    - Multidisciplinary teams
    - Research Symposia
    - Peers groups
- Version controlled – the research has been made available to the above range of experts regularly and comments have been documented and responded to.

This has quality assured the nature of research and triangulation has been embedded in the process of the research and of the PhD writing up. Table 11 summarises the Action Research applied in chronological order over the duration of the research. All issues raised in the various mechanisms of scrutiny provided are cross referenced to either sections of the dissertation or tables/figures where the subject matter has been dealt with in detail. In two cases seminal and important meetings (focus group for validation and critical

scrutiny of Questionnaires; Exposure of Version 3 of framework to a select group of Managers and experts) the proceedings have been reported in this chapter.

Table 11 Summary of Action Research applied to research conducted

ID	Artefact submitted for critical appraisal/scrutiny	Type of Submission[i]	Name of Version[ii]	date	Who involved in Scrutiny/Critique[iii]	Feedback/Questions and Changes Made[iv]
1.	Presentation	Sem (peer research group)	FA_PresMar28	28.03.07	Original DoS; 3 Senior Lecturers	Q: Why develop a framework? (1.3) Q: Why a KM perspective? (2.3.1.1)
2.	Presentation	Pre OR Conference	FA_Pressept5_v2-.ppt	3.09.07	Visiting Prof DoS 3 Senior Lecturers	Visiting prof : Aim for Saturation in literature review : DoS: What is the commonality that will draw the KM:CST:SSM in? (2.2.2;2.4; 2.5.1)
3.	Conference paper		abstractORconf.doc			
4.	Presentation	Focus Group	Questionnaires	1.10.2007	Visiting Professor; First DoS Second Supervisor (Deputy VC CU): External Industry Expert 2 Senior Lecturers	First DoS: Why do you want to use this questionnaire? MN: Why the different sections in the questionnaire? External Industry Expert: : Why are you simply determining the perceptual differences between the management/staff and students (users). There are many possible stakeholders for example the Board of Governors; Senior management team and others. FIRST DoS: Why not non experts? A random sample? Visiting Professor: If you are looking for a simple separation of 'Ought' and 'is' about various aspects of VLEs/E-Learning, then the degrees of granularities of 'Vital'; 'Important';'Useful'; 'irrelevant' might be too detailed. Why not accumulate into 'Vital'; 'Important';'Useful' into one category and 'irrelevant'. (5.13.5.2)
5.	Presentation	OR Conference	FA_Presoct107.ppt	1.11.07	OR conference attendees Edinburgh	1. Why look at VLE's: **(2.3.1.1)** 2. What value will the framework have? **(4.4.4.2)** 3. Who is the framework going to be aimed at? **(4.4.4.2)**
6.	Dissertation		FAJun08Ch1_3v4.doc(Jul 08)	Jul 08	Item to changes on vs1_3v4Second Supervisor/Original DoS	Table 24
7.	Presentation	Sem	FA_Pressept5_v2	15.09.2008	Progress meeting	Table 23

i. Artefact that was submitted to be exposed for critical appraisal usually presentation (Pres); Report (Rep);Dissertation (D); Briefing
ii. Various version numbering conventions were adopted. Finally FA_Yr_month_v e.g FA_apr13v10.
iii. This represents the method by which the work has been critiqued. Techniques include :
    - One person critiquing work (generally on submission of written work to supervisors or other researchers;
    - presentation to group of people
    - seminars (Sem)
    - focus group (focGrp)
    - PRP (PhD review panel - a set of reviews which were undertaken when transfer from the old PhD process at CU to New process was carried out.)
    - conferences (Conf)
    - paper publication
iv. Cross references the part of the dissertation where the issues/questions raised have been addressed

5.13.5 Questionnaires - E-Learning questionnaires

The Is/Ought paradigm highlights the differing perspectives of respondents within the organization primariy focusing upon 'Ought' being the stated or avowed intent of the organization and 'is' being the status quo as perceived by various respondents.

5.13.5.1 *Selection of Respondents*

The stakeholders that constitute a potential respondents for the questionnaire:

- Board of Governors
- Vice Chancellor
- Senior management team – Pro - Vice chancellors and Deans of Faculty
- Middle management : Associate Deans ; Heads of Department (HoD); Associate Heads of Department
- Teaching/ Research (Senior Lecturers/Lecturers; Teaching Assistants)
- Students

5.13.5.2 Focus Group

The questionnaires were originally designed to test for the readiness of an organisation for the uptake of Information Technology (IT). The questionnaires as used for IT were modified to VLEs/ E-Learning. This questionnaire was presented to a focus group consisting of:

- First DoS – Professor of Knowledge management and Head of Department of KM
- Visiting Professor (MN)– Visiting Professor, based in Australian University of Queensland
- Second Supervisor (Deputy VC CU) – Professor of Engineering; Dean of Faculty of Engineering and Computing (EC)
- Director of HR in industry: External Industry Expert (EIE)
- Senior Lecturer (SL), Phd Researcher
- Senior Lecturer (SL), Phd Researcher
- Senior Lecturer (SL), Phd Researcher

The meeting took place upon 1/10/2007. (see Appendix A)

5.13.5.3 Administration of Questionnaires

The questionnaire (Appendix B) was instantiated by the author for VLE/E-Learning and was administered to the Vice Chancellor of CU along with members of the senior management team (dean of faculty, head of departments), staff and a group of postgraduate students. The intention of the questionnaire was to provide a heuristic analysis which showed the

difference in the perception of Senior /Operational Managers and students at the commencement of the study.

The questionnaire is divided into eleven sections **()**. Each section examines various perspectives of stakeholders with regards to the juxta position of the organization with VLEs/E-Learning. For each section, several questions are asked. For each question there are two categories of answers. These being:

1 Importance to Your Organization

1.1 Vital - critical to the success of the organization's overall business strategy

1.2 Important – major contribution to the organization's overall business strategy

1.3 Useful – some benefits expected, but probably to one part of the organization

1.4 Irrelevant – not important

2 Reality of Current Ethos and Practice

2.1 True – existing ethos and practice matches or exceeds the statement

2.2 Largely True – some practices may exist, and there is a feeling of support

2.3 Largely Untrue – few practices may exist, and support is very limited

2.4 Untrue – has not been addressed seriously

The intention of the questionnaires was to draw the distinction between perceived importance to the organization (the ought perspective) and the perceived reality of current ethos and practice ('Is') perspective. To this end, the responses to Category 1 Importance to Your Organization were accumulated (i.e. 1.1 – 1.3). The author reflects the feedback from the focus group of 1.10.2007 (reported above) and argues that Vital/Important and useful are all manifestations of 'ought' as perceived by the stakeholders. They represent the aspiration of individuals to a level of granularity to which level of sophistication unnecessary to the needs of the study. Similarly 2.1 and 2.2 have been accumulated and 2.3/2.4.

This now profiles students and staff's perceptions into four categories:

1 'Ought' - Importance to your organisation - Vital/important/Useful

2 Irrelevant –

3 'Is' – True

4 'Is' – Untrue

It is to be noted that there are 60 questions in total for each questionnaire and for each question two responses are expected one for ' Importance to the organisation' and one for 'Reality of current ethos and practice'. Therefore each questionnaire would expect 120

responses per respondent. Where the total number of each respondent falls short of the expected 120 responses, the respondent has not answered all of the questions.

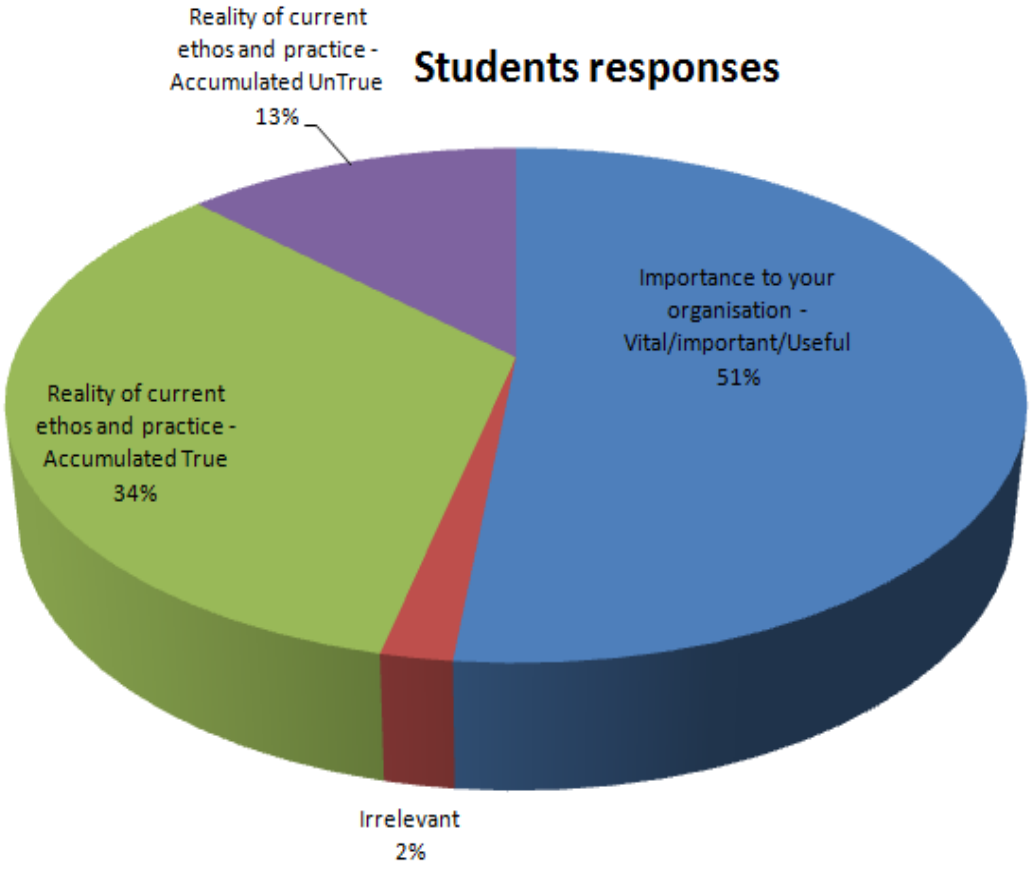
Table 22 shows the results of responses to the questionnaires: Figure 36 illustrates the results for:

- Students perceptions
- Senior/Operational management
- Totals for all

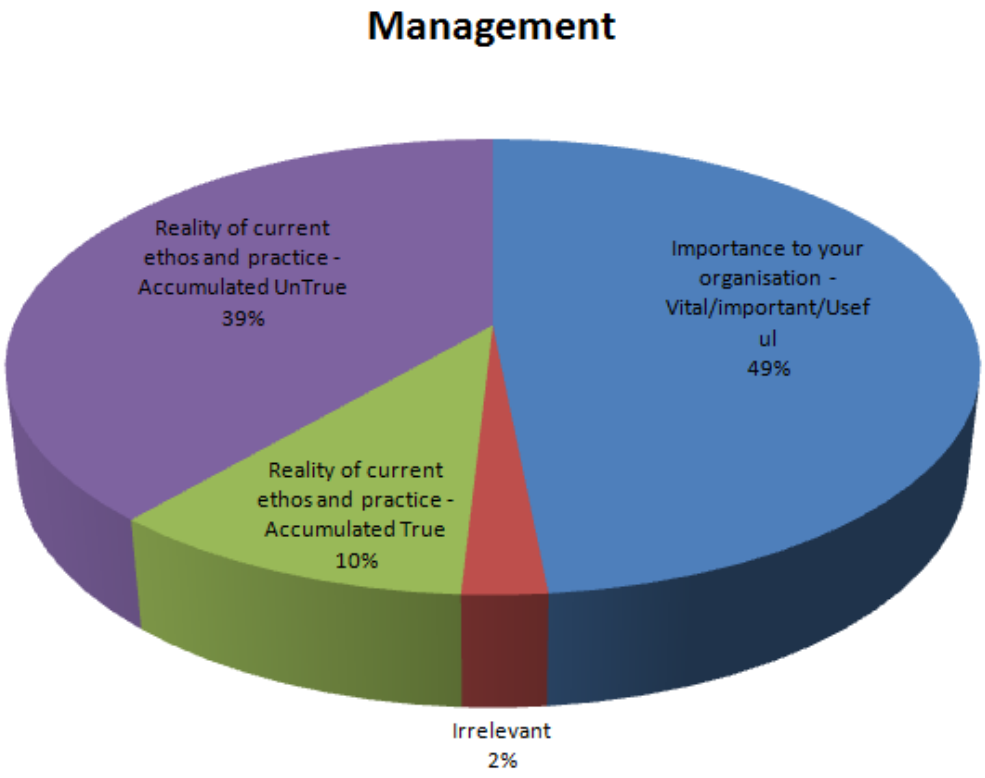
5.13.5.4 Data Analysis

The following pie charts have been generated using the dataset in Table 22

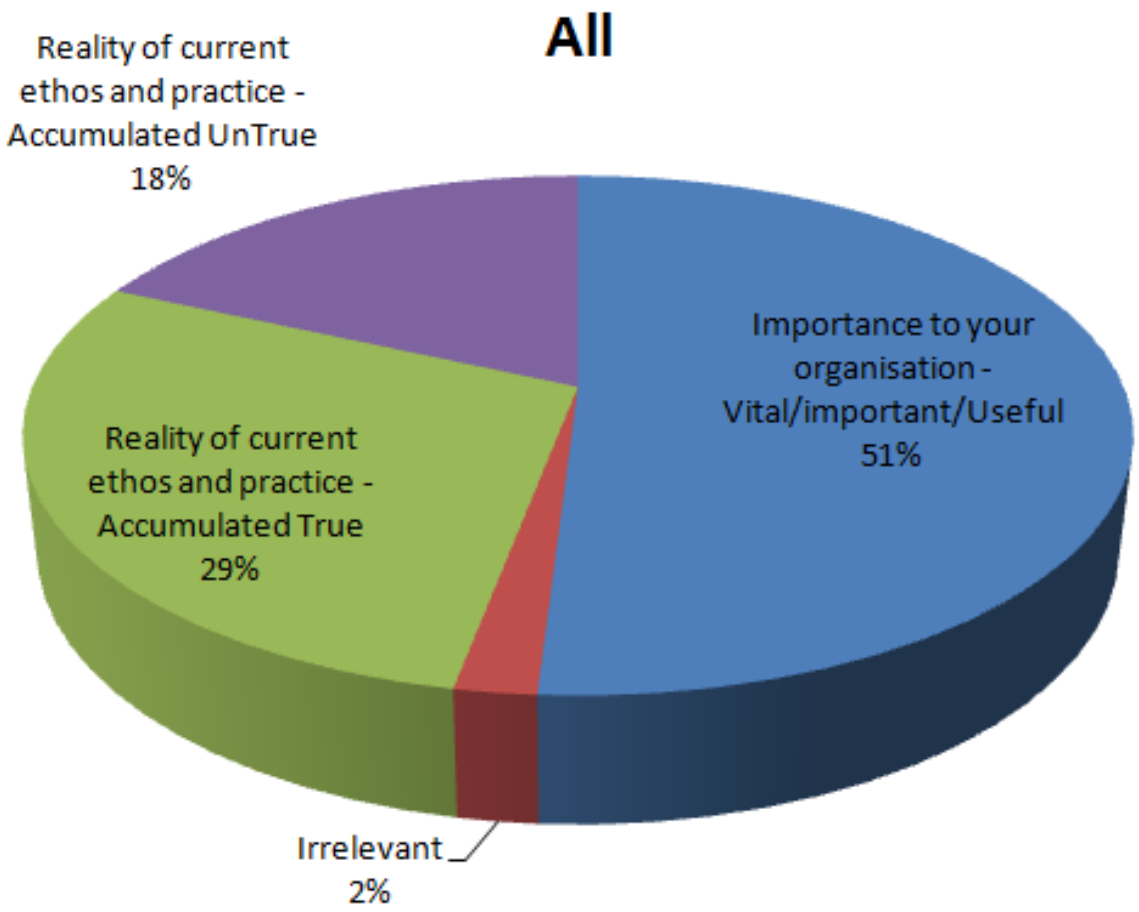
Figure 36 Results of questionnaires - Students responses; Management responses; Overall



- 51% of all respondents thought that VLEs/E-Learning were important
- 13% think that the various manifestations of E-Learning/VLE's have not been instantiated.
- 34% felt that organisational aspirations were realised.



- 51% of all respondents thought that VLEs/E-Learning were important
- 18% think that the various manifestations of E-Learning/VLE's have not been instantiated.
- 29% felt that organisational aspirations were realised.



Overall both management and students have differing perceptions about the reality on the ground:

- 51% of all respondents thought that VLEs/E-Learning were important
- 18% think that the various manifestations of E-Learning/VLE's have not been instantiated.
- 29% felt that organisational aspirations were realised.

5.13.5.5 Conclusions from Data Analysis

Figure 36 above Overall demonstrates:

- The acceptance of aspirations (vital/Important and useful) of VLE/E-Learning by a small majority demonstrate an agreement for the requirement 'ought' for each section and questions asked. However a sizeable number of respondents do not see VLEs/E-Learning as being important/relevant. This demonstrates a lack of awareness of VLEs/E-Learning.

- Very few (2%) see any irrelevancy to any of the questions.
- Many think that the 'Is' and 'Ought' are synchronous (29%). However there is a marked difference between management perceptions and students perceptions.

This supports the contention that both groups are uncertain about the instantiation of VLEs/E-Learning at CU and supports the assumption of the nature of reality as being changeable and a product of the perceptions of social actors (in concurrence with the axiological approach as outlined in (5.7.3). Furthermore an evaluative framework would enable a testing on the ground of the accuracy of these perceptions of the stakeholders.

5.13.5.6 Application of AR to scrutinize Conceptual Framework v1

The following scrutiny was arranged to evaluate the conceptual framework version 1:

- A focus group of several members

5.13.5.6.1 Focus Group

Focus group: Composed of other colleagues who were/are

- Senior lecturers (SL) teachers, researching into KM based frameworks
- (Moderator) ; Reader in KM based models
- Research students pursuing several projects based in KM

Attended by:

2 Senior lecturers; Reader; Research students

A presentation was made outlining the conceptual frameworkv1. Questions and suggestions were noted:

SL 1: Why have the domains that you have used? (see (4.4.2) above)

SL 2: It would be better if the framework was more specific, with clearer guidance. (

Reader: What will this framework actually do? (see 4.4.4.2)

Research Student: Vague, too abstract. How is the work on the various contributory disciplines incorporated?

5.13.6 Presentation to key stakeholders for validation of the Framework version 2

The final validation of framework version 2 **(**Figure 31**)** is an important stage of the research. The Validation was carried out in front of key stakeholders and ensured scrutiny at Strategic to operational level. The author was formerly a Governor on Board of Governors at CU and therefore has access to the most senior levels of Management at the case study. This access allowed the assembly of an eclectic, highly experienced group of senior managers who scrutinised the work from the strategic level down to operational level. Each of these managers brought a wealth of experience from many different universities and were therefore capable of 'testing' the conceptual framework:

- Second Supervisor (Deputy VC CU); The Deputy Vice Chancellor of CU. Former dean of faculty of Engineering & Computing, a Professor of engineering and formerly at Abertay University. A very senior manager of HE with many years of experience. (strategic management to operational management). Also second supervisor of PhD.
- Dean of faculty and acting pro vice chancellor at CU. Formerly at Cranfield University and wealth of experience in management(strategic management to operational management)
- Head of Department of Computing (Operational management)
- Associate Dean of International work – Senior manager at tactical level recently in post but with a SSM research background
- Director of Studies and a well published figure in KM.

5.13.6.1 Contents of presentation

The presentation dealt with the proposed frameworkv2 as shown in Table 29. A set of questions asked by the members of the group are presented and responses to these question s are summarized in

In this chapter a review of Research terms, purpose, assumption, paradigm; Saunders Research Onion is summarized with respect to research philosophies, approaches, strategies, choices, time horizons, research methods and the application of action research to the problem domain.

In this chapter the research purpose of

'*What criteria can be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, operational and tactical development and implementation of VLEs/E-Learning in UK Universities?'*

was stated and the research assumption that the reality under consideration was malleable and could change by the act observation was argued. The various research philosophies, as outlined by Saunders (2011) were summarized and those relevant to the research identified these being as the epistemological position of interpretevism, the ontological position of subjectivism and the axiological extension of action research. Strategies of case study and action research were selected and the quantitative technique of questionnaires, distributed, dataset accrued, analysed and subsequently reported. A longitudinal time horizon was argued and the application of action research was detailed as a summary table (Table 11)with an important focus group for the validation of the questionnaires and another focus group for critical scrutiny of version one of the framework were reported in depth in the body of the chapter. (5.13.5.6) (5.13.5.6.1)

5.14 Position of chapter 5 in research trajectory

As can be seen from Figure 32 chapter 4 has demonstrates the development of the evaluative framework. Chapter 5 summarises different research artefacts and applying to the problem domain. It must be reiterated that even though the diagram demonstrates a linear progression, the activities of action research embody an iterative process. The writing up of the dissertation itself has gone through much iterative refinement therefore in summary it may be concluded that thus far:

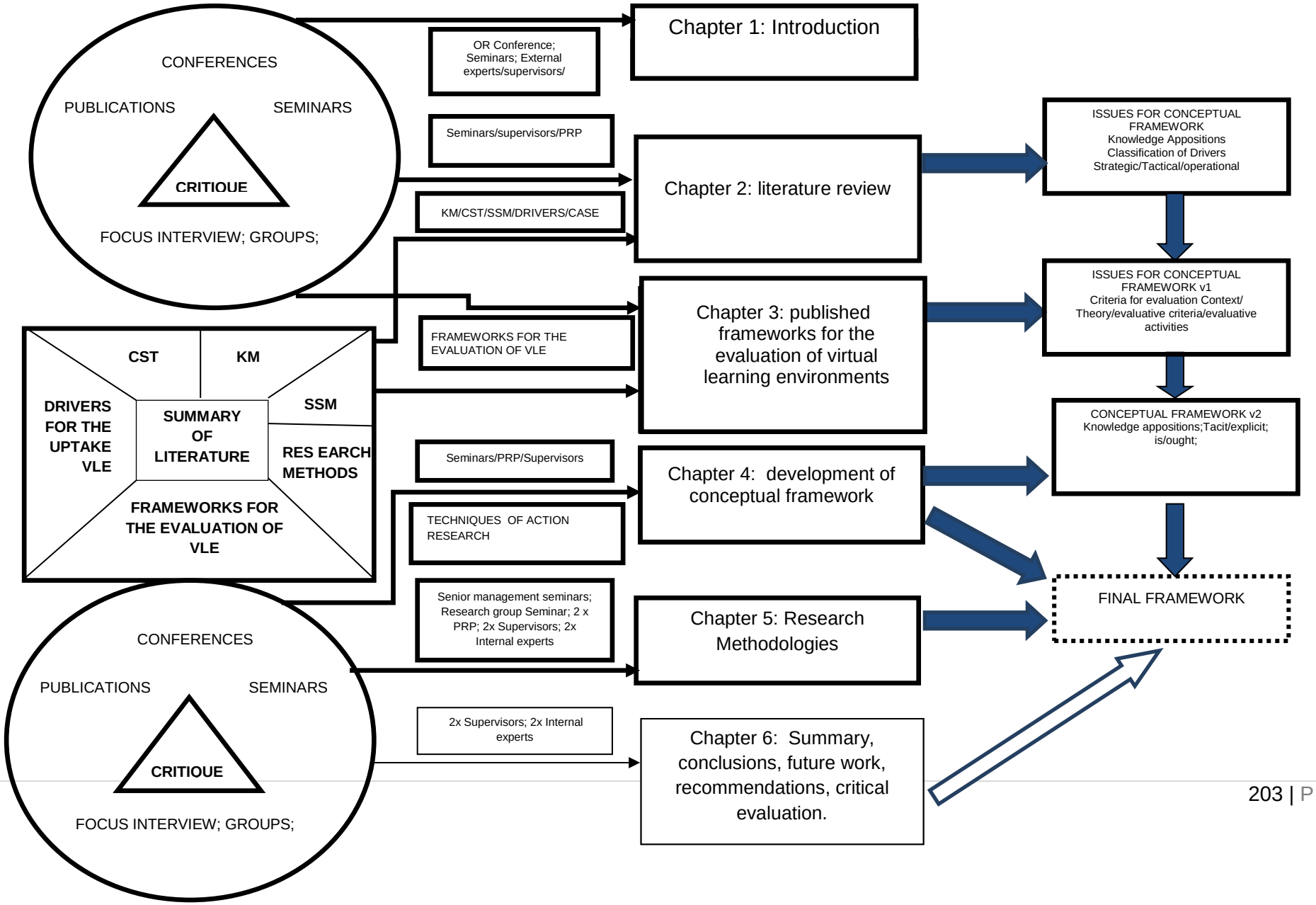
- Chapter 1 was populated with sufficient information to lay the groundwork for a research trajectory and a final dissertation structure was cemented and subjected to 3 presentations in (Table 11) (ID 1,2,4,5) including an OR conference. However, the materials in chapter 1 have been subjected to all of the artefacts of critique submitted to date (ID 1 – 19)
- Chapter 2 yielded the drivers for the uptake of VLEs/E-Learning; classification of drivers into Strategic/tactical/Operational (Table 18); people/processes/ technology

- Operational drivers according to their Strategic drivers(Table 20) Also the knowledge appositions of Know-why,know-what,know-where,know-when and know-how were

identified . The materials in chapter 2 have been subjected to all of the artefacts of critique submitted to date in (Table 11) (ID 1 – 19).

- Chapter 3 embodied the literature from extant evaluative frameworks. A schema for classification of evaluative frameworks was developed (Table 21).which contributed to elements subsequently used in the Framework v1 (Figure 30)
- Chapter 4 has drawn together all the previous chapters and research activities and artefacts to arrive at the proposed framework
- Chapter 5 reports the application of action research to the problem domain (Figure 37) shows the position of chapter 5 in the research trajectory.

Figure 37 POSITION OF CHAPTER 5 IN RESEARCH TRAJECTORY



6 Summary, Conclusions future work, recommendations Critical evaluation,

6.1 Introduction

In the previous chapter the rationale behind and the evaluative framework was presented. Examples of the questions that might be asked were also developed in arriving at an understanding of an organisations' relationship with VLEs/E-Learning.

In this, the last chapter of the dissertation, a summary of the work carried out over the progress of then trajectory of research will be presented. The aim and objectives which were to be addressed will be itemized and evidence provided to support their fulfillment. Future work and recommendations will be tendered and critical evaluation of the work carried out, reported.

6.2 Summary and conclusion

6.2.1 Summary of work carried out

The problem domain was identified through a literature review of evaluative frameworks and questionnaires distributed in the case study CU (CU). A framework for the evaluation of the management of VLEs/E-Learning was developed. Elements were drawn from several disciplines i.e KM, CSH, SSM. The central assumption for the inclusion of these disciplines was the contention that a VLE could be perceived as a computer and knowledge management system. In addition to the above disciplines, a review of literature of the drivers for the uptake of VLEs/E-Learning and preexisting evaluative frameworks was carried out.

From the combination of the Literature review, KM, CSH and SSM a nascent set of emergent domains were constructed. The final conceptual framework then evolved over a period of time and each version was scrutinized(the mechanism of which has been dealt in chapter 4). The following table demonstrates the evolution of the framework (the black arrows illustrate the direction travel along the evolutionary pathway)

Figure 20 Classification continuum

Strategic/tactical/operational

Why	How
Strategy	Operational
Concept/Abstract	Practical/real/concrete

Figure 27 Emergent domains of proposed conceptual framework

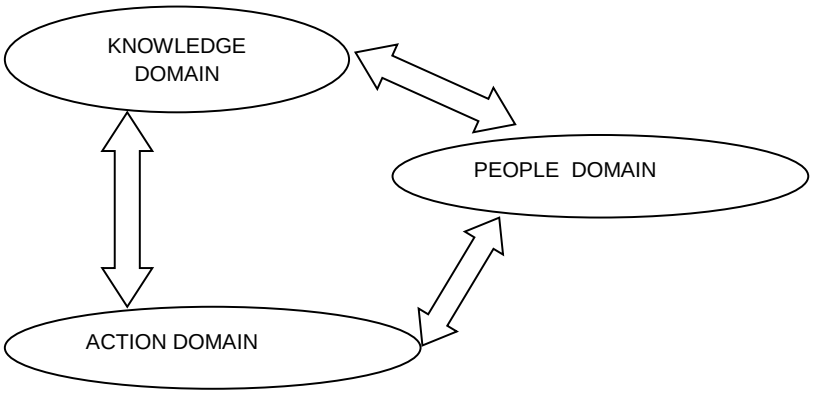
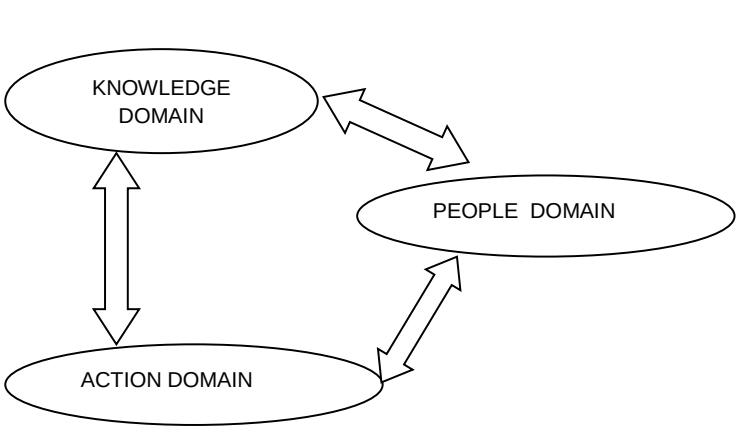


Figure 28 KM perspective on emergent framework



KM
Why what where when who How

Figure 29 Emergent Domains with Literature review and SSM contributions

Emergent Domains	KM	Emergent Criteria	Sources
KNOWLEDGE DOMAIN	Why	Drivers	Literature review on drivers
		Purpose:	Categories from literature on evaluative frameworks
	What	Theory Context: Evaluative Criteria	Categories from literature on evaluative frameworks
		worldview	CAT**W**OE
	where	Location;	
PEOPLE DOMAIN	who	Stakeholders;	Categories from literature on evaluative frameworks
		Actors; Customer ;Owner	**CA**TW**O**E
ACTION DOMAIN	How	Evaluative Activities	Categories from literature on evaluative frameworks
		Transformations	CA**T**WOE

The evolution of the framework began with the concept that conceptualization/abstraction predicates action (Figure 20). This conceptualization represented the knowledge domain. The people domain was argued to be the conduit from knowledge to action. These three domains were mapped onto the knowledge appositions (Figure 27). From the knowledge appositions and from literature review and SSM a set of criteria emerged (Figure 29). From this and further addition from KM (Explicit/Tacit) and CSH (Ulrichs boundary analysis), elements emerged for the conceptual framework v1 (Figure 30).

Figure 30 Emergent elements of conceptual framework v1

Contributions of sources--------->	**KM – TACIT/ EXPLICIT**	**KM- PEOPLE/ PROCESSES/ TECHNOLOGY**	**SSM CATWOE**		**LIT REVIEW DRIVERS**	**LITERATURE REVIEW**		**ULRICHS BOUNDARY ANALYSIS IS/OUGHT**
QUESTIONS								
WHY	**TACIT / EXPLICIT** Spread over all the questions			**WELTENSCHAUNG / ENVIRONMENT**	**DRIVERS**	**PURPOSE**	Context	**IS/ OUGHT** Asked over all of the questions
WHAT		**TECHNOLOGY**				**EVALUATIVE CRITERIA (EC)**		
WHERE								
WHEN								
WHO		**PEOPLE**	**ACTOR/ OWNER CUSTOMER**			**STAKEHOLDERS**		
HOW		**PROCESSES**	**TRANSFOR MATION**			**EVALUATIVE ACTIVITIES**		

Figure 31 Emergent elements of conceptual framework v2

QUESTIONS				**SOURCES**		**OUTCOMES**
	ID NO	**IS**	**OUGHT**	**TACIT**	**EXPLICIT**	
WHY DRIVERS/PURPOSE	**1**	**4.5.1.1** Why/Is	**4.5.1.2** Why/Ought	**4.5.1.3** Why/Tacit	**4.5.1.4** Why/Explicit	**4.5.2.5** Outcomes
WHAT **TECHNOLOGY/EVALUATIVE CRITERIA**	**2**	4.5.2.1 What/Is	**4.5.2.2** What/Ought	**4.5.2.3** What/ Tacit Sources of knowledge	**4.5.2.4** **WHAT / EXPLICIT SOURCES OF KNOWLEDGE**	4.5.2.5 What/ Outcome
WHERE	**3**	**4.5.3.1** Where/Is : 3.2 Where/ought		**4.5.3.2** **TACIT : 3.4 EXPLICIT**		**4.5.3.3** Outcome
WHEN	**4**	**4.5.4.1/4.2 WHEN/IS AND WHEN/OUGHT**		**4.5.4.2** **WHEN TACIT/EXPLICIT SOURCES**		**4.5.4.3** **WHEN OUTCOME**
WHO; **STAKEHOLDERS**	**5**	**4.5.5.1** Who/is	**4.5.5.2** Who/ought	**4.5.5.3** Who/tacit	**4.5.5.4** Who/explicit	**4.5.5.5** Who/outcomes
HOW **PROCESSES /TRANSFORMATION EVALUATIVE ACTIVITIES**	**6**	**4.5.6.1** Know – how is	**4.5.6.2** Know – how ought	**4.5.6.3** Know – how tacit sources of knowledge	**4.5.6.4** Know – how explicit sources of knowledge	**4.5.6.5** Know – how Outcomes

In arriving at the final version of the framework, the research trajectory adhered to also fulfilled the original aim and objectives of the research.

6.2.2 Work carried out compared to original Aims and objectives

The table below summarises and cross references the evidence to support the fulfillment of each objective

Table 12: Work carried out mapped to original Aims and Objectives of research

Original intention	**Evidence of completion**
Aim The aim of this research is to develop a conceptual framework, which is designed to help evaluate, within the contexts of knowledge management and critical systems heuristics and Soft Systems Methodology the management of Virtual Learning Environments/E-Learning in UK HE	As evidenced below
Objectives Therefore pursuant to the aim, the objectives of this research are to: 1. Examine the history of the uptake of E-Learning in UK universities, including the drivers, factors and reasons for implementation.	Reviewed literature on the drivers for the uptake of VLEs/E-Learning in HE. Drivers have been identified and a proposed schema of classification has been presented (2.8.3; 2.8.4) ((Table 5, Table 18, Table 20)
2. To critically appraise existing frameworks of evaluation and abstract possible elements of an evaluative framework.	Reviewed the literature on existing evaluative frameworks. A list of evaluative criteria and processes have been identified. A schema for the classification of evaluative frameworks (3.3.1, Table 21) is tendered.

3. Demonstrate the underlying philosophy of Knowledge Management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM)and identify the salient, appropriate principles to inform an evaluative framework	Reviewed the literature on KM/CSH/SSM (2.3.1)
4. Develop and evaluate by exposure to critical appraisal, a conceptual framework that is intended to evaluate the strategic and operational management of Virtual Learning Environments/E-Learning in UK universities	Application of Action Research as illustrated in Figure 1 and Figure 38

6.2.3 Contributions to knowledge

In the pursuance of the research there were several key contributions to knowledge

- Classification of drivers into strategic/tactical and operational drivers and also people processes and technology.
- Extraction of criteria from literature of evaluative frameworks (purpose, theory, context, evaluative criteria, evaluative activities, management activities).
- The combination application of KM specifically processes/ technology/ people; tacit and explicit knowledge and the knowledge appositions; SSM (CATWOE) and CSH (is/ought)

Each of these leads to a publication and papers have been prepared for publication in various journals.

6.3 Future work and recommendations

During the pursuance of the research trajectory, several opportunities presented for further work. These were not pursued because the main vein of work would have been compromised. These might include:

- A knowledge management based framework using ICARSUM
- Use of the Framework for general education (replacing Ofsted framework)
- Use of framework for HE (general)
- Use of the framework as tool for business consultancy

6.3.1 Use of ICARSUM as a basis of a framework

In the final version of the framework, elements derived from

- KM specifically processes/ technology/ people; tacit and explicit knowledge and the knowledge appositions.
- Literature review of Drivers were classified into strategic/tactical and operational drivers and also people processes and technology.
- Literature review of evaluative frameworks yielded a set of criteria of purpose, theory, context, evaluative criteria, evaluative activities, management activities.

The definition of KM that has been used throughout this research was stated as:

'Knowledge management refers to the systematic organization, planning, scheduling, monitoring, and deployment of people, processes, technology, and environment, with appropriate targets and feedback mechanisms, under the control of a public or private sector concern, and undertaken by such a concern, to facilitate explicitly and specifically the creation, retention, sharing, identification, acquisition, utilization, and measurement of information and new ideas, in order to achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical, cultural, and societal constraints.'

Lehaney et al (2004)

A substantive idea emerging from this definition is that KM can be encapsulated in the acronym ICARSUM (Identification, creation, acquisition, retention, sharing, utilization, and monitoring of knowledge) A possible line of enquiry might be to create a grid and map the drivers for the uptake of VLEs/E-

Learning and the criteria that emerged from the review of literature on evaluative frameworks across to the above mentioned ICARSUM. This would lead to a set of knowledge management activities linked with specific drivers and criteria for evaluation. An evaluative framework based upon knowledge management activities might yield exciting new lines of enquiry.

6.3.2 Use of the Framework for general education (replacing Ofsted framework

Ofsted (Office for Standards in Education) is the government organisation whose function it is to audit all providers of education including schools and colleges. The inspection framework for Colleges of Further Education for example has the following elements

Overall effectiveness

The judgement on overall effectiveness is based on how effective and efficient the provider is in meeting the needs of learners and other users, and why. Inspectors will use all the available evidence and take into account judgements on:

outcomes for learners

the quality of teaching, learning and assessment

the effectiveness of leadership and management.

Outcomes for learners

Inspectors will make a judgement on outcomes for learners by evaluating the extent to which:

all learners achieve and make progress relative to their starting points and learning goals

achievement gaps are narrowing between different groups of learners

learners develop personal, social and employability skills

learners progress to courses leading to higher-level qualifications and into jobs that meet local and national needs.

Quality of teaching, learning and assessment

Inspectors will make a judgement on the quality of teaching, learning and assessment by evaluating the extent to which:

learners benefit from high expectations, engagement, care, support and motivation from staff

staff use their skills and expertise to plan and deliver teaching, learning and support to meet each learner's needs

staff initially assess learners' starting points and monitor their progress, set challenging tasks, and build on and extend learning for all learners

learners understand how to improve as a result of frequent, detailed and accurate feedback from staff following assessment of their learning

teaching and learning develop English, mathematics and functional skills, and support the achievement of learning goals and career aims

appropriate and timely information, advice and guidance support learning effectively

equality and diversity are promoted through teaching and learning.

Effectiveness of leadership and management

Inspectors will make a judgement on the effectiveness of leadership and management by evaluating the extent to which leaders, managers and, where applicable, governors:

demonstrate an ambitious vision, have high expectations for what all learners can achieve, and attain high standards of quality and performance

improve teaching and learning through rigorous performance management and appropriate professional development

evaluate the quality of the provision through robust self-assessment, taking account of users' views, and use the findings to promote and develop capacity for sustainable improvement

successfully plan, establish and manage the curriculum and learning programmes to meet the needs and interests of learners, employers and the local and national community

actively promote equality and diversity, tackle bullying and discrimination, and narrow the achievement gap

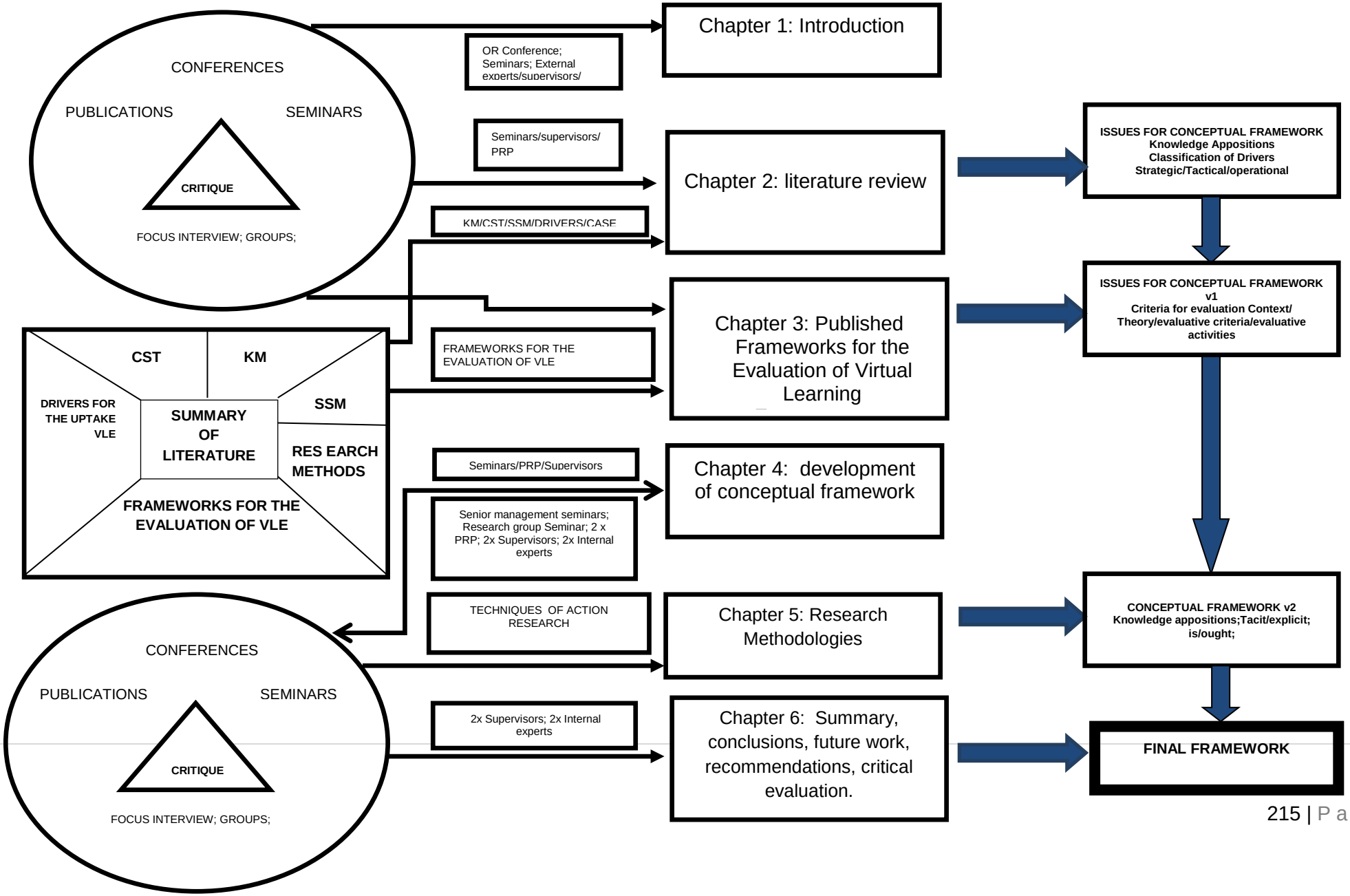
safeguard all learners.

The framework provides a set of questions which may be instantiated for Ofsted. For example the 'Why question' in the is/ought mode could investigate for the outcomes of learners and the Tacit/Explicit juxta-position

Why	Is	Ought	Tacit	Explicit
all learners achieve and make progress relative to their starting points and learning goals	What is happening in the organisation now?	National averages/benchmarks/regional standards; Perceptions of staff and students on how they ought to be doing. Anything else that ought to be measured?	Sources of tacit knowledge; ask parents; students;	Reports; computer records; Class teachers;
achievement gaps are narrowing between different groups of learners				
learners develop personal, social and employability skills				
learners progress to courses leading to higher-level qualifications and into jobs that meet local and national needs.				

In chapter 6, the original aims and objectives have been demonstrated to have been completed. The possible use of the Framework as a replacement for Ofsted has been explored and a possible instantiation for the 'Know-Why' apposition has been tendered.

Figure 38 Position of Chapter 6 in research trajectory



REFERENCES

ACE. (1997). Guiding Principles for Distance Learning in Learning Society. The American Council on Education. Retrieved may 30, 2008, from http://www.acenet.edu/calec/dist_learning/dl_principlesIntro.cfm

Alavi, M., & Leidner, E. D. (2001). Review: Knowledge management and knowledge management systems: conceptual foundations and research issues. *MIS, 25*(1), 107-136 .

American Ethnography Quasimonthly. (n.d.). Retrieved January 25, 2014, from http://www.americanethnography.com/ethnography.php

B, K. G. (1999). .

Basiel, A. (2001). *Virtual project environments for research taxonomy*. Retrieved from http://www.elearning.mdx.ac.uk/research/ViPERsystem/ViPERsystem.ppt

Basiel, A. (2001). *Virtual project environments for research taxonomy. .* Retrieved from http://www.elearning.mdx.ac.uk/research/ViPERsystem/ViPERsystem.ppt

Baskerville, R., & Dulipovici, A. (2006). The theoretical foundations of knowledge management.. *Knowledge Management Research & Practice*, 2.

Bassey, M. (1998). Action research for improving educational research. In R. Halsall (Ed.), *Teacher research and School Improvement: Opening Doors from the Inside* (pp. 93-110). Buckingham: Open Unversity Press.

Beer, S. (1981). *Brain of the firm* (2nd ed.). New York: John Wiley & Sons.

Bell, J. (2005). *Doing a Research Project: Guide for first time researchersd in education and social science* (4th ed.). Buckingham: Open University Press.

Bennet, A., & Bennet, D. (2004). *Organizational survival in the new world: the intelligent complex adaptive system. A new theory of the firm.* (Elsevier Science. ed.). Burlington.

Bhatt, G. (2000). Organising Knowledge in the knowledge development cycle. *Journal of Knowledge Management , 4*(1), 15-26.

Bhatt, G. (2001). Knowledge management in organisations: Examining the interactions between technologies, techniques and people. *Journqal of Knowledge management , 5*(1), 68-75.

Bhatt, G. (2002). Management strategies for indiviual knowledge and organisational . *Journal of Knowledge Management, 6*(1), 31-39.

Birch, K., & West, M. (2006). *Evaluation report, webct pilot projects.* Keele: E-Learning Initiative. Keele University.

Boisot, M. (1998). *Knowledge Assets .* Oxford: Oxford University Press.

Bonk, C., & Dennen, V. (2002). *E-learning evaluation measures.* Retrieved july 4, 2014, from http://www.trainingshare.com/download/evalmeth.doc

Bournemouth University. (2004). *Evaluation of a virtual learning environment (media2). .* Bournemouth: Academic Services & Bournemouth Media School.

Britain, O., & Liber. (2004). *environments., framework for the pedagogical evaluation of e-learning.* Retrieved 02 07, 2013, from JISC: http://www.jisc.ac.uk/uploaded_documents/VLE%20Full%20Report%2006.doc

Britain, S., & Liber, O. (1999). *Leeds university.* Retrieved 02 06, 2013, from http://www.leeds.ac.uk/educol/documents/00001237.htm

Brown S, D. B. (2002). The impact of new technologies on learning and teaching. *Presentation at ALT-C2002, 9th International Conference of the Association for Learning Technology.* University of Sunderland.

Brown, S., Davies, B., Franklin, T., & Smith, E. (2002). The impact of new technologies on learning and teaching: Presentation at ALT-C2002, 9th International Conference of the Association for Learning Technology. University of Sunderland.

Bukowitz, W., & Williams, R. (2000). *The knowledge management fieldbook.* London: Prentice Hall.

Burgess, H., Sieminski, S., & Arthur, L. (2006). *Achieving Your Doctorat in Education.* London: Sage.

Burrell, G., & Morgan. (1979). *Sociological Paradigms and Organizational Analysis.* Heinemann.

Checkland P, S. J. (1999). *Soft systems methodology in action.* chichester: John Wiley & Sons Ltd.

Checkland, P. B., & Scholes, P. C. (1990). *Soft systems methodology in action.* New York: John Wiley & Sons.

Checkland, P., Currie, W., & Galliers, R. (1999). *Systems Thinking. Rethinking management information systems: An interdisciplinary perspective.* Oxford: Oxford University Press.

Chohan, N. (2001). *Evaluation of MLEs.Leeds College of Technology*. Retrieved from http://ferl.qia.org.uk/display.cfm?resID=1715

Coghlan, D., & Brannick, T. (2005). *Doing Action research in your organisation* (2nd ed.). London: Sage.

Coleman, A. (2007). Leaders as researchers:supporting practitioner enquiry through NCSL research associate programme. *Educational Management Administrtation and Leadership, 35*(4), 479-97.

Collins, H. (2010). *Creative Research.* AVA Publishing.

Conole. (2004). *Journal of Interactive Media in Education.* Retrieved May 30, 2008, from http://www-jime.open.ac.uk/jime/index

Cook, J. (2001). *Evaluating learning technology resources and how they are used.* Learning Technology Support Service. Bristol University.

Costello, P. (2011). *Effective Action Research* (2 ed.). continuum.

Costello, P. J. (2011). *Effective Action Research : Developing Reflective Thinking and Practice* (2nd ed.). Continuum.

Costello, P. J. (2014). *Effective Action Research.* Retrieved jul 29, 2014, from http://lib.myilibrary.com?ID=297764

Coventry University . (2003). *Corporate plan 2003/04 – 2006/07.* coventry: Coventry University.

Coventry University . (2012). *Coventry University Staff Survey 2012. .* Coventry University Coventry.

Coventry University . (2012). *Learning and Assessment Strategy .* Coventry: Coventry University .

Coventry University. (2002). *Learning & teaching strategy 2002-2005.* coventry: Coventry University.

Coventry University. (2004). *E- Learning at Coventry University.* Coventry: Coventry University.

Coventry University. (2006). *. Coventry University e-learning strategy 2006-2010.* Coventry: Coventry University.

Coventry University. (2006a, 2006). *Coventry University e-learning strategy 2006-2010.* Coventry: Coventry University.

Coventry University. (2006b). *Coventry University institutional review document 2006.* Coventry: Coventry University/ Higher Education Academy/JISC E-Learning Benchmarking Pilot.

Dalkir, K. (2011). *Knowledge Management in Theory and Practice 2nd Edition* (2nd ed.). MIT Press.

Dearing, R. (1997). *The national committee of Inquiry in HE.* Retrieved 07 2014, 3, from http://www.leeds.ac.uk/educol/ncihe/

DEFS. (2007). *Department for education and skills*. Retrieved May 30, 2008, from http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=774

Dennen, V., & Bonk, C. (2002). *E-Learning evaluation measures.* Retrieved November 13, 2007, from http://www.trainingshare.com/download/evalmeth.doc

Dick, B. (1997). Retrieved oct 12, 2010, from http://www.scu.edu.au/schools/gcm/ar/arp/actlearn.html

Dick, B. (2002). *Action research: action and research*. Retrieved jul 9, 2014, from http://www.scu.edu.au/schools/gcm/ar/arp/aandr.html

Dictionary, M.-W. (2013). *merriam-webster*. Retrieved september 24, 2013, from http://www.merriam-webster.com/dictionary/evaluate

Dretske, F. (1981). *Knowledge and the Flow of Information.* Cambridge, MA: MIT Press.

Drew, S. (1999). *Building knowledge management into strategy, making sense of a new perspective.* Retrieved 2 3, 2007, from http://www.cyut.edu.tw/~s9414614/km/paper/Building%20Knowledge%20Management%20into%20Strategy%20Making%20Sense%20of%20a%20New%20Perspective.pdf

Dyson, M. C., & Campello, S. (2003). Evaluating Virtual Learning Environments: What are we measuring? . *Electronic Journal of E-Learning, 1*(1), 11-20.

Easterby-Smith, M., & Lyles, m. (2011). *Handbook of Organizational Learning and Knowledge Management* (2 ed.). John Wiley & Sons.

EEC. (2008). *e-learning action plan*. Retrieved from http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0172en01.pdf

Farlex. (2013). *The free dictionary*. Retrieved September 25, 2013, from http://www.thefreedictionary.com/society

Flood, R., & Romm, N. (1996, 2007). *Critical Systems Thinking.* Springer.

Foucalt, M. (1972 - 1977). *Power/knowledge;Selected interviews and other writings.* NY: Pantheon.

Franklin, T. (2004). *Towards and effective framework to evaluate e-learning.* manchester: Manchester university.

Frost, P. (2002). Principles of Action research cycle. In R. Ritchie, A. Pollard, P. Frost, & T. Eaude (Eds.), *Action Research:A Guide for Teachers. Burning Issues in Primary Education,* (pp. 24-35). Birmingham: National primary trust.

Gill, J., & Johnson, P. (2010). *Research Methods for Managers* (4th ed.). SAGE Publications Ltd.

Girard, J. (2005). The inukshuk: A canadian knolwedge management model. *KMPRO Journal , 2*(1), 9-26.

Glaser, B. (1992). *Basics of grounded theory analysis.* Mill Valley: Sociology Press.

Gray, D. E. (2009). *Doing research in the real world.* London: Sage publications.

GTCW. (2002a). *Continuing professional development an entitlement for all.* Cardiff: GTWC

GTCW (2002b) *Professional development pilot projects: Information Booklet 2002-2003.* Cardiff: General Teaching Council for wales.

Hackbarth, G. (1998). The Impact of Organizational Memory on IT Systems. *Proceedings of the Fourth Americas Conference on Information Systems*, 588-590.

Hammond, N. (2003). *Learning technology in higher education in the UK: trends, drivers and strategies.* Utrecht: Lemma Publishers.

Haywood. (2004). coventry: Coventry University.

Hillage, J., & Pollard, E. (1998). *Employability: developing a framework for policy analysis.* Londond: Department for Education and Employment (DfEE).

Hinze-Hoare, V. (2003). *HCI and educational metrics as tools for VLE evaluation. .* Southamptom : School of Electronics and Computer Science, University of Southampton, United Kingdom.

Hobbs, D. (2006). *The SAGE Dictionary of Social Research Methods*. Retrieved from http://srmo.sagepub.com/view/the-sage-dictionary-of-social-research-methods/n70.xml

Hopkins, D. (2008). *A Teachers Guide to Classroom Research.* Buckingham: Open University Press.

IHEP. (2000). Quality on the line: benchmarks for success in internet based distance education. Institute For Higher Education. Retrieved september 11, 2013, from http://www.ihep.com/Pubs/PDF/Quality.pdf

Investorworld. (2014). *Investorworlds*. Retrieved jun 30, 2014, from http://www.investorwords.com/1586/driver.html

Ivanova, G., & Smrikarov, A. (2006). An approach for analysis and evaluation of virtual learning environments. . Coimbra: 3rd E-Learning conference.

J, C. (2001). *Evaluating learning technology resources and how they are used.* Bristol : Learning Technology Support Service.

JISC. (2012). *Joint Information Systems Committee (JISC) e-Learning Pedagogy programme*. Retrieved june 30, 2014, from http://www.jisc.ac.uk/whatwedo/programmes/elearningpedagogy.aspx

JISC. (2014). *Effective use of virtual learning environments (VLEs)*. Retrieved JUNE 30, 2014, from http://www.jiscinfonet.ac.uk/infokits/vle/

Johnson, R. B., & Onwuegbuzie, A. J. (2004, October). Mixed methods research: A research paradigm whose time has come. *EDUCATIONAL RESEARCHER, 33* (7), 14-26.

Kearsley, G., & Shneiderman, B. (1999). *Engagement theory: a framework for technology based teaching and learning*. Retrieved july 29, 2009, from Kearsley, G. & Shneiderman, B. (1999). Engagement Theory: A framewo http://home.sprynet.com/~gkearsley/engage.htm

Kirkpatrick, D. L. (1994). *kirkpatrick's learning and training evaluation theory*. Retrieved June 21, 2014, from http://www.businessballs.com/kirkpatricklearningevaluationmodel.htm

Konrad, J. (2003). Review of educational research on virtual learning environments [VLEs] - implications for the improvement of teaching and learning and access to formal learning in Europe. Hamburg: Paper presented at the European Conference on Educational Research: University of Hamburg, .

Kuhn, T. S. (1996.). *The Structure of Scientific Revolutions, 3rd Ed.* (3rd ed.). Chicago and London:: Univ. of Chicago Press.

Kuusinen, R. (2004). *Models and Instruments for the Evaluation of E-learning and ICT-supported Learning (EVAL 3).* Tampere: University of Tampere, .

Laurillard, D. (1993). *Rethinking university teaching – a framework for the effective use of educational technology.* London: Routledge.

Lehaney, B., Clarke, S., Coakes, E., & Jack, G. (2004). *Beyond knowledge management.* Hershey USA: Idea Group Publishing.

Lévi-Strauss., C. (1963). *Structural Anthropology.* NY: Doubleday Anchor Books.

M, B. K. (2006). *Evaluation report, webct pilot projects. E-Learning Initiative.* Keele: Keele University.

Machlup, F. (1980.). *Knowledge: Its Creation, Distribution, and Economic Significance.* Princeton: Princeton University Press.

Malinowski., B. (1922). *Argonauts of the Western Pacific.*

Marsden, P. V., & Wright, J. D. (2010). *Handbook of Survey Research.* London: Emerald Group Publishing Ltd.

McElroy, M. (1999). The knowledge life cycle. Miami: ICM conference.

McElroy, M. (2003). *The new knowedge management;complexity, learning and sustainable innovation.* Boston: Butterworth-Heinemann.

Meyer, M., & Zack, M. (1996). The design and implementation of information products. *Sloan Management Review, 37*(3), 43–59.

Midgley, G. (1997). Dealing with coercion: critical systems heuristics and beyond. *Systems practice, 10*(1), pp 37-57.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science , 5*(1), 14-37.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation.* New York: Oxford University Press.

Oliver, M. (2000.). An introduction to the evaluation of learning technology. *Educational Technology and Society, 3*(4).

Open Distance Learning Quality Council. (2004). *ODQLC Standards*. Retrieved October 13, 2013, from http://www.odlqc.org.uk/standard.htm

Open source. (2014). *Moodle*. Retrieved June 29, 2014, from https://moodle.org/

Oxford English Dictionary. (n.d.). Retrieved January 24, 2014, from http://www.oxforddictionaries.com/definition/english/

Pasternack, B., & Viscio, A. (1998). *The centerless corporation.* New York: Simon & Schuster.

Patton, M. Q. (1997). *Utilization-focused evaluation* (3rd ed.). Thousand Oaks: Sage Publications.

Penrose, E. T. (1959). *The Theory of the Growth of the Firm.* New York: Wiley.

Piramuthu, S. (2005). Knowledge-based web-enabled agents and intelligent tutoring systems. *IEEE Transaction on Education, 48*(4).

Polanyi, M. (1962). *Personal Knowledge: Toward a Post-Critical Philosophy.* New York,: Harper Torchbooks.

Polanyi, M. (1975). *Personal Knowledge.* Chicago: University of Chicago Press.

Princeton University. (2012). *WordNet- Lexical databse for English*. Retrieved september 25, 2013, from http://wordnetweb.princeton.edu/perl/webwn

QAA. (2004). *Code of practice for the assurance of academic quality and standards in higher education (Quality Assurance Agency).* Retrieved from http://www.qaa.ac.uk/public/COP/cprovis/draft/draftCollabProvis.pdf

Ray, L. (2008). *Training programme evaluation*.

Ridenour, C. S., Newman., I., & Benz, C. R. (2008). *Mixed methods research : exploring the interactive continuum.* Carbondale : Southern Illinois University Press.

Ruggles, R., & Holtshouse, D. (1999). *The knowledge advantage.* Dover: Capstone Publishers.

S, B. (1985). *Diagnosing The System For Organizations.* Chichester: Wiley.

Saunders, M. L. (2011). *Research Methods for Business Students (5th Ed.).* FT Prentice hall.

Saunders, M., & Tosey, P. (2012). The Layers of Research Design. *RAPPORT*.

Snowden, D. (2000). Complex acts of knowing: paradox and descriptive selfawareness. *Journal of Knowledge Management, 6*(2), 1–33.

Starke-Meyerring, D. (2006). Building a shared virtual learning culture. *Business Communication Quarterly, 69*(1).

Stewart, T. A. (1997). *Intellectual capital: the new wealth of organizations.* New York: Currency/Doubleday.

Strauss, A. (1987). *Qualitative analysis for social scientists.* Cambridge: Cambridge University Press.

Swanborn, p. (2010). *Case Study Research.* sage publications.

The American Council on Education. (13/10/2013, October 13). *Guiding Principles for Distance Learning in Learning Society.* The American Council on Education.

Thomas, G., & James, D. (2006). Reinventing grounded theory: some questions about theory, ground and discovery. *British Educational Research Journal, 32*(6), 767–795.

Trochim, W. M. (2006, 10 20). *Research Methods Knowledge base.* Retrieved 9 24, 2013, from http://www.socialresearchmethods.net/kb/index.php#about

Ulrich, H., & Probst, G. J. (1984). Self organsiations and management of social systems. Berlin: Springer-Verlag.

Ulrich, W. (2005). *A Brief introduction to critical systems heuristics*. Retrieved June 30, 2014, from http://www.ecosensus.info/about/index.html

V, B. C. (2002). *E-learning evaluation measures.* Retrieved November 13 , 2007, from http://www.trainingshare.com/download/evalmeth.doc

Vance, D. M. (1997). Information, Knowledge and Wisdom: The Epistemic Hierarchy and Computer-Based Information System., (pp. 632-634). Indianapolis.

Von Krogh, G. (1998). Care in Knowledge Creation. *California Management Review , 40*(3), 133-153.

Walker, S. (2004). *framework for the evaluation of online learning*. Retrieved may 30, 2008, from http://www.niace.org.uk/online/Documents/Evaluation-Frame.

Weick, K. (2001). *Making sense of the organization. .* Malden: Basil Blackwell.

Wiig, K. (1993). *Knowledge management foundations.* Arlington: Schema Press.

Table 13: FREQUENCY OF OCCURRENCE OF TERMS USED TO DESCRIBE THE JUXTA POSITION OF DIGITAL TECHNOLOGY AND EDUCATION

The table below demonstrates the frequency of usage of a selection of the different terms and synonyms describing the juxta position of digital technology and education:

- Google scholar has been chosen as an example of a popular search engine which is used by academics and lay informed person.
- OPAC is the universities system which accesses major academic databases and journal archives.
- Google is the most popular search engine.

The figures give an indication of the occurrence of the terms. Recent definitions have been tendered to clearly identify the salient features of the different terms. Definitions have been quoted from JISC (Joint Information Systems Committee) and other sources which encapsulate the common understood meanings of the terms. However there is confusion in the literature where for example VLE and Online learning environment are used as synonyms for example a recent software, Moodle, is quoted both as a VLE and Online learning environment. More refined definitions for VLE and E-Learning will be derived

Term	**Google scholar(on 20.07.2012)**	**OPAC Articles**	**Google (alone)**	**Definitions**
VLE - Virtual Learning Environment	10,800	57,499	*1,400,000*	*'..A 'Virtual Learning Environment' (VLE) or **'Learning Management System**' [is] designed to act as a focus for students' learning activities and their management and facilitation, along with the provision of content and resources required to help make the activities successful.*' JISC (2012a)
E - Learning	3,440,000	2,470,008	477,000,000	*'..e-Learning is defined as 'learning facilitated and supported through the use of information and communications technology (ICT).'* JISC (2012b)
Online Learning Environment	*2,170,000*	*136,448*	*275,000,000*	Is used extensively as synonym for VLE.
LMS - Learnin	*29,200*	*1,711*	*8,010,000*	'*..A 'Virtual Learning Environment' (VLE) or **'Learning Management System**' [is] designed to*

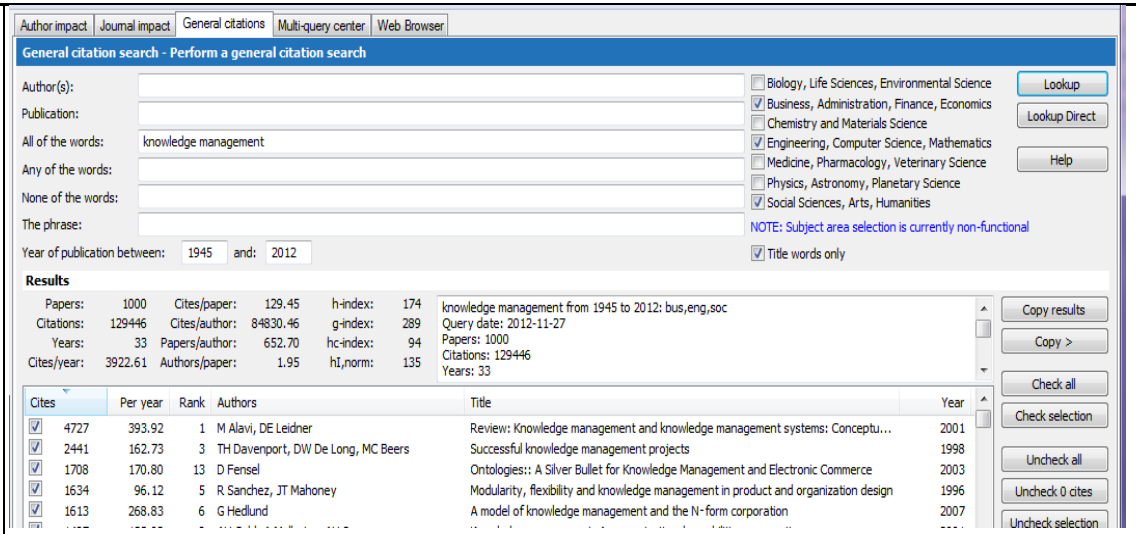
g Management System				*act as a focus for students' learning activities and their management and facilitation, along with the provision of content and resources required to help make the activities successful*.' JISC (2012c)
VLS - Virtual Learning System	*2,130*	*40*	*57,100*	*'..Information technology- based environments, in which the learner's interactions with learning materials (e.g., assignments and exercises), instructors, and/or peers are mediated through technology*. (Alavi and Leidner, 2003)[*** find the article]
CBT – Computer Based Training	*22,900*	*1,527*	*3,180,000*	*'..Acronym for* ***c***omputer-***b***ased ***t***raining*, a type of education in which the student learns by executing special training programs on a computer.* Webopedia (2012) *'..Computer-based training (CBT) is any course of instruction whose primary means of delivery is a computer.'* Techtarget (2012) *'..Computer-Based Training – (CBT) Training (of humans) done by interaction with a computer.'* Encyclopedia2 (2012 *'..Use of computers in imparting training, monitoring trainee progress, pr oviding feedback, and assessing final results*.' Businessdictionary (2012)
MLE – Managed Learning Environment	*11,500*	*77*	*756,000*	*'..MLEs are concerned with whole institutional systems and MLEs involve the joining-up or interoperation of several separate systems – Student Record Systems, Library Systems, Management Information Systems, VLEs, timetabling systems and so on.'* JISC (2012d)
CBL - Computer Based Learning	*5,470*	*301*	*251,000*	A variety of definitions which simply suggest the use of computers to help students learn *An interactive instructional approach in which the computer takes the place of an instructor, providing information and questions or exercises, as well as feedback to the student's response.*

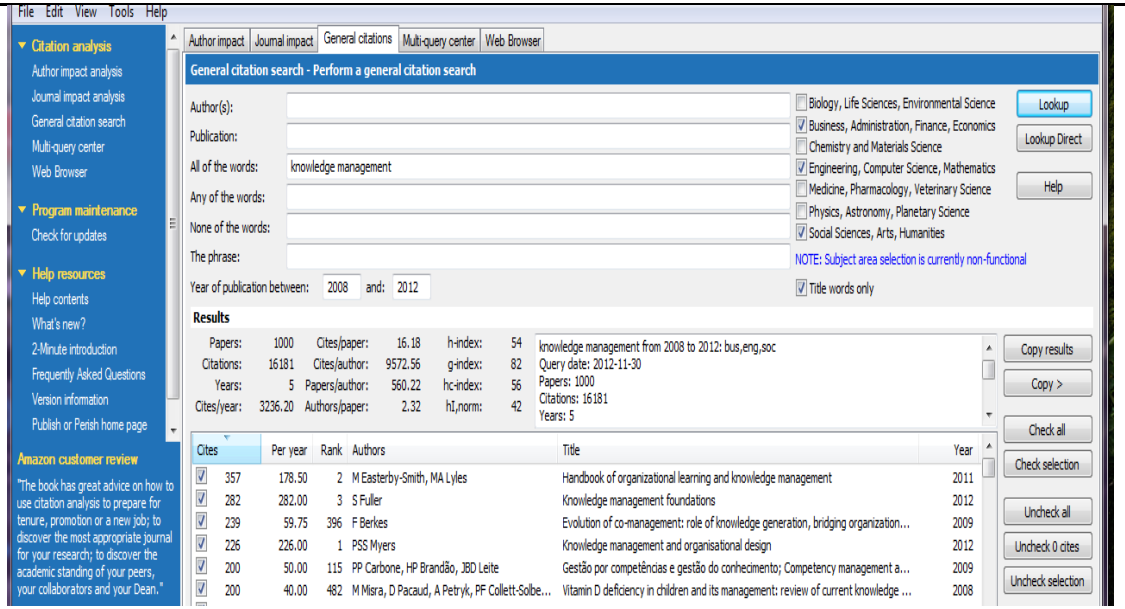
CMS - Content Management System	*57,000*	*3,519*	*82,000,000*	*'..A content management system (CMS) supports the creation, management, distribution, publishing, and discovery of corporate information. CMS covers the complete lifecycle of the pages on site, from providing simple tools to create the content, through to publishing, and finally to archiving.*
Personalised learning environments				*'..Personal learning environments (PLE) are environments in which individuals can access personal learning resources, tools and services. The term refers in part to the government agenda towards supporting 'personalised learning' (DfES, 2005), a term that has come to mean more than differentiated learning, but also assisting and enhancing learning with ICT. More recently, Scott Wilson and others at JISC-CETIS have outlined an alternative design approach to VLEs, and they have introduced the term PLE to reflect the new design principle.* JISC 2012e

Table 14 RESULTS OF SW TO DETERMINE CONTRIBUTIONS TO KM

Sw used	Search term used	Rationale for use/notes	Results
Publish or perish	KM: years from 1945 – 2012 Search term is broad, and the words KM are not necessarily in the title.	KM has been derived as a formal discipline post war. It is reasoned that this search term would yield the seminal works and authors. As can be seen the most often quoted author since 1945 is I Nonaka. A brief summary of his publication is presented later	The top most cited references since 1945 are:

Cites	Per year	Rank	Authors	Title	Year
28185	1565.83	651	I Nonaka, H Takeuchi	The knowledge-creating company: How Japanese compani...	1995
20107	1436.21	209	C Argyris, DA Schön	On organizational learning	1999
14443	3610.75	538	DJ Teece	Dynamic capabilities and strategic management: organizin...	2009
11627	894.38	506	TH Davenport, L Prusak	Working knowledge: How organizations manage what the...	2000
11186	588.74	577	I Nonaka	A dynamic theory of organizational knowledge creation	1994

	KM: years from 1945 – 2012 With KM in the title	It is reasoned that the words in the title will narrow the search to more appropriate area M Alavi has conducted an often quoted review with the highest citations. This has been summarized later in this chapter.		

	KM in from 2005 - 2012	The literature from 2008 has been selected as it was the year of commencement of the research. It can be seen that Easterby-Smith and Lyles (2011) have produced a work with the greatest citations. However the book is a compilation of articles from different authors and leaves many areas of KM unexplored. whereas the work by Fuller is more recent work an chooses to consider KM from a Universities perspective. It does not however consider the commercial, organizational perspective.		

	KM evaluative frameworks 1945 - 2012			

Table 15 Grid to rationalise strategic drivers

DRIVERS	Widening access and student diversity	Beliefs and expectations of stakeholders	increasing widening participation, particularly	Clear vision and leadership	Employability	Quality and standards	Globalization of learning	Professionalism of teaching	Evaluation and review and communicati	Generally enhancing the quality of teaching and	Safeguarding existing international student	Educationally relevant technological innovation in
1. **Widening access and student diversity**			X									
2. **Beliefs and expectations of stakeholders and society in general**												
3. **increasing widening participation, particularly**												
4. **Clear vision and leadership**												
5. **Employability**												
6. **Quality and standards**										X		

7. **Globalization of learning**												
8. **Professionalism of teaching**												
9. **Evaluation and review and communication of outcomes**												
10. **Generally enhancing the quality of teaching and learning**												
11. **Safeguarding existing international student market**												
12. **Educationally relevant technological innovation in ICT**												

Table 16 Coventry University Value Analysis. (Source: Coventry University (2006a))

	Capability	Impact	Metric	Economic Benefit	Strategic Fit
University	Better able to serve markets. Provides more flexible programme. Better student support. Helps create a distinctive course offering.	More capable and employable graduates. Improved reputation for educational innovation. Improved brand presence.	Better FDS results. Measures of public perception of CU. Greater grant income for E-Learning projects. Better recruitment and retention. Positive student and staff survey results. Benchmarking surveys.	Improved HEFCE income. Greater grant income. Greater income from overseas activities. Improved fee income from CDP activities.	Supports emphasis on employability, enterprise and a wider concept of university education. Aligns with 'Student First'.
School	Provides expertise, support and assistance in developing an E-Learning portfolio. More varied, flexible and attractive programme.	More students and staff participating in E-Learning. Greater student and staff satisfaction.	Support of Approval Panels, professional bodies etc. Student survey data. WebCT tracking data.	Improved income.	All schools have sophisticated E-Learning aspirations and plans.
Course Team	Provides support and assistance in the construction of new courses and review of existing ones. Keeps course teams informed of latest developments and possibilities.	Reduced course development effort. Better courses. Wider availability of courses.	Course satisfaction data. Shorter development times. External comment.	Greater income per course. Longer course life cycles. Lower course maintenance costs.	Most new courses want to include blended learning elements. Course teams nearly always state that they would like to streamline the course development process and shorten lead-in times.
Individual staff	Staff development and training. Hands on assistance in developing new materials and approaches. Practical assistance in developing online modules.	Less time spent in module development. More interesting and student-friendly modules. More flexible delivery options. Less effort spent in assessment etc.	Number of modules using innovative E-Learning approaches. Improved staff satisfaction. Number of staff involved in E-Learning staff development opportunities.	Financial rewards linked to contribution; E-Learning helps staff make a greater contribution. Ability to work more flexibly.	E-Learning is now central to all HE institutions' plans; all staff will benefit from being expert at the use of innovative E-Learning approaches to help career development.
Individual students	Development of high quality anytime, anywhere learning opportunities.	Improved ability to balance study and other demands. Savvy with smart technology.	Student satisfaction surveys. Focus group research.	Greater employability. Improved ability to balance study with income earning opportunities.	Matches to CU image of the type of students we want to attract and graduates we want to produce.

Table 3.2: Coventry University Value Analysis (Numbered). (Source: Coventry University (2006a))

	1. Capability	2. Impact	3. Metric	4.Economic Benefit	5. Strategic Fit
University	1. Better able to serve markets. 2. Provides more flexible programme. 3. Better student support. 4. Helps create a distinctive course offering.	1. More capable and employable graduates. 2. Improved reputation for educational innovation. 3. Improved brand presence.	1. Better FDS results. 2. Measures of public perception of CU. 3. Greater grant income for E-Learning projects. 4. Better recruitment and retention. 5. Positive student and staff survey results. 6. Benchmarking surveys.	1. Improved HEFCE income. 2. Greater grant income. 3. Greater income from overseas activities. 4. Improved fee income from CDP activities.	1. Supports emphasis on employability, enterprise and a wider concept of university education. **2.** Aligns with “Student First”.
School	1. Provides expertise, support and assistance in developing an E-Learning portfolio. 2. More varied, flexible and attractive programme.	1. More students and staff participating in E-Learning. 2. Greater student and staff satisfaction.	1. Support of Approval Panels, professional bodies etc. 2. Student survey data. 3. WebCT tracking data.	1. Improved income.	**1.** All schools have sophisticated E-Learning aspirations and plans.
Course Team	1. Provides support and assistance in the construction of new courses and review of existing ones. 2. Keeps course teams informed of latest developments and possibilities.	1. Reduced course development effort. 2. Better courses. 3. Wider availability of courses.	1. Course satisfaction data. 2. Shorter development times. 3. External comment.	1. Greater income per course. 2. Longer course life cycles. 3. Lower course maintenance costs.	1. Most new courses want to include blended learning elements. **2.** Course teams nearly always state that they would like to streamline the course development process and shorten lead-in times.
Individual staff	1. Staff development and training. 2. Hands on assistance in developing new materials and approaches 3. Practical assistance in developing online modules.	1. Less time spent in module development. 2. More interesting and student-friendly modules. 3. More flexible delivery options. 4. Less effort spent in assessment etc.	1. Number of modules using innovative E-Learning approaches. 2. Improved staff satisfaction. 3. Number of staff involved in E-Learning staff development opportunities.	1. Financial rewards linked to contribution; E-Learning helps staff make a greater contribution. 2. Ability to work more flexibly.	**1.** E-Learning is now central to all HE institutions’ plans; all staff will benefit from being expert at the use of innovative E-Learning approaches to help career development.
Individual students	1. Development of high quality anytime, anywhere learning opportunities.	1. Improved ability to balance study and other demands. 2. Savvy with smart technology.	1. Student satisfaction surveys. Focus group research.	1. Greater employability. 2. Improved ability to balance study with income earning opportunities.	1. Matches to CU image of the type of students we want to attract and graduates we want to produce.

Table 17: A Summary Of Drivers For The Uptake Of E-Learning At Coventry University. including Dearing and Hammond.

Driver	Source

• increasing and widening participation, particularly:
  ○ returners to education
  ○ under-represented groups in Universities (disabled; young; semi-skilled or unskilled family backgrounds; disadvantaged localities)
• increasing involvement to needs of business, other institutions, with world of work
• exploiting new technology and flexible delivery to be more accessible and ensuring that
• maximum use is made of its facilities through longer opening hours.
	Dearing 1997

• Educationally relevant technological innovation in ICT • Beliefs and expectations of stakeholders and society in general • Widening access and student diversity • Employability • Quality and standards • Increased IT and literacy of students • Student expectations of ICT use • The earner-learner • Increased provision of part time courses • Globalization of learning • Professionalism of teaching • Staff shortages in key areas • Staff handling larger groups and increased IT literacy of new staff	Hammond 2003
• Clear vision and leadership • A diversity of technologies to act as a coherent whole • The identification and dissemination of good practice • Expansion of E-Learning to accommodate CPD requirements • Optimizing the distance learning offering • Obtaining a complete picture of students' perception of e learning • Developing innovative and exciting E-Learning materials to stimulate learning	CU (2004)
• Impact • Metric • Economic benefit • Strategic fit	Coventry (2006a)

Table 17: A Summary Of Drivers For The Uptake Of E-Learning At Coventry University. including Dearing and Hammond.

Driver	Source
• A plurality of missions • Non-prescriptive (fitness for purpose) • Leadership (examining the function of management and its effectiveness) • Continuous improvement which looks for mechanisms by which change is achieved • Fact based management • Activities management and reporting • Main processes for appropriate delivery • Needs, interests and expectations of staff and students • Resources allocation and value for money achieved • Support of collaborations and partnerships • Evaluation and review and communication of outcomes • Generally enhancing the quality of teaching and learning • Increasing retention and completion • Keeping up with the competition • Facilitating collaboration with other institutions • Improved flexibility of delivery for on-campus students • Reducing teaching costs long-term • Increasing the volume of distance learning • Supporting local businesses and economic development • Improving provision for students with disabilities • Widening access to under-represented groups • Facilitating the transfer of students from further education • Safeguarding existing international student markets • Pursuit of new corporate clients • Safeguarding existing corporate clients • Entry into new international student markets	Coventry (2006b)

Table 18 CLASSIFICATION OF DRIVERS INTO STRATEGIC/TACTICAL/OPERATIONAL

Driver	Type of Driver (strategic (S)/tactical(T)/operational(O))
increasing and widening participation, particularly:	S - a 'why'
• returners to education	Tactical more why than how?
• under-represented groups in Universities (disabled; young; semi-skilled or unskilled family backgrounds; disadvantaged localities)	Tactical
• increasing involvement to needs of business, other institutions, with world of work	tactical
• exploiting new technology and flexible delivery to be more accessible and ensuring that	O- because specifying that new technology is to be used therefore more a 'how'.
• maximum use is made of its facilities through longer opening hours.	O – specifies longer opening hours
Educationally relevant technological innovation in ICT	S- is not specific more a why question
Beliefs and expectations of stakeholders and society in general	S
Widening access and student diversity	S
Employability	S
Quality and standards	S
Increased IT and literacy of students	O
Student expectations of ICT use	O
The earner-learner	S
Increased provision of part time courses	T
Globalization of learning	S
Professionalism of teaching	S

Staff shortages in key areas	T
Staff handling larger groups and increased IT literacy of new staff	T
Clear vision and leadership	S
A diversity of technologies to act as a coherent whole	T- The coherent whole would be a S driver to which this is a tactical driver
The identification and dissemination of good practice	T-Good practice in place in order for identification and dissemination to take place
Expansion of E-Learning to accommodate CPD requirements	T- E-Learning would be emplaced as a product of a S driver, this would be a further expansion.
Optimizing the distance learning offering	T- specifies the type of learning i.e distance learning
Obtaining a complete picture of students' perception of e learning	T- aspiration to find students perception,
Developing innovative and exciting E-Learning materials to stimulate learning	Operational - In order to widen access
Impact	Operational - outcome of strategic drivers
Metric	Operational - measurement of outcomes in Impact
Economic benefit	Strategic/Tactical/operational - calculate economic benefit at all levels, depending upon the nature of information available.
Strategic fit	S/T/O-
A plurality of missions	S - aspiration and requirement for evaluation
Non-prescriptive (fitness for purpose)	S - aspiration for evaluation
Leadership (examining the function of management and its effectiveness)	S -
Continuous improvement which looks for mechanisms by which change is achieved	S -

Fact based management	T/O
Activities management and reporting	Operational - activities (processes)
Main processes for appropriate delivery	Tactical - 'main processes'
Needs, interests and expectations of staff and students	T/operational
Resources allocation and value for money achieved	T
Support of collaborations and partnerships	T
Evaluation and review and communication of outcomes	S
Generally enhancing the quality of teaching and learning	S
Increasing retention and completion	T
Keeping up with the competition	S
Facilitating collaboration with other institutions	T
Improved flexibility of delivery for on-campus students	T
Reducing teaching costs long-term	T
Increasing the volume of distance learning	T
Supporting local businesses and economic development	T
Improving provision for students with disabilities	T
Widening access to under-represented groups	T
Facilitating the transfer of students from further education	T
Safeguarding existing international student markets	T
Pursuit of new corporate clients	S
Safeguarding existing corporate clients	T
Entry into new international student markets	T

Table 19 CLASSIFICATION OF DRIVERS INTO PEOPLE/PROCESSES/TECHNOLOGY

Classification Criteria ⟶ / **Drivers ↓**	**S/T/O**	**People**	**Processes**	**Technology**
Beliefs and expectations of society	**S**	*		
Increasing and widening participation, particularly:				
• returners to education	T	*		
• under-represented groups in Universities (disabled; young; semi-skilled or unskilled family backgrounds; disadvantaged localities		*		
• increasing involvement to needs of business, other institutions, with world of work			*	
• exploiting new technology and flexible delivery to be more accessible and ensuring that				*
• maximum use is made of its facilities through longer opening hours.				*
Widening access and student diversity	S		*	
Employability	S		*	
increased IT literacy of new staff	O	*		
Quality and standards	O		*	
Increased IT and literacy of students	O	*		
Student expectations of ICT use	O	*		
The earner-learner	S		*	
Increased provision of part time courses	T		*	
Globalization of learning	S		*	
Professionalism of teaching	S		*	
Staff shortages in key areas	T	*		
Staff handling larger groups and	T	*		

Clear vision and leadership	S	*		
A diversity of technologies to act as a coherent whole				*
The identification and dissemination of good practice			*	
Expansion of E-Learning to accommodate CPD requirements				*
Optimizing the distance learning offering			*	
Obtaining a complete picture of students' perception of e learning			*	
Developing innovative and exciting E-Learning materials to stimulate learning			*	
Impact		*	*	*
Metric		*	*	*
Economic benefit		*	*	*
Strategic fit		*	*	*
A plurality of missions			*	
Non-prescriptive (fitness for purpose)			*	
Leadership (examining the function of management and its effectiveness)			*	
Continuous improvement which looks for mechanisms by which change is achieved			*	
Fact based management			*	
Activities management and reporting			*	
Main processes for appropriate delivery			*	
Needs, interests and expectations of staff and students		*		
Resources allocation and value for money achieved			*	
Support of collaborations and partnerships			*	
Evaluation and review and communication of outcomes			*	
Generally enhancing the quality of teaching and learning			*	
Increasing retention and completion			*	
Keeping up with the competition			*	
Facilitating collaboration with other institutions			*	
Improved flexibility of delivery for on-campus students			*	
Reducing teaching costs long-term			*	
Increasing the volume of distance learning			*	
Supporting local businesses and economic development			*	
Improving provision for students with disabilities		*	*	
Widening access to under-represented groups		*		

Facilitating the transfer of students from further education		*		
Safeguarding existing international student markets			*	
Pursuit of new corporate clients			*	
Safeguarding existing corporate clients			*	
Entry into new international student markets			*	

Table 20 Grid for mapping Strategic drivers to tactical/operational ones

Strategic Drivers Tactical Operational Drivers	Widening access and student diversity	Beliefs and expectations of stakeholders and society in general	Clear vision and leadership	Employability	Enhancing Quality of teaching and learning and standards	Globalization of learning	Professionalism of teaching	Evaluation and review and communication of outcomes	Educationally relevant technological innovation in ICT
1. Increased IT and literacy of students									*
2. Student expectations of ICT use									*
3. The earner-learner	*								
4. Staff shortages in key areas					*				
5. Staff handling larger groups	*				*				
6. Increased IT literacy of new staff									*
7. From groups who are under-represented in Universities including									
a. people with disabilities	*								
b. young people from semi-skilled	*								
c. unskilled family backgrounds	*								
d. disadvantaged localities	*								
e. offering opportunities later in life to those who missed out first time round	*								
8. Expansion of E-Learning to accommodate CPD requirements									*
9. Obtaining a complete picture of students' perception of e learning		*							
10. Needs, interests and expectations of staff and students		*							
11. Improved flexibility of delivery for on-campus students	*								

Strategic Drivers Tactical Operational Drivers	Widening access and student diversity	Beliefs and expectations of stakeholders and society in general	Clear vision and leadership	Employability	Enhancing Quality of teaching and learning and standards	Globalization of learning	Professionalism of teaching	Evaluation and review and communication of outcomes	Educationally relevant technological innovation in ICT
12. Improving provision for students with disabilities	*								
13. Facilitating the transfer of students from further education	*								
14. Increased IT literacy of students									*
15. Student expectations of ICT use		*							
16. The earner-learner				*					
17. Staff shortages in key areas	*								
18. increased provision of part time courses	*								
19. increasing their contribution to the economy				*					
20. increased responsiveness to the needs of business;				*					
21. collaborating more closely and effectively with other institutions						*			
22. collaborating more closely and effectively with the world of work;				*					
23. The identification and dissemination of good practice								*	
24. Optimizing the distance learning offering						*			
25. Developing innovative and exciting E-Learning materials to stimulate learning						*			*
26. Main processes for appropriate delivery					*				
27. Support of collaborations and partnerships						*			
28. Increasing retention and completion					*				
29. Keeping up with the competition									
30. Facilitating collaboration with other						*			

Strategic Drivers Tactical Operational Drivers	Widening access and student diversity	Beliefs and expectations of stakeholders and society in general	Clear vision and leadership	Employability	Enhancing Quality of teaching and learning and standards	Globalization of learning	Professionalism of teaching	Evaluation and review and communication of outcomes	Educationally relevant technological innovation in ICT
institutions									
31. Resources allocation and value for money achieved					*				
32. Reducing teaching costs long-term							*		
33. Increasing the volume of distance learning	*					*			
34. Supporting local businesses and economic development				*					
35. Pursuit of new corporate clients				*					
36. exploiting new technology and flexible delivery so as to make themselves more accessible and ensuring that maximum use is made of its facilities through longer opening hours.									*
37. A diversity of technologies to act as a coherent whole									*

Table 21 Summary of Frameworks for the evaluation of VLEs/E-Learning

Theories used; context; stakeholders; evaluative criteria, evaluation processes/activities, management activities (Source: Various Authors)

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
Ray (2011.)	Evaluation of training	Kirkpatrick Blooms taxonomy	• Training events for trainees	• Trainers • Trainees • senior management • training manager	• objectives met • summary reports • learning outcomes achieved • degree of implementation of learning action plans	identification of training needs • needs audit, • initial knowledge/skills • audit of trainees • involvement in decision making process • training • preplanning • programme planning	
Kearsley and Schneiderman (1999)	Evaluation of learning	Engagement theory Learners engaged using cognitive processes: • creating, • problem solving, • decision making, • motivated by working		• learners • instructors	• Effectiveness of engagement • collaborative skills • degree of addressing individual differences • appropriate components for different aspects of learning •		preparation of instructors

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		collaboratively in groups					
Britain & Liber (1999) & (2004)	Evaluation of Teaching and learning	Conversational framework based upon Conversation Theory **6.3.2.1.1 Teacher Presents Conception** **6.3.2.1.2 Student Presents Concep**	University setting	• Teacher • Student	• Text, video, audio, images[2] • one off or continuous process[3] • resource negotiation[4] • mutual rights and responsibilities of teacher/student • currency of negotiation • self-organisation • space or tools are	• negotiation of learning contracts with teachers • provision for prevention of exploitation •	

2 the evaluative criteria are whether these are available

3 the criterion is whether the application of theory is continous process or a single event?

4 does resource negotiation take place

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		tion **6.3.2.1.3 Teacher sets up micro world** **6.3.2.1.4 Student interacts with micro world** **6.3.2.1.5 Tutor provides feedback to the student**			available to let the learners organise themselves as a group, outside of the teacher's purview?		
					• adaptation	possibility of the teacher to adapt the course and its resources in light of experiences gained dnote[5] during its operations	
					coordination:	learners collaboration in creating own learning	
		1. Student modifies actions			Monitoring	teacher monitoring/remedial action taken	
					individualization:	• students finding own resources for	

5

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						independanr learning • sharing of knowledge with other learners	
		Viable Systems Model (VSM)learning management which are supporting pedagogical innovation using E-Learning (module level)			• system tools • module time period for presentations • module structure over time sequentially or hierarchically • facilities to organise learners, • types of learning activity supported by the system, • how well learning progresses on module,	• underlying pedagogical model(s) or approach(es) encouraged by the system, module rules made explicit to students,	
					• degree of learner independence	• finding and managing resources • owning file stores	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						or repositories, talking to other students (other than in the main module discussion),	
						• creating their own discussions and learning activities involving peers, • locating people with similar interests outside of their own module, course, year or institution, • resources fragments of module structure people be added/changes/deleted. •	
					whether the degree can be viewed at programme level	rules for delivering a module can be specified,	institutional management of programmes (programme level)

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
							performance of a module be monitored by managers programmes can be adapted from within the system, teachers working on different modules can coordinate and assist one another. ,
					students' management of their own learning (learner level). student centeredness, facilities to assist in students organising themselves, view current and completed work in modules, monitor their own activities		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					and Personal Development Planning (PDP).		
Kearsley and Schneiderman (1999)		Engagement theory • that learners are engaged in learning using active cognitive processes (creating, problem solving, reasoning, decision making, evaluation) • are intrinsically motivated by creating collaborative teams where learning activities occur in groups (e.g one minute in class exercise in pairs to multi team, multi year cross curricular year long project) • are project based			• effectiveness of engagement theory with curricula, disciplines, age groups? • skills required for collaboration; • addressing of individual differences • evaluation methods to be used • most important component of engagement theory for different aspects of learning • best form of preparation for instructors; • the nature of groupware to be used • ability of engagement theory to be scaled up for large classes running simultaneously in different institutions		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		(selection of project, use of different activities and resources), • have an outside , authentic, focus • are based upon the principles Relate (communication, planning, management, social skills)-Create (problem definition, application of ideas)-Donate (making a useful contribution to e.g. campus group, community organisation, school, church etc					
Oliver (2000)	Evaluation	diversity of evaluation plurality of views; a focus on utility of			• student location, • competency in English, • level of ICT expertise,	conversion of real life teaching and learning to a supported VLE as • parallel model	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		evaluation; priorities of evaluation • authenticity, • adoption of socio-cultural models of learning • practitioner based evaluation			• degree of VLE activity, • methodology for communication, feedback (reaction of students to presented content) and assessment	with one to one transference of real life activities; • fixed model using a pre established pedagogical model addressing staff acceptance of the model and a stakeholder induction • open choice model, supplies a set of virtual tools the combination of which may be instantiated differently for different pedagogical models; • VLE construction with presentation of content (the conversion of concrete live face to face learning materials to web delivery),	
Basiel (2001)	Evaluation	online learning theory (telepistemology)	application of learning theory		• levels of learner		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
Evaluation		application of learning theory applied to VLEs centred upon • levels of learner autonomy, using • *View of knowledge* • *Learning theory* • *Knowledge types* • *Instructional settings* • *Teaching & learning methodological design* • *Student & teacher's roles* • *Cognitive psychology type* • *Curriculum design* • the ability of students to manage their own learning process,	applied to VLEs in HE		autonomy, using • the ability of students to manage their own learning •		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
Cook (2001)	evaluation	*is a process of asking pertinent and incisive questions*		**Students**	• Integration of Learning Technology • development of usefull resources		
		types of evaluation • needs analysis – assessment of current situation • strength and weaknesses, • availability of suitable resources, • potential users' attitude and skills			• strength and weaknesses, • availability of suitable resources, • potential users' attitude and skills		
		summative evaluation			evaluation –success of outcome • how fit for purpose • how effectively used	focus groups useful for post test formative/summative assessment, discussion allow views to emerge care in selection of members of	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						groups	
						questionnaires • large numbers of respondents in less time • good for structured questions • can use open and closed questions • low response to be expected	
		types of resources Technologies:			quality of resource success measured by • how fit for purpose • how effectively used	e.g. email and video conferencing	
		archives of reference materials (digital educational materials):			measured by • quality of resource		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		tools for authoring resources of tutorials			• accessibility • ability to match users' requirements		
					accessibility		
				students	ability to match users' requirements • navigation • ease of learning of particular functions • ease of use • enjoyability, • usefulness for passing exams		
				teachers	content of high quality for course		
				developers	feasibility of and time to make changes required		
				IT support staff	• hardware requirements • Impact on network		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
				managers	• appropriateness for institutional strategy • impact on image		
				funders	• value for money); • budget(in addition to travel,		
						observations	
		•				think alouds conjunction with observation- user asked to explain thinking when engaged with system, can be done in	
					interaction between user and system	system log data software that keeps track of interaction between user and system, e.g. internet servers keep record of every page visited	
					textual data	use of text based media, e.g. email or discussion boards,	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						where interaction can be printed off	
					cost of production of resource	cost analysis	
					impact of intervention on student learning	pre and post testing evaluation dependant upon tools used and reliability as measures of student learning	
Bonk & Dennen (2002)		• formative evaluation • summative evaluation • contractual agreements • context, input, process • product (CIPP model) • evaluation, objective orientated evaluation • Marshall and Shriver (1994) 5			• cost benefit analysis • time to competency • time to market • return on expectation • (AEIOU) • accountability • effectiveness • impact • organizational context • unintended consequences and consumer orientated		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		levels of evaluation of • self • course materials • curriculum • modules • learning transfer •			evaluation		
Chohan (2001)		•	**Leeds University**			• to identify the need for an MLE; • devise criteria to compare MLEs; • create shortlist of companies, • invite them to demonstrate their envisaged solution • finally write report to allow a decision to be made.	
Konrad (2003)	**Objectives to be**	• good course					

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
	used in evaluation	design • a planned pedagogical approach • staff development					
		students to have • the discipline to meet deadlines • motivation for complete participation in learning activities • time to devote to course • ability to work alone and in teams • flexibility to deal with technological problems • be self starters • be able to learn from the printed word		**students**			

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		• manage their own time to set aside specific times routinely • be able to ask questions for clarification • have access to current technologies and good basic computer skills					
		the principles of good practice in undergraduate education as being to: • encourage contacts between students and faculty; • develop interaction between students; • use active learning; • give prompt					

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		feedback; • focus on time on task; • have high expectations; • respect pedagogical diversity; • be selective to ensure fitness for purpose.					
Dyson & Campello (2003)	A framework for the evaluation of different VLE evaluations				• purpose of evaluation •	• formative, • summative, • illuminative, • integrative • quality assurance	
					• quality of interaction of participants as perceived by HCI/usability criteria; • usability heuristics;	• usability versus learning • experiments vs evaluations • process versus	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					• frequency of interactions, • quality of interactions • learner perceptions • tools' • usefulness; • learning outcomes • learning technologies •	outcome, • qualitative versus quantitative (paradigm debate); • subjective versus objective, includes • expert versus user,	
Hinze-Hoare (2003)	**Evaluation of VLE**				usability (HCI index) • familiarity • consistency • forward error recovery • subsitutivity, • dialogue • initiative, • task • migratability, • responsiveness,	• ;	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					• customisability		
					EDI index • collaboration • control • culture • reflection • reinforcement		
Conole (2004)	development of representation of E-Learning domain					• metrics (identification and development of metrics to measure E-Learning); • user requirements (methodological elicitation of user requirements); • evaluation (processes for monitoring, feedback and control); • understanding the learning	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						process; • understanding the learner (methods to determine degree of online learning); • pedagogical models and practice; • capturing experience; • ideas and practice; • intended and actual use; • reuse and assessment	
Kuusinen (2004)	evaluation of E-Learning and ICT supported learning in vocational education training (VET).				• time • resources • investments • networking, • web reading skills	assessing • learning, production change process	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					• verbal modes of action including	• communications • communication dialogue to share understanding • discussion and interaction	
Bournemouth (2004)	Use of media2in		Bournemouth university		• ease of use of VLE • levels of usage by staff and students, • the use and impact of specific learning resources within Media2; • the effects of teaching and learning from staff and students perspectives		
					• Type of learning environment types of		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					teaching methods • internet technologies (repository of lectures slides and materials), • real time information and communication, using technologies to support self study, development of virtual classroom); • support in education including teacher support peer support for with online discussions),		
Conole (2004)	E-Learning				metrics	identification and development of metrics to measure E-Learning	
					user requirements	methodological elicitation of user requirements);	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						monitoring, feedback and control	
						understanding the learning process;	
						• pedagogical models and practice • capturing experience; • ideas and practice; • intended and actual use; • reuse and assessment	

Kuusinen (2004)	Evaluation of models of evaluation	• cost benefit model
		• resource allocation model
		• a model with the following phases:
		  ○ managing
		  ○ purpose
		  ○ stakeholders
		  ○ techniques
				• institution;
				• department;
				• course team;
				• students external authorities
					• resources
					• investments and time resources
					• technological skills
					  • know how in networking, web reading skills specifically
					  • mastering the web browser,
						• assessing the learning change process
						• communications
						• communication dialogue to share understanding
						• discussion
						• interaction
						• facilitator of	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
		○ meta evaluation			• information retrieval, • constructing web documents;	discussion • formative, • summative, • illuminative, • integrative	
						•	
Franklin (2004)		○		•	• purposes • understanding • action ○ incentives to develop courses • institutional rewards for effective teaching • a technology plan • electronic security to secure validity of information and a centralised development and support for infrastructure	•	
					• learning design to fit the context of learning • learner support		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					organizational commitment • demonstrable learning outcomes • technology to support learning • teaching • learning • planning stages • system design • academic standards • quality assurance • development • support • communication • representation and assessment, encompassing review and planning as major foci • institutional context and commitment, • curriculum and		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					instruction, • faculty support, • student support • evaluation and assessment focussing on learning, review and planning stages • controls and drivers • institutional strategy and capacity • external collaboration/ partnerships • regional agenda • infrastructure; • professional bodies • processes • course design • course development • teaching • learning. • computer assisted support		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
Walker (2004))	Stages of evaluation				pre course design includes intent of course strategic justification clear statement of objectives assessment methods course content meaningful memorable motivational have mix of media to be coherent and consistent level appropriate to students' needs interface Navigable customisable aesthetic and address disability issues interactivity		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					between students student and teachers students and content encourage collaboration support existence of support to be clearly communicated to learners and address educational, technical and personal need		
					assessment of students	• pre testing to determine educational and computer literacy • checking students perceptions of course outcomes and compare with teachers	
						• Formative evaluation identifies students reactions	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						○ questionnaires ○ happy sheets ○ online diaries used as part of course content and employing usability heuristics •	
					determining the learning taking place		
					using diversity of assessment methods	Quizzes Written work demonstrations	
					confidence logs quality/quantity of interaction contributions	•	
						• Summative evaluation determines whether outcomes are mapped to objectives	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						• strategic intentions to be evaluated, • objectives stated at commencement of course and assessment to measure learning against objectives • support • end of course questionnaires • interviews • tutorials used to evaluate educational personal and technical provided	
					• assessment of quality of contributions	• participation online diaries • blogs • reflection piece at	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						end of the course	
					▪ student satisfaction using	▪ end of course ▪ questionnaires ▪ online diaries ▪ blogs ▪ reflection pieces ▪ interviews	
Piramathu (2005)	capture knowledge creation and learned knowledge of students over time in an intelligent tutoring system called Intelligent Multiagent Pedagogical System (IMAPS) Framework and is intended to monitor the students' progress.				▪ nature of student requests (per lesson plan or adhoc) ▪ amount of time spent per lesson ▪ amount uninterrupted time spent per lesson ▪ number of times student went back over covered material in that session; ▪ frequency of help requests; ▪ average time spent on given 'page' during lesson plan.		
Ivanova & Smrikarov (2006)	Methodology for analysis and	▪ cybernetic model for evaluating VLEs				▪ defining the purpose with regards to needs	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
	evaluation of VLES					analysis (diagnostic), ▪ development (formative) ▪ monitoring (summative) purposes); ▪ evaluation types being ▪ needs analysis ▪ assessment of current situation o formative, o summative and o integrative; o identifying needs of users (teachers, web programmers, system administrators, managers);	
		▪ connoisseur model				▪ requiring evaluator to appreciate, perceive, criticize), ▪ qualitative evaluation (providing experts	

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
						judgements on basis of observations made),	
		▪ goals free model	▪			observes outcomes and infers intended objectives	
		conversational framework model based upon : ○ mapping the interaction between teacher and student;			○ textual data, ○ system log data;	○ interviews ○ focus groups, ○ questionnaires	
Birch and West (2006)					• ICT competency of academics • motivation to participate • developing competency • confidence, • teething problems • support		• ongoing staff development • an increase in ICT resources is required • change staff and student behaviour • production of

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
							VLE materials is time consuming.
Starke-Meyerring (2006)					• team and technology integration • communication channels • ability of students to learn about impact of technology on communication collaboration • students control of web space • tracking drafts and designs of documents • equality of access • shared partnership identity • share learning environment with communication • behaviour of stakeholders		

Author	Purpose	Theory	Context	Stakeholders	Eval Criteria	Eval Processes	Management Processes
					• privacy of students • classroom context		

First DoS: Why do you want to use this questionnaire?

FA: In order to ascertain the perceptions of the Management/Teachers/Staff and Students. In effect to investigate whether there is a case for the production of an evaluative framework, and if there is, to assist in determining the possible nature of the framework.

Visiting Professor: Why the different sections in the questionnaire?

FA: These provide a comprehensive investigation into various aspects of the juxtaposition of VLEs/E-Learning and an organisation. It may be argued that the sections may not be all inclusive nor definitive, but they are sufficiently diverse to afford a reasonable perspective.

SL: Why are you simply determining the perceptual differences between the management/staff and students (users). There are many possible stakeholders for example the Board of Governors; Senior management team and others.

FA: I am establishing the need for a framework for the evaluation of the management of the development and implementation VLEs/E-Learning. It is primarily about the 'providers' and 'users/clients'. Therefore I am targeting the:

- VC- because this office straddles the Board of Governors and Management of the university.
- Dean Of Faculty of EC : This member of the Senior Management Team has expertise in Computing/IT/ and would have greater awareness of the issues.
- HoD : Computing – as for Dean of Faculty but more technical awareness of issues.
- Students studying MSc Information technology for management.

Appendix A

Focus group results.

First DoS: Why not non experts? A random sample?

FA: That might be a useful tool, but it is valid to select people who are more likely to be aware of IT/VLEs/E-Learning technologies. In aspiring to an evaluative framework of management feedback of perceptions of people nearer the technologies would be a 'best' awareness.

Visiting Professor: If you are looking for a simple separation of 'Ought' and 'is' about various aspects of VLEs/E-Learning, then the degrees of granularities of 'Vital'; 'Important';'Useful'; 'irrelevant' might be too detailed. Why not accumulate into 'Vital'; 'Important';'Useful' into one category and 'irrelevant'.

FA: So noted.

Appendix B

Questionnaire on E-Learning

Thank you for agreeing to participate in this survey. The survey is a part of research to assess the management of E-Learning. The assessment has been developed to help understand and illustrate the organization's current situation against the desired outcomes. The questionnaire will take no more than 20 minutes to complete.

The exercise consists of a series of statements concerning E-Learning. Read each statement in the questionnaire carefully, then select the appropriate response against 'Importance to Your Organization' and against 'Reality of Current Ethos and Practice'.

A four point scale is used for your responses under each of the two headings.

Importance to Your Organization

Vital - critical to the success of the organization's overall business strategy

Important – major contribution to the organization's overall business strategy

Useful – some benefits expected, but probably to one part of the organization

Irrelevant – not important

Reality of Current Ethos and Practice

True – existing ethos and practice matches or exceeds the statement

Largely True – some practices may exist, and there is a feeling of support

Largely Untrue – few practices may exist, and support is very limited

Untrue – has not been addressed seriously

Section 1: Awareness and Commitment

	Importance to your organization				Reality of current ethos and practice			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. At all levels, there is a general understanding of how and why e-learning is undertaken in the organization.								
2. At least one member of the board of governors champions the management of e-learning								
3. The board is committed to e-learning in concept and practice								
4. Senior management demonstrates e-learning commitment by policies, guidelines and actions.								
5. Senior management supports and is seen to support e-learning and desirable e-learning behavior								
6. E-learning is recognized throughout the organization as supported by senior management, 'here to stay'' and a critical component of organizational strategy								
7. The strategic and operational effectiveness of e – learning in regard to the whole organization is under continual review, and feedback and control systems are in place.								
8. E-learning intellectual assets are recognized and valued.								

Section 2: Strategies to Encourage E-Learning

	Importance to your organization				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. There is a program of initiatives in place to improve e-learning concepts and practices								
2. There is a clear vision as to how e-learning should be integrated with core organizational activities								
3. E-learning initiatives are prioritized with 'normal' organizational activities and such initiatives have an appropriate and clear budget								
4. E-learning initiatives are prioritized with 'normal' business activities, and such initiatives have an appropriate and clear budget.								
5. E-Learning principles are set, and definitions of key concepts and management are clear								
6. Faculties or the whole university take responsibility for and ownership of e-learning initiatives								

Section 3: Applying and Employing E-Learning

	Importance to your organization				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. Ideas to utilize E-Learning more widely are monitored, reviewed, and acted upon for organizational improvement.								
2. Internal methods are monitored and reviewed for examples of best practice and these are disseminated and encouraged								
3. E-learning provision is targeted at key decision points in major business processes.								

Section 4: Monitoring and Review

	Importance to your organization				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. Key performance indicators for e-learning are in place								
2. There is a balanced scorecard approach (or similar) to cover functional sections of your business, such as markets, people, operations, finance								
3. The impact of e-learning on overall performance is measured regularly								
4. The value of e-learning assets is appraised continually								
5. Senior level action is taken in response to assessments of e-learning as means to improve business effactiveness								

Section 5: Organizational Structure and Processes

	Importance to your organization				Reality of current ethos and practice			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. Formal systems exist to encourage and facilitate the intrafaculty and interfaculty dissemination of e-learning								
2. An Agile systematic and contemporary 'e-learning chart' is in place to direct staff to appropriate e-learning sources								
3. Informal intrafaculty and interfaculty e-learning networks are propagated								
4. Appropriate access to cross-organizational e-learning information is given to all relevant users in suitable formats.								
5. E-learning information is disseminated effectively and efficiently.								

Section 6: Human resources

	Importance to your organization				Reality of current ethos and practice			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. A Chief e-learning officer is in post, and has a clear and effective role, with high level authority								
2. The creation, storage, analysis and dissemination of e-learning information is undertaken by committed e-learning information workers.								
3. Cross disciplinary teams are formed and managed effectively and efficiently								
4. Best practice and fresh ideas are disseminated by flexible e-learning information workers who are rotated around the business functional areas.								

5. Natural turnover of staff is used as an opportunity to widen the e-learning information base.								
6. E-learning networks are used to support virtual or remote teams								

Section 7: Culture

	Importance to your organisation				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. Failure is recognized as an opportunity to learn								
2. Recording and sharing e-learning information is routine and commonplace								
3. It is natural, standard, procedure to avoid 're-inventing the wheel', by looking for best practice and re-usable work.								
4. Best practice and fresh ideas are disseminated by flexible e-learning information workers who are rotated around the business functional areas.								
5. Natural turnover of staff is used as an opportunity to widen the e-learning information base.								
6. E-learning networks are used to support virtual or remote teams								

Section 8: External Factors

	Importance to your organization				Reality of current ethos and practice			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. There is a system in place to collect, categorize, analyze, and disseminate market and rival organization intelligence.								
2. There is a program of external participation in discussion forums, such as conferences, to share and learn new ideas and experiences.								
3. Relationships with clients and suppliers are enhanced by sharing appropriate technology.								
4. Customers suppliers, and rivals, recognize the organization as being innovative								
5. Ideas for new alliances to increase intellectual capital are continually monitored, reviewed, and acted upon where suitable.								

Section 9: Incentives

	Importance to your organization				Reality of current ethos and practice			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. E-learning is monitored, reviewed, and built in to the mainstream performance appraisal and reward system								
2. Good e-learning information sharing behavior, such as sharing and reusing is actively promoted on day to day basis								
3. Bad e-learning information sharing behavior, such as hoarding is actively discouraged on a day to day basis.								
4. Individuals are clearly and visibly rewarded for teamwork, e-learning information sharing, reuse and dissemination of good practice.								
5. From recruitment onwards, staff are expected and encouraged to attend training and development program in good e-learning information sharing								

practices.								

Section 10: Information Technology (IT)

	Importance to your organization				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. The effective use of suitable Information Technology is normal custom and practice.								
2. The IT used is leading edge, and is fully supported.								
3. IT enables the appropriate information to be available to the right people, in the right place, at the right time.								
4. IT makes it easier to search for specific information.								
5. IT enables effective and efficient communications across physical and time boundaries								

Section 11: Maintenance and Security

	Importance to your organization				**Reality of current ethos and practice**			
	Vital	Important	Useful	Irrelevant	True	Largely True	Largely Untrue	Untrue
1. Out of date e-learning information is updated or deleted, and new information is added from appropriate sources by means of timely reviews								
2. Effective and efficient cataloguing and archiving procedures are in place for electronic and other documents								
3. Key e-learning to be protected is identified, and suitable measures are in place to ensure it remains within the organization in the event of key staff leaving								
4. E-learning intellectual assets are legally protected.								
5. reliable and complete IT security procedures are in place and used (e.g. backup, recovery)								
6. Regulatory and policy requirements are published clearly and widely, and effective compliance monitoring system is in place.								

Table 22: results of E-Questionnaires							
tudents	nportance to your ganisation - tal/important/Useful	releva	eality of rrent ethos and ctice - cumulated ue	eality of current hos and actice - ccumulated nTrue	otal responses om each spondent	% response from each spondent : i.e (total sponses by spondent/120)*100	
	0		7	2	20	00.00	
	7		1		20	00.00	
	3		3		2	1.67	
	9		9	8	11	2.50	
	5		1		7	4.17	
	3		9		16	6.67	
	6		4	1	11	2.50	
	3		0	0	13	4.17	
	9		8		18	8.33	
0	8		0		9	9.17	
1	7		0	2	09	0.83	
2	9		8	1	18	8.33	
3	0		3	7	20	00.00	
4	8		6		16	6.67	
5	9		8		18	8.33	
6	9		1		26	05.00	
otal	**85**	**3**	**78**	**18**	**714**	**verage response**	9.27
taff							
VC	9		4	5	19	9.17	
C	0	0	8	5	13	4.17	
oD 1	8			7	16	6.67	
oD 2	7			2	14	5.00	
					verage response	**3.22**	
	24	**1**	**8**	**79**			
ll	**109**	**4**	**26**	**97**			

Table 23 Progress meeting 15 September 2008	
Progress meeting for September 15 2008 Present: B.Lehaney; M.Nicholls: R.Sassman; B. Cargill: F.Aslam	
Points raised :	
MN: Clarification of the research design diagram. Recommended that the 'empirical' data circle be moved out of the main box. The questionnaire is not a part of the main development of conceptual framework	Several changes carried out to research design. Final version as seen in Figure 1.1.
BC: Take out the word 'empirical' out	
BL: Distinction between the different types of dissonance. In questionnaire	Questionnaire distributed to selection of respondants from Case organisation –results demonstrate that an evaluative framework would seek to reconcile the different perceptions of different respondants.
• Between vital/important and largely untrue/untrue – supporting the idea of a set of issues that need to be looked at	
• Between the different users, demonstrating different views and different issues	
BC: Grid to look at differences between respondents groups. Must not become too engrossed in gathering data. Look at a few more then move on, the main point of survey is to substantiate the field of inquiry.	
BL: Net main thrust of work is to produce the issues for the conceptual framework. Read Phillips and Pugh.	Issues arisen at the appropriate juncture of research trajectory.
MN: In general good progress made from last year.	
BL: Referred to other work used by BC, demonstrating the nature of using preexisting work and mapping it to own area of concern.	Logical linkage of appropriate disciplines reasoned into research

Table 24 Changes to Dissertation May 2008
From Prof Lehaney; FA08May_Chp3_v1.doc
14 May 2008
• There is a lot of good material here but the presentation needs a lot of improvement. There are also issues of substance and I have commented on these below.
• Please list the subject header in emails of drafts to reflect what is in it. That is really helpful to me.
• Also please name your file in a meaningful way, as I could have 20 Word files entitled ''Work Completed'. I would suggest something like 'FA14May08'. There are lots of odd gaps between words, double full stops, etc, etc.
• There are lots of inconsistencies.
• For example, compare the spacing in heading 1.1 with that in heading 3.2.
•
• There are many cases of poor English, which look as if you have rushed and left things out. It appears not to have been proof read. Overall it is a good work in progress but is badly marred by the things I mention here.
• I would like to see a revised version, with no additional material at all, which has the points listed fixed, before you write anything new. In some cases the substance can also be fixed by moving things around, without adding material. I suggest by the end of May. Please let me know if this is agreeable and feasible. Not adding written material does not prevent you from continuing with empirical work. Stick with that in parallel with adjusting your written work to date.
• **Abstract**
• This should be on a single page.
• There should be no references in the Abstract, as it refers to the whole of your main text as the source.
• **Chapter 1**
• There are some inconsistencies in quotes in Chapter 1. Mostly you have italics and quotation marks. In at least one case you miss the quotation marks.
• Chapter 1 is twice as long as it should be. Some of the material can be transferred to other chapters.
• The research design is missing from Chapter 1.
• The summary of chapters is missing from Chapter 1.
• **Chapter 2**
• I like the Table in 2.1, but would move it to the end of the chapter and summarise the main points for each publication and ad those to the table. The table is numbered as 'Table 2', which is inconsistent with your previous table numbering (later, you have a Table 2.1).
• Your referencing in this table (2) is not consistent or correct in many cases.
• In addition, the typeface or effect changes part way down. Table 2.6 provides a useful summary. You need to find a way to display this so it has 'chunks' of cohesive material on a single page (for each set of material). ie it could go over several pages but make each page meaningful.

- Given the work in Chapter 2, the final single paragraph summary is very weak.
- You need a 'Conclusions' section and you should have a lot to go in it.

- **Chapter 3**
  - The first 'sentence' is not in English. It is also not completely factually correct as you claim to have done something in Chapter 2 that you have not done.
  - The second 'sentence' of the second paragraph is not in English. Also, this is too detailed.
    - What, overall, does the Chapter do?
    - How does it add to your work?
    - How does it add to your move towards showing a contribution to knowledge?
    - How does it add to your research design? Why is it there? Here does it fit within your research design?
    - What would happen if this chapter were not there?
    - The third 'sentence' in 3.2 is not in English.
    - Your statement in 3.2 'It can be observed from the definition that KM involves knowledge and the attainment of strategic aims' is tautological. I deliberately did not use the term 'knowledge' or the term 'management' in my definition of KM. There is no link from 3.2 to 3.3.

- **Chapter 4**
  - Is the opening sentence correct? If yes, summarise these things here. No need to refer to Fig 3.1 here.
  - That is just a part of the overall material to which you refer in 4.1. 4.2 isn't doing very much.
  - When complete it should probably go in an Appendix. 4.3 should draw on 4.2, or the appendix (or there is no point to 4.2 at all). 4.3 should not be about a diagram. It should be about your research design, and within the section you use a diagram to help explain that design. Overall 4 is weak and does not seem supported very much from literature. A complete 4.2 (or appendix) should fix that. You barely mention triangulation, and not until 4.4. Triangulation is THE key to your work being credible. Overall, 4 is a very weak chapter at the moment.

- **Chapter 5**
  - The biology and systems stuff simply does not belong here.
  - This chapter is about your empirical work. Isn't the early part of this a link between systems thinking and your research design?
  - Shouldn't it go in the research design chapter – having first discussed the systems stuff in the section on that (3.4)?

- **Appendices**
  - These must be 'stand alone'.
  - You need to source what is in them and explain any diagrams. A reader should be able to look at Appendix 1 (for example) and understand what the diagram is about and what the source is. 'Figure 1.1' in Appendix 2 is in fact a table. Figure 3.1 in Appendix 4 should not be in an appendix at all. This is your research design diagram. It should be in the chapter and each component should be supported through literature and reasoning, as should the sections and the whole. Triangulation is key. There are inconsistencies in your headings and figure and table labelling in the appendices.

References

There are lots of inconsistencies and errors. Here are just a few examples.

- Birch K, West M (2006). You list 2006 for Birch in the standard way, but then also note 2006 at the end of the reference;
- Britain and Liber (1999). Look at the difference between this and Birch above. You miss

out the initial and you use and'. You have a space after Programme and before the semi-colon. For Basiel you note when last accessed. You do not do this for Britain and Liber and you are inconsistent with this throughout. For Britain and Liber (2004) you use 'Visited'.
• The above are from the first five references alone, so there is a lot of work to do on the reference list.

Table 25 Revision carried out on critique on version chapter1_3v4

Item to change (1_3v1)	pages	IM	BL	Done
Long sentences, Break down into bullet points	Most e.g 27, 29,	X		X
Work out chapter, section and paragraph structure??		X		X
Blank page after page 1		X		X
Change abstract remove definitions and focus on 'what' is research about and 'why' it is important		X		X
Use style headings and automatically generate table of contents	All pages	X		X
Use style headings and automatically generate list of figures	All pages with figures	X		X
Use style headings and automatically generate list of tables	12	X		X
Chapter 1.1 overview		X		X
Remove spaces between headings and main text	All	X		X
Change objectives		X		X
Textual changes	7,8,10,	X		X
Remove indentations from quotations	8,9,23, 36, 39,45, 97,98	X		X
Extract common definition then cite references	9	X		X
Find better reference to replace zebrawords	10	X		X
Headings (drivers etc)	11, 35, 36,			X
Ensure that drivers of ICT etc are covered	11	X		X
Summarize sections	12		X	X
Section 1.3.2 make brief overview in introduction to section	13,22	X		X
Reverse sections into date order	13	X		X
Change fig to figure	14,24,35,53	X		X
Check table 2.1, 3.1	15, 16	X		X
Capitals	22	X		X
Vary foregoing	23	X		X

Table 25 Revision carried out on critique on version chapter1_3v4				
Reference phase	23			X
Section 1.5 chapter summary include a diagram showing each part completion of chapters	26	X		X
Link chapter to next chapter	26	X		X
Section 2.2 Harvard style	28	X		X
hyphens	29,38,50			X
Check on ERIC (www.eric.ed.gov)	31			X
Ensure Harvard style	32, 43, 53	X		X
Explain context and history of Conversational framework	32		X	X
Capitalise bullet points or not	33	X	X	X
Fit table to page	34	X		X
Be consistent with spacing in the table	34	X		X
Turn headings into bullet points	36		X	X
Use reference at beginning of paragraph	36	X		X
Change surmises	37	X		X
Remove spaces	37,50	X		X
add year	38	X		X
Labeling for table	39	X		X
Define range of terms used in E-Learning at beginning	41	X	X	X
Correct referencing	45		X	X
Spaces	46,50,95	X	X	X
Incorrect spaces between paragraphs	47	X	X	X
Put table in appendix	56	X	X	X
Think about how to organise chapter perhaps by identifying criteria then summarising in table with authors from whom criteria have been extracted	55	X	X	X
Make textual changes	93,94		X	X

Table 25 Revision carried out on critique on version chapter1_3v4				
X section to appropriate section	93		X	X
Remove introduction paragraph	95	X		X
Rethink new introduction	95			X
Put in references	96 (3.2)	X		X
Change words e.g. contend to propose	96 (3.2), 98	X		X
Ensure header/footers are consistent	98 and all pages	X		X
Use more references than just two papers	106	X	X	X
Quote source	107	X	X	X
Check source for table 2.1 /locate next to discussion	108	X		X

Table 26: PRP: 28.08.2009

PRP Panel's Decision Record

Potential Questions

Progress	a. Is the timetable for completion feasible? b. Has the student passed the appropriate modules for the current PRP milestone c. Does the student appear to be experiencing difficulties due to problems or some external issues? d. Have appropriate arrangements been made to ensure completion?
Quality	e. Is the quantity of written work sufficient for the target research degree? f. Is the standard of written English acceptable?
Scope	g. Is it clear what basic research question(s) is being asked, or claims being made? h. Is the proposed scope of the research feasible? i. Has the topic changed significantly since the last PRP?
Training	j. Has the student passed M001RDC? k. Has the student passed the required number of taught credits? l. Does the student have the knowledge and skills to complete the research?
Other	m. Has the student kept an appropriate record of research activity and supervision? n. How many times have the students and supervisor(s) met since the last PRP? o. Is the panel satisfied that the supervision arrangements are still appropriate?

Decision

Decision	Tick One	Dates
Progress (P) to next phase/year		[redacted]
Referred (R), progress to next phase/year but there are minor issues to addressed by a given date	✓	31/10/09
Repeat (Rt) do not progress to next phase/year as there are major issues that must be addressed by a given date		
Transfer (T) to fallback award and re-profile programme of study		
Defer (D) until a given date because of serious personal or medical problems		
Fail (F) programme of study and withdraw from the University		[redacted]

Feedback and/or issues to be addressed

Evidence	Comments
PRP Summary (2 A4 pages)	
Presentation Materials (15 minutes)	Much clearer focus on specific research questions and an appropriate revision to the methodology in the light of these questions
Discussion	
Universe Record	
Other	

Signatures

Chair of PRP	[redacted]
Independent Subject Expert	
Director of Studies or Alternate	
Date of PRP	20/8/09

Table 27 PRP 27.01.2011

Progress Review Panel - July 2010_FA Version 1

PRP Panel's Decision Record

Potential Questions

Progress	a.	Is the timetable for completion feasible?
	b.	Has the student passed the appropriate modules for the current PRP milestone
	c	Does the student appear to be experiencing difficulties due to problems or some external issues?
	d.	Have appropriate arrangements been made to ensure completion?
Quality	e.	Is the quantity of written work sufficient for the target research degree?
	f.	Is the standard of written English acceptable?
Scope	g	Is it clear what basic research question(s) is being asked, or claims being made?
	h	Is the proposed scope of the research feasible?
	i.	Has the topic changed significantly since the last PRP?
Training	j.	Has the student passed M001RDC?
	k.	Has the student passed the required number of taught credits?
	l.	Does the student have the knowledge and skills to complete the research?
Other	m.	Has the student kept an appropriate record of research activity and supervision?
	n	How many times have the students and supervisor(s) met since the last PRP?
	o	Is the panel satisfied that the supervision arrangements are still appropriate?

Decision

Decision	Tick One	Dates
Progress (P) to next phase/year	✓	
Referred (R), progress to next phase/year but there are minor issues to addressed by a given date		[illegible]
Repeat (Rt) do not progress to next phase/year as there are major issues that must be addressed by a given date		
Transfer (T) to fallback award and re-profile programme of study		
Defer (D) until a given date because of serious personal or medical problems		
Fail (F) programme of study and withdraw from the University		[redacted]

Feedback and/or issues to be addressed

Evidence	Comments
Written output	Substantial document produced. May need to be consolidated for the final thesis
Presentation Materials (15 minutes)	Good presentation - well timed and to the point.
Discussion	Good discussion concerning all issues raised and defended the work well.
Universe Record	Appl to be classified for 40 credit taught modules
Other	Ethics form to be completed

Signatures

Chair of PRP	PROF KEITH BURNHAM [redacted]
Independent Subject Expert	DR RAGEV GALA
Director of Studies or Alternate	DR ANTHONY OLOMOLAIYE
Date of PRP	27/01/2011

APL FORM + LOW RISK ETHICS - COMPLETED AND APPROVED FORMS RECEIVED 27/1/2011

Registry Research Unit Page 4 of 6 26 JULY 2010

Table 28 prp 10.01.2013

Questions asked by Independent Expert / discussion points

- Capetalise on methodology
- Make aims clear from start

Comments from student

Student defended well.
Happy with supervision

Comments from Director of Studies

Student making good progress –
Student writing-up.

Suggestions for next year of study (if applicable).
(including whether points raised from previous PRP have been realised)

None.

The following marks have been confirmed:

Checklist	Mark

Quality & Research Support Page 2 of 4

Signatures:

	Name	Signature
Chair of PRP	M. Saidani	[redacted]
Independent Subject Expert	A. GARCIA-PEREZ	
Director of Studies (or alternate)	A. CLEMENTE	
Date of PRP	10/1/2013	

Table 29: Presentation made to senior management team at Coventry University 3.01.2013

FURRKH ASLAM

A FRAMEWORK FOR THE EVALUATION OF MANAGEMENT OF VLES/E-LEARNING

1

Objectives

- Statement of problem
- Research methodology
- Characteristics of framework
- Derivation of domains of framework
- Mapping of elements across questions
- Example questions
- Any Questions?

2

The Problem

Evidence for problems with VLEs/E-Learning from several sources:

- Literature:
- Case organisation
- These sources yielded the following issues:
  - The evaluation of VLEs is carried out primarily for the underlying pedagogy. This does not consider the problems of management of the VLE.
  - No framework to evaluate the management of VLEs/E-Learning
  - No framework that examines VLEs/E-learning through the lens of KM, CST, SSM
  - No validation nor verification based upon fitness for purpose (i.e linking to societal, international, national, sector drivers)

3 

Statement of research question

- '*What criteria can be identified to be placed in a framework that would enable the identification of and subsequent resolution of issues in the management of the strategic, tactical and operational development and implementation of VLEs in UK Universities?'*

4

Research Methodology

- the problem domain deals with management in large organisations (HE institutions). Management is a human construction, it is a dynamic, highly complex entity, is in a continual state of flux and that the act of observation may change the observed behaviour.
- Action research has been applied at all levels of research. In practice this means that every stage of research of:
  - identification of the area of research
  - formulation of the research question
  - the trajectory followed in addressing the research question
  - the emergence of evaluative criteria
  - the development of a framework in which to place those criteria
- are all subjected to reflection and open to critical review by the academic community and where possible supported by quantitative data. Furthermore the research methodology itself is subjected to the same reflection and critical review.

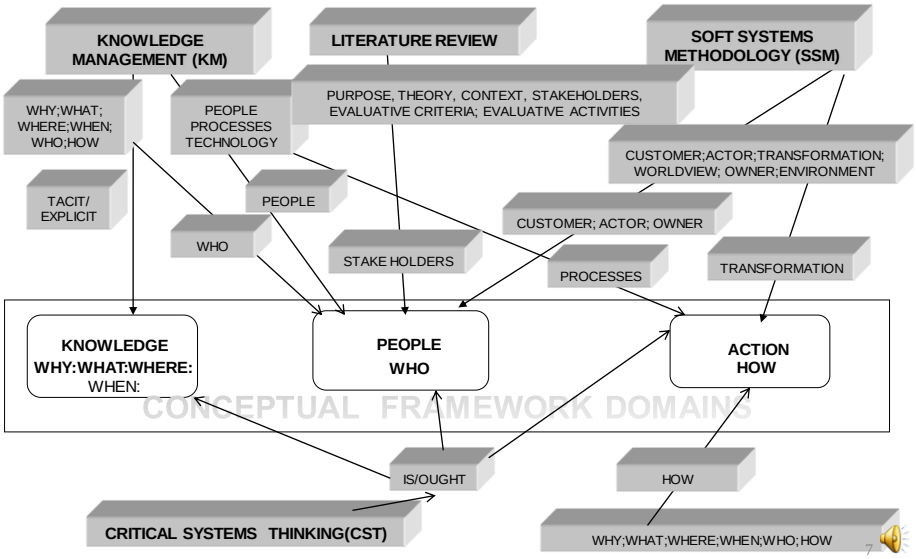
5

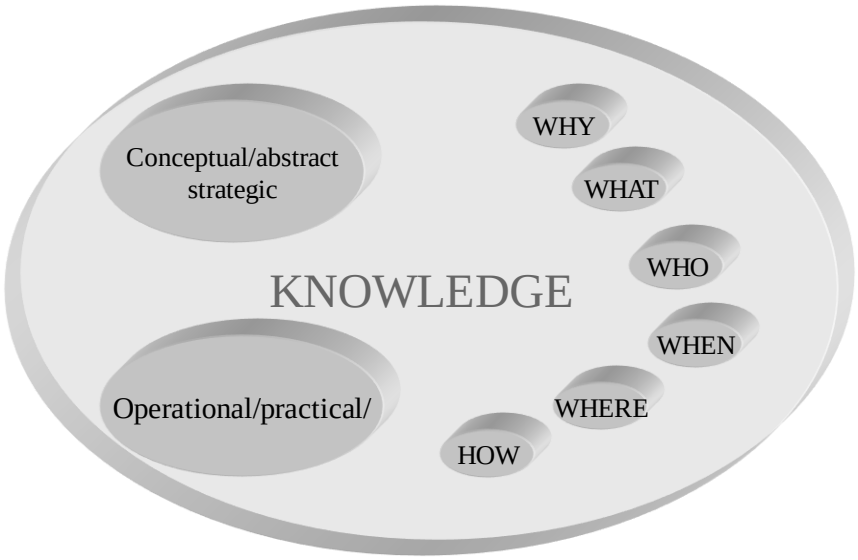
Characteristics of framework

It is to be noted that the framework is designed to be a tool which is:

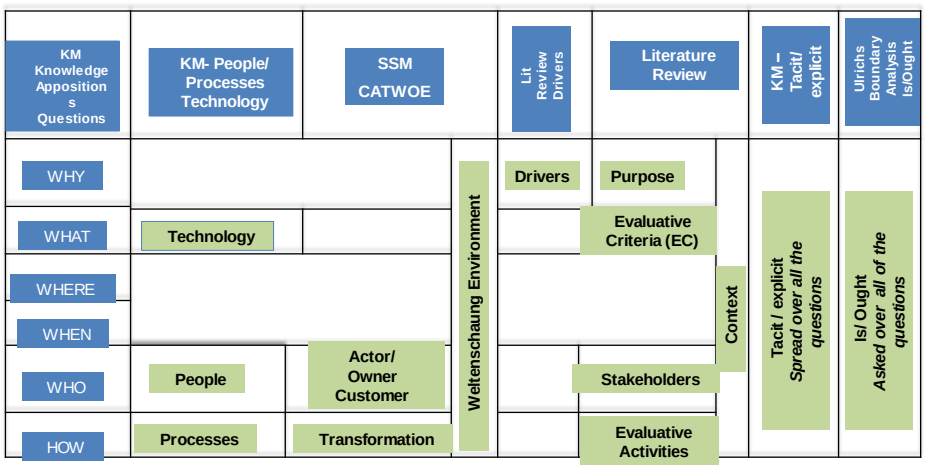
- Diagnostic/evaluative – allowing a status of the organisation to be ascertained in the 'Is' mode
- Iterative – there are several iterations of application of questions envisaged, as part answers to each question yield information for each, other question.
- Not prescriptive and seeks to determine the present modus operandi of the VLE/E-Learning in an organisation and also allows for the exploration for further strategic/operational development.

6


KNOWLEDGE MANAGEMENT (KM)
LITERATURE REVIEW
SOFT SYSTEMS METHODOLOGY (SSM)
WHY;WHAT; WHERE;WHEN; WHO;HOW
PEOPLE PROCESSES TECHNOLOGY
PURPOSE, THEORY, CONTEXT, STAKEHOLDERS, EVALUATIVE CRITERIA; EVALUATIVE ACTIVITIES
CUSTOMER;ACTOR;TRANSFORMATION; WORLDVIEW; OWNER;ENVIRONMENT
TACIT/ EXPLICIT
PEOPLE
CUSTOMER; ACTOR; OWNER
WHO
STAKE HOLDERS
PROCESSES
TRANSFORMATION
KNOWLEDGE WHY:WHAT:WHERE: WHEN:
PEOPLE WHO
ACTION HOW
CONCEPTUAL FRAMEWORK DOMAINS
IS/OUGHT
HOW
CRITICAL SYSTEMS THINKING(CST)
WHY;WHAT;WHERE;WHEN;WHO;HOW
7


Conceptual/abstract strategic
WHY
WHAT
WHO
KNOWLEDGE
WHEN
Operational/practical/
WHERE
HOW
8

Sources for framework mapped to questions

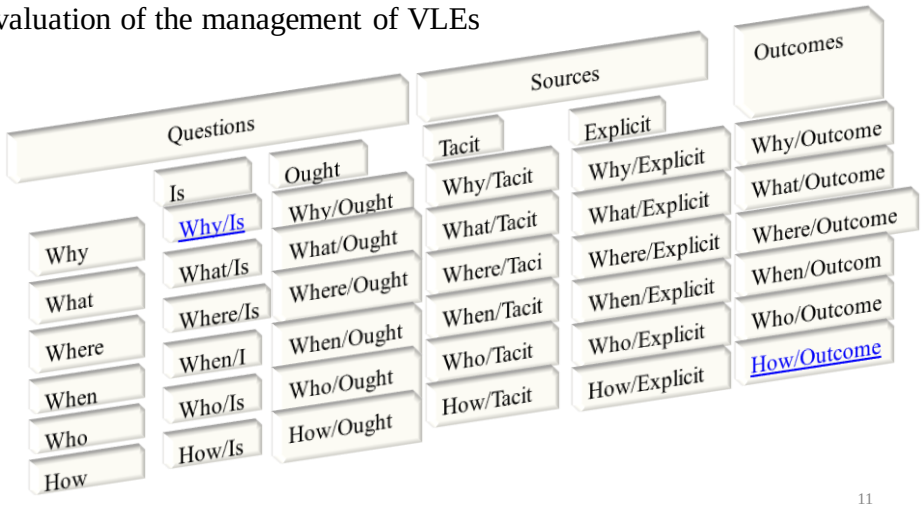


9

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
Why	1	1.1 Why/Is	1.2 Why/Ought	1.3 Why/Tacit	1.4 Why/Explicit	1.5 Outcomes
What	2	2.1 What/Is	2.2 What/Ought	2.3 What/ Tacit Sources of knowledge	2.4 What / Explicit sources of knowledge	2.5 What/ Outcome
Where	3	3.1 Where/Is : 3.2 Where/ought		3.3 Tacit : 3.4 Explicit		3.5 Outcome
When	4	4.1 /4.2 When/Is and When/Ought		4.3/4.4 when Tacit/Explicit sources		4.5 When Outcome
Who	5	5.1 who/is	5.2 who/ought	5.3 Who/tacit	5.4 who/explicit	5.5 who/outcome
How	6	6.1 Know – how is	6.2 Know – how ought	Know – how tacit sources of knowledge	6.4 Know – how explicit sources of knowledge	6.5 Know – how Outcomes

10

Conceptual Framework for the evaluation of the management of VLEs



11

Summary of questions

- Questions – instantiations of questions based upon KM .
  - Within this the is/ought mode is sought . Across all questions – gives comparison between extant reality with
    - organisations own perceived 'ought' mode
    - And best practice in sector/competitors
  - Know – why: seeking to determine aspirations/purpose/goal/objectives/drivers
  - Know-what: incorporating technology/environment/weltenshaung/context/evaluative criteria
  - Know –who: identification of stakeholders especially Customers/Actors/Owners comparing those from literature ()
  - Know – when: important chronological events, timelines,
  - Know – where: geographical locations of VLE: relative position in layered hierarchy of systems.
  - Know – how: the action end of the spectrum of knowledge to action, focussing upon processes/activities in the development and implementation of VLE/E-Learning.

12

Summary of questions - I

- Sources – these specifically seek to determine the tacit and explicit sources of knowledge – in recognition that significant activity occurs outside of the explicit forms of knowledge
- Outcomes – It is reasoned that any activity conducted should have a demonstrable outcome by which it is possible to measure the degree of completion or success of a task or course of action undertaken.

13

Why What

Where

Questions

When

How Who

14

Why

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
Why	1	1.1 motivation for VLE/E-Learning. own localised drivers are made explicit.	1.2 comparison with the drivers from literature (as summarised in table above) a version of competitor analysis but rooted in academic literature identify aspirations which have not been covered thus far.	1.3 To identify those people and processes which are not explicitly stated. To scrutinise actual extant processes. 'why' question i.e purpose/drivers, the process by which the purpose and drivers are arrived at	1.4 the formal people, processes, technology by which 'purpose' and 'drivers' are arrived at are being identified. This could identify the organisational organs e.g. Board of Governors, Senior management team, E-Learning organisational units etc.	1.5 A definitive measureable list of Drivers/purpose for the VLE Tacit sources of knowledge Explicit sources of knowledge

15

What

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
What	2	2.1 What • Is pedagogic theory (if any) upon which the VLE/E-Learning is based • Are the Evaluative Criteria identified? • Is the Technology used to support the VLE/E-Learning • Is the Emergent property of the VLE/E-Learning – • Is the Weltenshaung – worldview emerges • Is the environment	2.2 to allow the comparison with literature i.e: • Examining the pedagogic theories used by others in the sector • Checking the list of evaluative criteria from literature • Review of Technology • to identify any factors which have not been covered thus far.	2.3 as for 1.3 Identification of all people and processes which are involved.	2.4 Identification of all explicit people/processes/technology used for each heading identified in 2.1: Pedagogic theory Evaluative Criteria Technology Emergent property of the VLE/E-Learning Weltenshaung – worldview emerges Environment	2.5 What set of deliverables could be arrived at? The organisation is encouraged to arrive at a set of deliverables for each of the items identified in 2.2 – 2.4.

16

Where

Questions			Sources		Outcomes
	Is	Ought	Tacit	Explicit	
3	3.1 Where/Is is self explanatory, the question stimulates the organisation to take stock of the system both geographically and in systems terms. No framework examined thus far considers this perspective	3.2 Where/Ought provides the opportunity for the organisation to identify possible best practice, it may stimulate the collection of data in the sector.	3.3 Identification of sources of tacit knowledge	3.4 Identification of sources of explicit knowledge as identified aboves	3.5 Measurable deliverables that organisation may decide to use.

17

When

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
When	4	4.1 This may yield a historical perspective focussing upon when the VLE was developed/implemented, with timeline and important milestones When is the evaluation to take place? .	4.2 Nothing in the literature to compare the 'when' with.	4.3 As for 1.3/2.3/ 3.3/ i.e Identification of major players/processes in development and implementation	4.4 As for 1.4:2.4:3.4 Identification of sources of explicit knowledge as identified above	4.5 Measurable deliverables that organisation may decide to use.

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Who

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
Who	5	5.1 Stakeholders including Customers, Owners, Agents in the organisation	5.2 Comparison of stakeholders in literature. Any others not covered in the is mode.	5.3 N/A	5.4 As for 1.4/2.4 – explicit sources of identification of stakeholders?	5.5 As for 1.5/2.5 – how can completion of this question be measured e.g. definitive list of stakeholders, names, position, job descriptions.

19

How

Questions				Sources		Outcomes
		Is	Ought	Tacit	Explicit	
How	6	6.1 This seeks to ascertain how the evaluation of management of VLE is carried out within the organisation. Are there evaluative activities carried out? what are they?	6.2 What evaluative activities should be in place? What evaluative activities have been determined from the literature?	6.3 What sources of tacit knowledge about evaluation might exist?	6.4 Are there explicit notational repositories of evaluative activities. Books, manuals, electronic resources?	6.5 As\Above – decisions about measureable outputs from evaluation

20

TABLE 30 SUMMARY OF CONCEPTUAL FRAMEWORK						
QUESTIONS				Sources		**OUTCOMES**
		IS	**OUGHT**	**TACIT**	**EXPLICIT**	
WHY	**1**	**1.1** **MOTIVATION FOR VLE/E-LEARNING.** **OWN LOCALISED DRIVERS ARE MADE EXPLICIT.**	1.2 • comparison with the drivers from literature (as summarised in table above) a version of competitior analysis but rooted in academic literature • identify aspirations which have not been covered thus far.	1.3 • To identify those people and processes which are not explicitly stated. • To scrutinse actual extant processes. **'WHY' QUESTION I.E PURPOSE/DRIVERS, THE PROCESS BY WHICH THE PURPOSE AND DRIVERS ARE ARRIVED AT**	1.4 • the formal people, processes, technology by which 'purpose' and 'drivers' are arrived at are being identified. This could identify the organisational organs e.g. Board of Governors, Senior management team, E-Learning organisational units etc.	1.5 A definitive measureable list of • Drivers/purpose for the VLE • Tacit sources of knowledge • Explicit sources of knowledge
WHAT	**2**	2.1 What • Is pedadogic theory (if any) upon which the VLE/E-Learning is based • Are the Evaluative Criteria identified? • Is the Technology used to support the VLE/E-Learning • Is the Emergent property of the VLE/E-Learning – • Is the Weltenshaung –worldview emerges • Is the environment	2.2 to allow the comparison with literature i.e: • Examining the pedagogic theories used by others in the sector • Checking the list of evaluative criteria from literature • Review of Technology to identify any factors which have not been covered thus far.	**2.3** as for 1.3 **IDENTIFICATION OF ALL PEOPLE AND PROCESSES WHICH ARE INVOLVED.**	**2.4** Identification of all explicit people/processes/technology used for each heading identified in 2.1: • Pedadogic theory • Evaluative Criteria • Technology • Emergent property of the VLE/E-Learning • Weltenshaung –worldview emerges • Environment	**2.5** What set of deliverables could be arrived at? The organisation is encouraged to arrive at a set of deliverables for each of the items identified in 2.2 – 2.4.
WHERE	**3**	**3.1** • Where/Is is self explanatory, the question stimulates the organisation to take stock of the system both geographically and in systems terms. No framework	**3.2** • Where/Ought provides the opportunity for the organisation to identify possible best practice, it may stimulate the	**3.3** Identification of sources of tacit and explicit knowledge	**3.4** Identification of sources of explicit knowledge as identified aboves	**3.5** Measurable deliverables that organisation may decide to use.

		examined thus far considers this perspective	collection of data in the sector.			
WHEN	**4**	**4.1** • This may yield a historical perspective focussing upon when the VLE was developed/implemented, with timeline and important milestones • When is the evaluation to take place? .	**4.2** Nothing in the literature to compare the 'when' with.	**4.3** As for 1.3/2.3/ 3.3/ i.e Identification of major players/processes in development and implementation	**4.4** **AS FOR 1.4:2.4:3.4** Identification of sources of explicit knowledge as identified aboves	**4.5** Measurable deliverables that organisation may decide to use.
WHO	**5**	**5.1** Stakeholders including Customers, Owners, Agents in the organisation	**5.2** Comparison of stakeholders in literature. Any others not covered in the is mode.	**5.3** N/A	**5.4** **AS FOR 1.4/2.4 – EXPLICIT SOURCES OF IDENTIFICATION OF STAKEHOLDERS?**	**5.5** As for 1.5/2.5 – how can completion of this question be measured e.g definitive list of stakeholders, names, position, job descriptions.
HOW	**6**	**6.1** This seeks to ascertain how the evaluation of management of VLE is carried out within the organisation. Are their evaluative activities carried out? what are th	**6.2** What evaluative activities should be in place? What evaluative activities have been determined from the literature?	**6.3** What sources of tacit knowledge about evaluation might exist?	**6.4** Are there explicit notational repositiories of evaluative activities. Books, manuals, electronic resources?	**6.5** As\Above – decisions about measureable outputs from evaluation

Appendix C.

. **Low Risk Research Ethics Approval Checklist**

Applicant Details

Name: Furrkh Aslam	E-mail: f.aslam@coventry.ac.uk
Department: Computing	Date: 9.10.2010
Course PhD	Title of Project: A Conceptual Evaluative Framework for the Management of Virtual Learning Environments in UK Universities

Project Details

Summary of the project in jargon-free language and in not more than 120 words:

- **Research Objectives**:
  - Examine the history of the uptake of E-Learning in UK universities, including the drivers, factors and reasons for implementation.
  - To critically appraise existing frameworks of evaluation and abstract possible elements of an evaluative framework.
  - Demonstrate the underlying philosophy of Knowledge Management (KM), Critical Systems Heuristics (CSH) and Soft Systems Methodology (SSM) and identify the salient, appropriate principles to inform an evaluative framework.
  - Develop and evaluate by exposure to critical appraisal, a conceptual framework that is intended to evaluate the strategic and operational management of Virtual Learning Environments/E-Learning in UK universities.
- **Research Design (e.g. Experimental, Desk-based, Theoretical etc):** Action Research
- Methods of Data Collection: Questionnaires; Focus groups; Seminars.

Participants in your research

1. Will the project involve human participants?	**Yes**	

If you answered **Yes** to this questions, this may **not** be a low risk project.

- If you are a student, please discuss your project with your Supervisor.
- If you are a member of staff, please discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval Routes.

Risk to Participants

2. Will the project involve human patients/clients, health professionals, and/or patient (client) data and/or health professional data?		**No**
3. Will any invasive physical procedure, including collecting tissue or other samples, be used in the research?		**No**
4. Is there a risk of physical discomfort to those taking part?		**No**
5. Is there a risk of psychological or emotional distress to those taking part?		**No**
6. Is there a risk of challenging the deeply held beliefs of those taking part?		**No**
7. Is there a risk that previous, current or proposed criminal or illegal acts will be revealed by those taking part?		**No**
8. Will the project involve giving any form of professional, medical or legal advice, either directly or indirectly to those taking part?		**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project.

- If you are a student, please discuss your project with your Supervisor.
- If you are a member of staff, please discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval Routes

Risk to Researcher

9. Will this project put you or others at risk of physical harm, injury or death?		**No**
10. Will project put you or others at risk of abduction, physical, mental or sexual abuse?		**No**
11. Will this project involve participating in acts that may cause psychological or emotional distress to you or to others?		**No**
12. Will this project involve observing acts which may cause psychological or emotional distress to you or to others?		**No**
13. Will this project involve reading about, listening to or viewing materials that may cause psychological or emotional distress to you or to others?		**No**
14. Will this project involve you disclosing personal data to the participants other than your name and the University as your contact and e-mail address?		**No**
15. Will this project involve you in unsupervised private discussion with people who are not already known to you?		**No**
16. Will this project potentially place you in the situation where you may receive unwelcome media attention?		**No**
17. Could the topic or results of this project be seen as illegal or attract the attention of the security services or other agencies?		**No**
18. Could the topic or results of this project be viewed as controversial by anyone?		**No**

If you answered **Yes** to **any** of these questions, this is **not** a low risk project. Please:

- If you are a student, discuss your project with your Supervisor.
- If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval route.

Consent of the Participant

19. Are any of the participants under the age of 18?		**No**
20. Are any of the participants unable mentally or physically to give consent?		**No**
21. Do you intend to observe the activities of individuals or groups without their knowledge and/or informed consent from each participant (or from his or her parent or guardian)?		**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project. Please:

- If you are a student, discuss your project with your Supervisor.
- If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval route.

Participant Confidentiality and Data Protection

22. Will the project involve collecting data and information from human participants who will be identifiable in the final report?		**No**
23. Will information not already in the public domain about specific individuals or institutions be identifiable through data published or otherwise made available?		**No**
24. Do you intend to record, photograph or film individuals or groups without their knowledge or informed consent?		**No**
25. Do you intend to use the confidential information, knowledge or trade secrets gathered for any purpose other than this research project?		**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project:

- If you are a student, discuss your project with your Supervisor.
- If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval routes.

Gatekeeper Risk

26. Will this project involve collecting data outside University buildings?		**No**
27. Do you intend to collect data in shopping centres or other public places?		**No**
28. Do you intend to gather data within nurseries, schools or colleges?		**No**
29. Do you intend to gather data within National Health Service premises?		**No**

If you answered **Yes** to **any** of these questions, this is **not** a low risk project. Please:

- If you are a student, discuss your project with your Supervisor.
- If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval routes.

Other Ethical Issues

30. Is there any other risk or issue not covered above that may pose a risk to you or any of the participants?		**No**
31. Will any activity associated with this project put you or the participants at an ethical, moral or legal risk?		**No**

If you answered **Yes** to these questions, this may **not** be a low risk project. Please:

- If you are a student, discuss your project with your Supervisor.
- If you are a member of staff, discuss your project with your Faculty Research Ethics Leader.

Principal Investigator Certification

If you answered **No** to **all** of the above questions, then you have described a low risk project. Please complete the following declaration to certify your project and keep a copy for your record as you may be asked for this at any time.

Agreed restrictions to project to allow Principal Investigator Certification

Please identify any restrictions to the project, agreed with your Supervisor or Faculty Research Ethics Leader to allow you to sign the Principal Investigator Certification declaration.

Participant Information Leaflet attached. Informed Consent Forms attached. Risk Assessment Form attached.

Principal Investigator's Declaration

Please ensure that you:

- Tick all the boxes below and sign this checklist.
- Students must get their Supervisor to countersign this declaration.

I believe that this project **does not require research ethics approval**. I have completed the checklist and kept a copy for my own records. I realise I may be asked to provide a copy of this checklist at any time.	X
I confirm that I have answered all relevant questions in this checklist honestly.	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request a new ethical approval if the project subsequently changes the information I have given in this checklist.	X

Signatures

If you or your supervisor do not have electronic signatures, please type your name in the signature space. An email sent from the Supervisor's University inbox will be accepted as having been signed electronically.

Principal Investigator

Signed:

 .....(Principal Investigator or Student)

Date: 9.10.2010.....

Students storing this checklist electronically must append to it an email from your Supervisor confirming that they are prepared to make the declaration above and to countersign this checklist. This-email will be taken as an electronic countersignature.

Student's Supervisor

Countersigned: Anthony Olomolaiye: .....(Supervisor)

Date: 9.10.2010.....

I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.