

***Critical Success Factors for  
e-Learning in Higher Education:  
An Emancipatory and Critical  
Research Approach***

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**by**

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**Abstract**

For e-Learning to be successful, it is simply not enough that the courses are well designed, that the module delivery adopts appropriate pedagogical approaches, that tutors are well versed in their subject matter areas and are able to facilitate online courses. The intricacy of the various interest groups involved in this process has prompted this investigation into critical success factors for e-Learning. This holistic investigation seeks to investigate the whole range of issues that might impact on the success of e-Learning and the key research question to be addressed is “What are the underlying Critical Success Factors (CSFs) required to support the design, development, implementation and management of e-Learning in HE institutions?”

In the context of this research, a compelling justification for adopting a more interpretivist approach is that it is often neither possible nor desirable to engage in research that is purely based on quantification when investigating attributes such as attitudes, beliefs or judgements. In the context of this research, the goal was to allow the e-Learning CSFs to emerge from the evaluation of factors in the limited sphere of five high level categories, rather than placing a wider focus on the key performance indicators of HE programme provision in its entirety. By adopting a critical research approach, it was possible to elicit views from participants attending a number of international conference workshops in an environment away from their day to day work. The data was collected through focus groups at international workshops and was analysed through thematic analysis using a process of isolating and selectively coding similarities and differences of key issues within a particular aspect of e-Learning as identified by participants emerging from their own professional practice.



These CSFs emerged from participants' cross boundary groupings which made sense to them as practitioners. The findings revealed that the development and implementation of a strategic plan, based on learning and business needs, and teamwork were crucial to success of e-Learning. With regard to technology, while it was deemed necessary for computer architecture to be fit for purpose and that appropriate teaching and learning software had to be found, technical support was a key issue that needed to be addressed. In the view of respondents, an appropriate pedagogical approach requires curriculum designers to focus on identifying strategic learning issues, deciding on effective pedagogical methods, and aligning teaching strategy with available tools. A surprising finding was that respondents felt that it would be beneficial to the curriculum design process if there were formalised processes appropriate to the institutional setting which seems to run counter to the current arguments for more informal social software approaches to learning and teaching with technology.

Whilst it still seems to be helpful to break the CSFs into the categories offered by the e-Learning framework, it has become obvious that "one size does not fit all", and CSFs are likely to vary from institution to institution due to differences in size, culture, student and staff profile, etc. and this could be regarded as a limitation to this research. This research indicates that if academic staff and learners are expected to engage in e-Learning, then staff and student support, skills and professional development must be put in place to underpin the continual development that seems to be a permanent feature of learning technologies. Future research must focus on how these human issues can be dealt with. Finally, the ontology that has been developed as a result of this research is seen as a foundation for future research into this extremely complex field of enquiry.

## **Acknowledgements**

The process of conducting the research described in this thesis has been both an academic and philosophical journey. In academic terms, this journey enabled me to explore new methodological processes required to complete the study, and as lecturer and tutor, it allowed me to develop an insight into widely held views by the e-Learning community. Philosophically, I had to discover a way to apply research methods, learning theories and epistemologies to the design, development and delivery of e-Learning. Yet it should be noted that this journey has required a great deal of emotional support from family, friends and colleagues.

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## Index of Terms

AI	Artificial Intelligence
AICC	Aviation Industry CBT Committee
AR:	Action Research
AUQA	Australian Universities Quality Agency
BECTA	British Educational Technology Association
BSI	British Standards Institute
CAA	Computer Automated Assessment
CAI	Computer-Assisted Instruction
CAL	Computer Assisted Learning
CCF	Course Creation Fellows
CEL	Centre for Leadership and e-Learning
CEN	Comité Européen de Normalisation
CfP	Call for Participation
CI	Co-operative Inquiry
CMC	Computer-Mediated-Communication
COMETT	COMMunity program for Education Teaching and Training
CSCL	Computer-Supported Collaborative Learning
CSFs	Critical Success Factors
DE	Distance Education
ECDL	European Computer Driving Licence
ELE	Electronic Learning Environment
EMAR	Educational Management Action Research
ESD	Educational Systems Design
EU	European Union
F2F	Face-to-Face
GRID	a term in distributed computing where computer cluster are composed of multiple nodes
HCI	Human Computer Interaction
HE	Higher Education
HEIs	HE Institutions
HTML	HyperText Markup Language
IBL	Internet Based Learning
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers

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IMS	originally known as the 'Instructional Management Systems' project, but this has now been dropped and 'IMS' no longer stands for anything.
IP	Intellectual Property
IS	Information System
ISD	Instructional Systems Design
ISO	International Standards Organisation
ITM	MA in Information Technology Management
JISC	Joint Information Systems Committee
LAN	Local Area Network
LMS	Learning Management Systems
LOs	Learning Objects
MLE	Managed Learning Environments
NICLS	Networked Information and Communication Literacy Skills
ODL	Open and Distance Learning
OU	Open University
PC	Personal Computer
PDA	Personal Digital Assistant
QAA	Quality Assurance Agency for Higher Education
RDF	Resource Description Framework
REALs	Rich Environments for Active Learning
SCORM	Sharable Content Object Reference Model
SoURCE	Software Use, Re-use & Customisation in Education
TLA	Teaching Learning and Assessment
TLTP3	Teaching and Learning Technology Programme 3
UKeU	UK eUniversity
URI	ref on page 60
VLE	Virtual Learning Environments
VR	Virtual Reality
WAN	Wide Area Network
WiTEC	Women in Science, Engineering and Technology in European Countries
WWW	World Wide Web
XML	eXtensible Markup Language

## **1 Introduction**

Over the past few decades, Information and Communication Technologies (ICT) have continued their rapid advances. Thus, in an increasingly competitive environment, employers and professional associations now need staff with communication, planning and networking skills, as well as problem analysis and problem solving abilities (Kakabadse and Korac-Kakabadse, 2000). The call for employees to become more flexible and self-confident professionals, and to engage in lifelong learning, has intensified (McPherson and Nunes, 2004a:2). Broader access to a range of increasingly powerful, flexible, friendly and cost-effective ICT systems, together with the advent of increased connectivity made available by the Internet and the World Wide Web (WWW), has led numerous educational researchers, lecturers and training practitioners to investigate implications and possibilities of technologies for teaching, learning and training.

### **1.1 Background**

There is in fact a rich and extensive body of research addressing issues related to the use of learning technologies. However, most of this research directly addresses issues of learning and teaching, i.e. the learning experience, pedagogic approaches, tutoring strategies, design of online environments. The literature reveals a number of issues concerning new modes of learning, course delivery and more importantly programme management. Although it is critical to consider the use of ICT itself in designing, developing and delivering e-Learning courses, it is also imperative to pay attention to other contiguous issues such as external societal forces, institutional structure, strategic management processes, as well as to new staff roles and skills (Wills and Alexander, 2000).

Managing educational programmes enhanced by technology pose a new set of research challenges that need to be carefully considered and this investigation seeks to include these latter issues in this holistic study. There is actually considerable experience within the higher education system in working with programmes support by educational technology, both in the UK, Europe and elsewhere. Where educational practitioners have been involved in successful technology enhanced learning programmes, they have advocated the expansion of this type of learning. Yet, since research in this domain has, by and large, tended to concentrate on teaching and learning issues, rather than on management issues, there is still insufficient integrative and holistic research incorporating this key element of the learning process.

If institutions wish to take up the challenge of introducing new models of teaching and learning, incorporating technology enhanced learning, then cases showing best practice in this area need to be reviewed, cross-referenced and analysed. The body of knowledge emerging from such distillation should then be established as good practice and disseminated through academic and practitioner networks to inform management practice.

Furthermore, educational technology essentially draws on interdisciplinary knowledge, and therefore combines a number of subject domains. For instance, the implementation of ICT within an educational context bears many similarities to the more general implementation of Information System (IS) projects in other disciplines (Marchewka, 2006). Corresponding research, such as that of the Standish Group International (2001) reveals that institutional issues such as strategic thinking and top-level sponsorship are key factors for successful IS project outcomes.



Since such parallel studies indicate that the institutional setting, organisational vision, strategy and top-level support may be critical to the success (or failure) of IS initiatives, it could be argued that external and organisational factors may have an equal impact on the implementation of technology enhanced learning. Indeed, if lessons to be learned from IS project research can be applied to educational courses that make use of ICTs, then it could be said that success in such courses depends on apposite management strategies and criteria as well as appropriate technology, sound course design, development, and delivery.

## **1.2 The Role of ICTs in Education**

As far back as the early nineties, authors, such as Cummings (1995), were arguing that computer mediated educational technology offered promising potential for use in educational settings, for example in Computer Assisted Learning (CAL); as Personal Computer (PC) tools and multimedia applications; in hypermedia applications; in simulations and game-like edutainment products; in integrated learning environments; and even in virtual reality (VR) and artificial intelligence (AI) applications. Indeed, Bill Gates went as far as saying that *“Technology can humanize the education environment, bring mass customization to learning, fine-tune the product to allow students to follow somewhat divergent paths and learn at their own rates”* (Gates, 1995).

In the Department for Education and Skills (2004) document, ‘Progress towards a Unified E-Learning Strategy’, widespread support of the description of e-Learning given in the document was claimed, and it stated that most of the 430 respondents believed that a unified strategy was appropriate and supported the vision for e-Learning. It also asserted that many supported the proposals for innovation in teaching and

learning, whilst most respondents believed the action areas for sustainable development were both feasible and appropriate. Thus, with reducing costs, and increasing availability of computers, there seems to be a widening recognition that these advancing technological developments have enabled new approaches to learning and teaching, increasing the importance of the role of ICTs within education at all levels.

It should be noted that the term e-Learning is closely associated with other forms of learning such as: Distance Education, Open Learning, Networked Learning, Collaborative Learning, Virtual Learning and the very recent Technology Enhanced Learning. Therefore, before going on to discuss whether e-Learning can be successfully incorporated into HE, it is necessary to untangle some of this associated terminology.

### ***1.2.1 Distance Education***

Distance Education (DE) is a well known term, and is particularly associated with course delivery environments that are not wholly provided using traditional face-to-face (f2f), on-campus lectures within Higher Education (HE). In particular, Escolet (1980) described DE as a means by which educational media can be distributed without necessity of regular classes. An oft cited definition of DE is:

“[...] planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as organisational and administrative arrangements.”

Moore and Kearsley (1996:2)

In this sense, DE can be used as a vehicle to enable access to education for those unable to attend conventional university and further education courses.

### ***1.2.2 Open Education / Learning***

Open education was described by Escolet (1980) as being characterised by removal of restricted entry by virtue of privilege; accreditation of prior learning; management of flexible timetables; and by substantial changes in the traditional relationship between tutors and students. Paine (1989:ix) describes open learning as “[...] *both a process which focuses on access to educational opportunities and a philosophy which makes learning more client and student centred*”, giving learners increased flexibility in how, where, when and what to learn. More recently, Simpson (2002:2) describes it simply as a system that has very broad entry requirements. Institutions that offer this type of learning opportunity do so in a spirit of openness, and learning can take place equally well within a f2f or DE setting. Thus, whilst a number of terms have emerged encompassing open learning as being delivered through ICT, as an educational concept, this learning approach can be considered independent of ICT.

### ***1.2.3 Networked Learning***

As proposed by Fowell and Levy (1995), networked learning means “[...] *learning mediated by communication technologies*”. Therefore, networked learning enables interaction between learners and facilitators via networked electronic media. This offers a new set of pedagogic opportunities as development towards the electronic campus proceeds, and will become increasingly integrated into campus cultures (Fowell and Levy, 1995). The concept of networked learning is thus an all-embracing term that includes Internet based learning and all electronic enabled computer-supported collaborative learning (CSCL). Recent developments in web and Internet based learning originated a range of new terms and concepts.

### ***1.2.4 Computer-Supported Collaborative Learning***

Whalley (2000) suggested that CSCL might have the following benefits for online learners:

“Best practice science teaching often involves highly motivating hands-on experiences for learners. Simulations can provide equally profound experiences, especially when learners can collaborate and communicate with one another. Users of such simulation environments can be located anywhere on the Internet, and gain a richer understanding through their shared dialogues.”

### ***1.2.5 Virtual Learning***

French *et al.* (1999) consider the concept of virtual learning, which they define as: “*The educational process of learning over the Internet without having face-to-face contact*”, highlighting the one advantage to learners. This implies that learning can be individualised, self-directed and undertaken at times convenient to the learner. French (1999), also refers to this as Internet Based Learning (IBL), and says that the Internet “[...] *replaces conventional lecture halls and classrooms, creating new opportunities and challenges for teachers and learning*”. However, virtual learning is now seldom used, with online learning replacing this as a more popular term.

### ***1.2.6 Online Learning***

A move away from the assumption that delivery via the WWW is restricted purely to ‘traditional’ distance learning is evident. Online learning can also be seen as simply an alternative to traditional methods of delivery within an on-campus environment.

### 1.2.7 e-Learning

Indeed, the term e-Learning is often used interchangeably with terms such as; open learning, networked learning, virtual learning and online learning. The main characteristic linking all these modes of learning is the use of ICTs in the form of educational technologies, i.e. any courses that are not entirely delivered using traditional methods and which are supported by technology as a delivery vehicle. This view is in accordance with that of the Department for Education and Skills e-Learning Strategy Consultation Document, “[...] *if someone is learning in a way that uses information and communication technologies (ICTs), they are using e-Learning*”, (Department for Education and Skills, 2003). Other researchers, such as Igonor (2002), define e-Learning as teaching “[...] *that is delivered electronically, in part or wholly – via a web browser*”, placing particular emphasis on making use of the World Wide Web (from hereon described as the web).

This is supported by Long (2004), who offers the following definition:

“e-Learning is defined as: any form of learning that utilizes a network for delivery, interaction, or facilitation (in a few years you might not even use the computer). The network could be the Internet, a school or college LAN (Local Area Network) or even a complete WAN (Wide Area Network). The learning could take place individually (guided or instructed by a computer) or as part of a class. Online classes meet either synchronously (at the same time) or asynchronously (at different times), or some combination of the two”.

(Long, 2004: 7-24)

In the tertiary education sector, universities are being asked to enrol increasing numbers of students, which creates pressure on HE to reach progressively more students from a diverse range of backgrounds, without increasing costs too much.

The widespread uptake of ICT in society means that HE institutions (HEIs) are currently under pressure to address the issue of providing alternative forms of student support as a matter of urgency. The development of e-Learning has provided greater opportunities for enabling interaction between individuals and groups and allowing learners to share information.

Indeed, e-Learning may be able to have a significant impact on teaching and learning by providing access to new information sources through the Internet for educationalists, learners and researchers. Furthermore, academics can now incorporate a range of ICT resources, such as e-mail, video conferencing and bulletin board systems and online learning environments, to support teaching and learning.

The combination of the demands presented above has led HE institutions to consider alternative methods for delivering some, if not all, of their courses. Thus, for the remainder of this thesis, the term '*e-Learning*' will be used as an umbrella term to summarise the characteristics of the overlapping educational delivery approaches making use of and supported by ICT and Internet based technologies for teaching and learning within HE academic learning environments.

### **1.3 Rationale for this Research**

Research regarding the nature of e-Learning is complex and somewhat fragmented, and hitherto, few satisfactory frameworks have existed to support its development. This situation is deemed unsatisfactory to sustain the necessary change management process that is inherent to the establishment of innovative e-Learning. Thus, the purpose of this research is to present an investigation into professional and practical issues facing

educationalists intending to make use of online learning strategies derived from a holistic perspective. In view of that, it was decided to draw inspiration from generic management theory which suggests that it is essential to identify a set of factors that are critical to successful change management (Huotari and Wilson, 2001) and to apply this to the domain of e-Learning.

Research into the field of e-Learning has also been described as educational informatics, which unites elements of computer science, information science, educational studies and psychology (Levy *et al.*, 2003). The research described in this thesis will take a strategic view of e-Learning as a means of supporting teaching and learning through digital technology and will investigate the various factors considered to be vital for its implementation in Higher Education (HE).

#### **1.4 Why is e-Learning Important?**

e-Learning is already being increasingly used in education and training, e.g. in schools, colleges, universities, community centres, in the workplace, and in the home.

Individuals are discovering that they can now access courses that were hitherto unavailable to them, making it easier for them to get involved in personal and professional learning. Politicians in the UK government (Department for Education and Skills, 2003) consider it important because it can contribute to all their objectives for education, i.e. to raise standards; improve quality; remove barriers to learning and participation in learning; prepare individuals for employment; provide upskilling in the workplace; and ultimately, to ensure that every learner achieves their full potential.

This is significant for HE because more and more applicants to university will have increasing expectations of e-Learning occurring within their courses and programmes.

### ***1.4.1 Benefits of e-Learning***

For many educationalists, enthusiastic about seeking improved methods of facilitating the learning process, the answer to increasing quality within educational provision seems to lie in the use of e-Learning. Daniel (1998), comments that e-Learning can be used in a manner to suit the requirements of the individual students based on flexible communication modes. According to Klein and Ware (2003), e-Learning also offers professionals, who may otherwise find it difficult to attend programmes of study or conferences, the opportunity to gain requisite continuing professional development. Consequently, to many, the adoption of an e-Learning solution is becoming increasingly attractive as a potential solution to provide flexibility and to widen participation (McPherson, 2003). Van Brakel (1999: 390) notes that:

“the web’s communication protocol is supporting hypertext and hypermedia principles [thus enhancing] the application of many new didactic approaches or models”.

Van Brakel (1999: 390)

Thus, benefits from e-Learning for learners, tutors and institutions as discussed by a number of other authors (Stamatis *et al.*, 1999; Nunes and Fowell, 1996 and Eisenstadt *et al.*, 2004) could be summarised as follows:

- electronic distribution of course material;
- flexibility for students - when to study, at what pace - supporting different learning styles;
- accommodation of different ability levels;
- establishment of communication between students and tutors, and between students;
- greater access to information;
- greater flexibility in maintaining and up-dating course documentation.

Benjamin (1994), as quoted by Salmon (2000:11), further qualified these benefits for the e-Learner as being “[...] *unlocked from the shackles of fixed and rigid schedules and from physical limitations*” and “*released into an information world which reacts to his or her own pace of learning*”. e-Learning aims at attaining these types of benefits



through different ICT based infrastructures, although it should be noted that the introduction of educational technologies has not been without its critics (Luckin, *et al.*, 2004). Despite its potential and some successes, e-Learning is still not being used to its full potential within HE, and as a consequence, remains greatly under-utilised in this context (Economist Global Executive, 2003).

### ***1.4.2 Disadvantages of e-Learning***

Concerns about the design and implementation of e-Learning have formed the basis of one of the most persistent and controversial discussion topics in the educational community. Debates regarding the most appropriate use of technology in teaching and learning continue to frustrate educationalists and many question why there is a noticeable unwillingness to make use of e-Learning. Herrington *et al.* (2003) argue that educators need strategies to support and encourage online learners in what are sometimes unfamiliar and discomforting activities when moving toward student-centred rather than teacher-centred learning settings. Another problem is that although many academics are expert in their subject area, they are as yet totally inexperienced in online teaching methods (McPherson and Nunes, 2004a). Furthermore, at this time, many students are ill-equipped for the demands of e-Learning (Nunes *et al.*, 2000). With these issues in mind, the converse question that must be asked is what is required to implement successful e-Learning programmes and courses?

### ***1.4.3 What is required to make e-Learning Successful?***

McPherson and Nunes (2003a) argue that for e-Learning to be successful, it is not enough that the courses are well designed, that the module delivery adopts appropriate pedagogical approaches and that tutors are well versed in their subject matter areas as

well as being able to facilitate online courses. Since university programmes are set in specific environments, i.e. within HE institutions, any initiatives involving the integration of ICTs for teaching and learning have to consider the complex social forces influencing its acceptance, and thought must be given to the interests of numerous stakeholders at all levels, e.g. funding providers, employers, academic leaders, administrators, in addition to course tutors and the learners themselves. It is the intricacy of the various interest groups that has prompted this holistic investigation into the factors required to implement successful e-Learning initiatives.

### **1.5 Critical Success Factor (CSF) Analysis**

In actual fact, the notion of isolating critical factors as a guide for business success was first introduced by Daniel (1961), but was overlooked until Rockart (1979) reintroduced and further developed this concept. According to Rockart (1979), Critical Success Factors (CSFs) are the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization. It is a widely used top-down methodology, often used as a means to establish management information requirements, to define information to be managed; and above all to identify the crucial factors that must be addressed for an organisation to do well. It can also be used for examining factors affecting technological change.

More recently, Robson (1997:155) drew attention to CSFs as “... *those handful of things that within someone’s job must go right*”, indicating that these are factors that the manager should keep a firm eye on in order to achieve success. This implies that these are factors that practitioners and managers should keep a firm eye on. In policy terms, Johnson and Scholes (1999:192) described them as “... *those components of strategy*

where the organisation must excel to out perform competition.” McPherson and Nunes (2006a) indicate that the identification of Critical Success Factors in specific situations, e.g. in change situations such as that triggered by the introduction of e-Learning, can be very helpful.

The fundamental question here is then the evaluation of factors in the limited sphere of online learning, rather than placing a wider focus on the key performance indicators of HE programme provision in its entirety. This allows the identification of elements that are crucial to the successful management of e-Learning. To meet specific standards, Bendell *et al.* (1998:31) suggest that CSFs:

“[...] represent a small number of key indicators that are such that if they are showing satisfactory progress towards targets, the organization generally will be perceived as being successful on its path of quality improvement.”

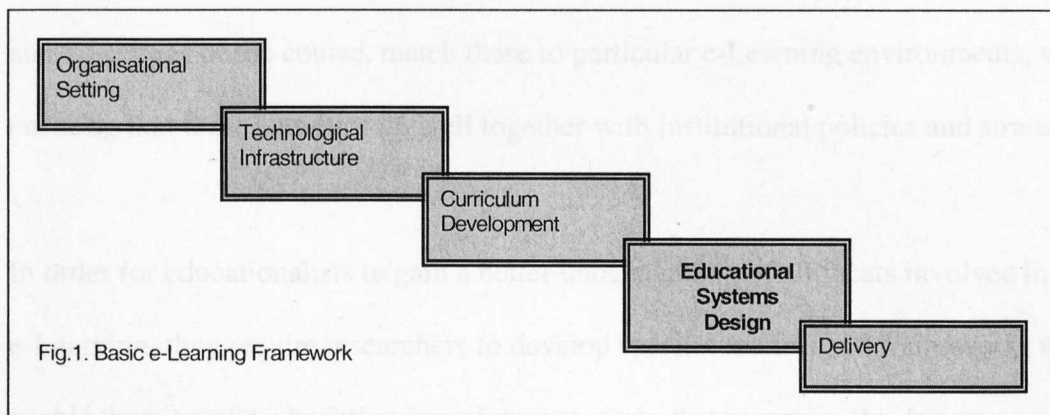
Bendell, *et al.* (1998:31)

Riddy and Fill (2003), define CSFs as ‘*bigger picture*’ criteria that an organisation must address to ensure the success of an e-Learning project. As a consequence, it is felt that CSF Analysis can be regarded as an extremely suitable approach for planning and managing the introduction of e-Learning. As such, inevitably, they need to be thoughtfully expanded to define the full range of activities required for the successful implementation of e-Learning courses.

In this respect, CSF analysis can be regarded as a useful method for converting abstract views of the design, development and implementation of e-Learning programmes into an explicit strategic statement. In this study, the CSF analysis will begin with a statement of eventual goals of e-Learning. The proposal is then to offer five or six high level aims that the literature claims will enable the realization of these targets. Views

from participants will be elicited and in the final analysis, the hierarchy of corresponding objectives and their success factors will then be developed, leading to identification of actual requirements at the implementation level. During this process, it is necessary to identify assumptions, cross-reference any usage scenarios, and identify any problems with the process.

In context of this research, CSFs emerge from the evaluation of factors in the limited sphere of e-Learning, rather than placing a wider focus on the key performance indicators of HE programme provision in its entirety (McPherson and Nunes, 2004b). Therefore the focus in this study is to be placed on the processes necessary to facilitate e-Learning design, development and implementation. In the case of this research, the range of the concerns facing e-Learning practitioners is shown in Figure.1.



## 1.6 Extended Framework for Development of e-Learning

Numerous authors have proposed models and frameworks on differing aspects of e-Learning. For instance, Wills *et al.* (1999) have evaluated a number of such frameworks for open and distance learning (ODL), concluding that these have been crucial in the successful application of ICT to learning settings:

“Digital technology is used extensively for varied purposes and in varied ways, depending on the intended audience for the course, and the availability and cost of technology. The capabilities of the new technologies have made possible for more interactive experience that more closely parallels face-to-face teaching – in effect creating a virtual classroom.”

Wills *et al.* (1999)

This indicates that key issues that concern e-Learning developers are efforts to meet teaching and learning requirements of tutors and learners. However, in order to better integrate all the required elements of e-Learning design, development and delivery, practitioners new to e-Learning need to try and harness the promise of new ICTs, take advantage of opportunities to adopt appropriate pedagogical models, while balancing these efforts against institutional constraints. Consequently, educationalists need guidance on how to develop modes of teaching and learning that meet the overall aims and objectives of the course, match these to particular e-Learning environments, whilst ensuring that these activities go well together with institutional policies and strategies.

In order for educationalists to gain a better understanding of all facets involved in e-Learning, they require researchers to develop specific models and frameworks that enable them to take a holistic view of the processes that comprise the design, development and implementation of online courses. Khakhar and Quirchmayr (1998:7) defend the idea that such frameworks should focus on how technology can efficiently support tutors and educationalists in their capacity to provide learners with high quality learning environments, as well as provide support materials and embed learning and teaching strategies within the institutional and social environment in which they are situated.

In view of that, Goodyear (1999) proposed that these frameworks should aim at:

- improving the quality of the organisational environment in which e-Learning takes place;
- developing pedagogical frameworks appropriate to the environment in which learning is taking place;
- enhancing the skills of teachers, trainers and managers in the use of innovative methods and techniques;
- ensuring the quality and “user-friendliness” of learning materials and on-line services;
- encouraging the recognition of qualifications obtained through e-Learning.

Reflection and discussion led to a more advanced iteration of the basic e-Learning framework presented in Chapter 1. The e-Learning Framework presented in Figure.2 was adapted and improved from an original proposal by Al Rawas (2001), and is intended to specify who the various stakeholders in the e-Learning process are. This later version was presented at workshops at Association of University Administrators Annual Conference in Southampton, UK (*AUA 2002*), E-Learn in Montreal (*E-Learn 2002*), 2002 International Conference on Advanced Learning Technologies in Kazan, Russia (*ICALT 2002*), and the International Conference on Computers in Education Conference in Auckland, New Zealand (*ICCE 2002*). Accordingly, this thesis presents different perspectives and discussions on issues related to identification of e-Learning CSFs in each of five categories, which have been determined from an e-Learning framework, shown in Figure.2.

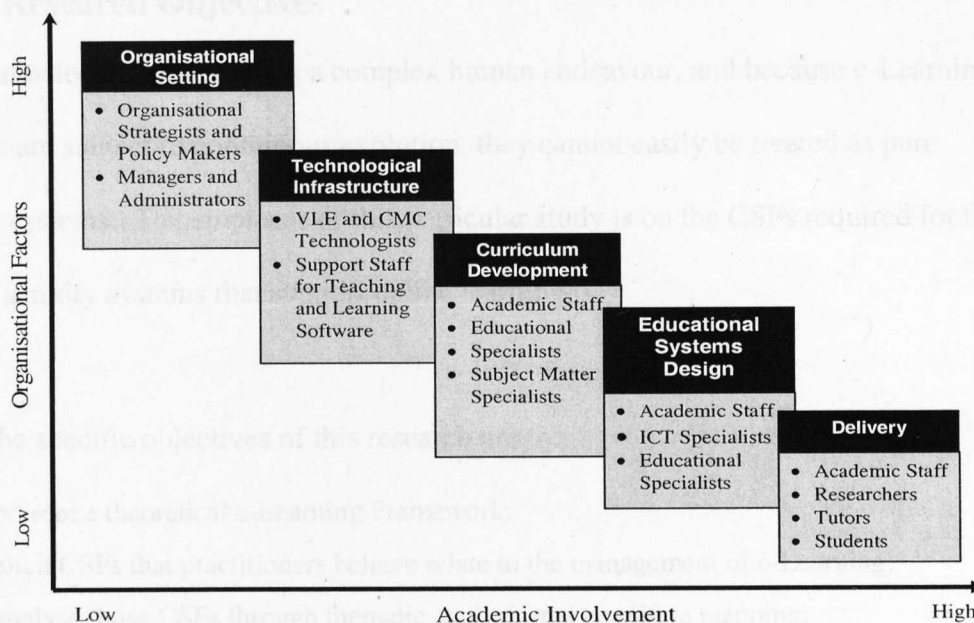


Fig. 2 Extended eLearning Framework (McPherson and Nunes, 2003)

In order to explain the context of the identification of CSFs in relationship to the e-Learning framework (presented in Chapter 5), literature relevant to each broad category identified above needs to be discussed in detail in Chapters 6-10.

However, as e-Learning is expected to play a major role within the educational sector in the future, the key research question that this study seeks to address is as follows:

“What are the underlying CSFs required to support the design, development, implementation and management of e-Learning in HE institutions?”

It is acknowledged that other studies have been carried out to reveal some of the key factors to be considered when introducing e-Learning solutions within academic environments (Volery and Lord, 2000; Soong *et al.*, 2001; Testa and de Freitas, 2003), although these have taken a different methodological approach to this study, and it is intended to compare the findings from these investigations to those from this research.

## 1.7 Research Objectives

Since knowledge acquisition is a complex human endeavour, and because e-Learning systems are subject to continuous evolution, they cannot easily be treated as pure science systems. The emphasis of this particular study is on the CSFs required for the human activity systems that support online learning.

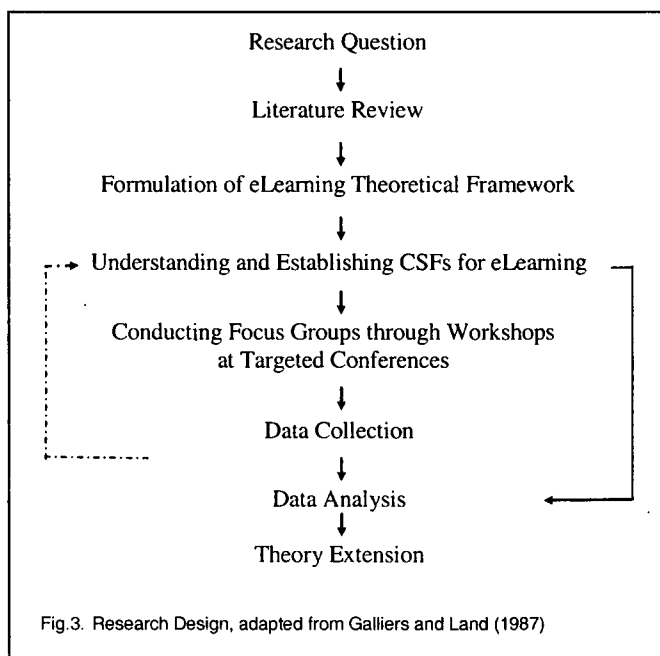
Thus, the specific objectives of this research are to:

- present a theoretical e-Learning Framework;
- elicit CSFs that practitioners believe relate to the management of e-Learning;
- analyse those CSFs through thematic analysis and cognitive mapping;
- verify or adapt the e-Learning Framework to guide future practice.

## 1.8 Research Outline

In effect, this is a study of issues that affect the successful management of e-Learning, and in order to ensure that this investigation was conducted in a sound way, it was decided that it was necessary to generate a sound research design (Figure.3).

This research design was adapted from a framework proposed by



Galliers and Land (1987), and the details of how this will be explained in more depth in the Chapter 7. Having selected an appropriate research design; a suitable e-Learning framework, was identified as a suitable guide for use in this study (McPherson and Nunes: 2004a), and by means of an extensive literature review, this was related to what is considered necessary for the effective management of



e-Learning programmes within HE. Subsequently, focus groups were conducted at a number of international conference workshops in order to elicit the CSFs that educationalists, based on their expertise and acquired knowledge, believe must be addressed for managing effective e-Learning.

During the analysis process, it was decided that a thematic mapping approach should be used to explore and compare the responses gathered to the framework categories, and from this, an appropriate ontology be produced in order to classify the CSFs identified. It is envisaged that this investigation will establish a body of knowledge for managers, developers and educationalists of online learning programmes through the verification of the e-Learning Framework. It is felt that the identification of e-Learning CSFs may well enable institutional leaders to develop appropriate strategies and policies to guide educational professionals and practitioners responsible for managing e-Learning programmes.

## **1.9 Thesis Structure**

Having provided the background to the research in this chapter, the rest of this thesis will be structured as follows:

Chapter One presents a methodology for investigating the CSFs that support the management of e-Learning. In this chapter, the rationale for the research approach underpinning the study will be discussed.

This will be followed in Chapter Two by a discussion of the first of the five categories of the e-Learning Framework presented in this chapter, i.e. organisational issues in the

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context of e-Learning. The institutional environment is probably the most critical factor in HE e-Learning development, and yet at the same time, possibly one of the most neglected by researchers and practitioners.

In Chapter Three, the second category of the e-Learning framework (enabling technologies) will be presented. Since the appropriate, efficient and educationally sound use of educational technologies needs careful planning, resourcing and support, concerns related to IS infrastructure and ICT technologies for enabling e-Learning will be addressed in some depth.

In Chapter Four, the discussion will be centred on issues related to the curriculum design for e-Learning courses. This process could be said to systematically respond to the most crucial set of questions in a learning setting: what is supposed to be learned; why is it relevant to wider learning programmes; what learning and teaching strategies should be adopted; what evaluation and assessment strategies need to be in place in order to ensure that the desired aims and learning outcomes are achieved? Finally, revising those aspects that have not proved to be effective is required for the next iteration.

In Chapter Five, attention will then be turned to development of specific environments required to support e-Learning. This requires detailed specification of learning needs, materials, activities and delivery methods and needs. This has been predominantly described, particularly in the United States, as Instructional Systems Design (ISD). However, given that this research stems from a constructivist philosophy, the term Educational Systems Design (ESD) and Learning Design (LD) have also been used to describe this particular aspect of e-Learning.

In Chapter Six, the debate will focus on concerns related to the delivery of e-Learning, addressing issues such as: online learner skills; e-Learning facilitation, tutoring and support; the effective and appropriate use of e-Learning materials; the use of computer-mediated-communication (CMC) tools to enable both peer-to-tutor and peer-to-peer interaction; as well as tutor strategies, skills and training.

A full description of the research methodology will be presented in Chapter Seven, while the strategy and process of data collection and analysis for the four different workshops will be presented and discussed.

The findings emerging from the analysis will be discussed in Chapter Eight, and a visual summary of the emergent CSFs from the four workshops will be offered to provide an overview for carrying out a contextualised discussion of CSFs identified.

In Chapter Nine, an initial ontology will be presented and will then be followed by a discussion and integration of research findings to draw out the key aspects of interest that emerge from the analysis.

Finally, Chapter Ten will present the ‘Conclusions and Future Work’. In this chapter, a critique of the current situation in HE in light of findings of this research will be presented and recommendations for future research will be proposed.

The final sections of the thesis will contain the Bibliography and Appendices.

## 2 Organisational Influences and Institutional Context

At the initial stage of this research, the way that cultural and structural issues of HE might affect e-Learning did not seem to be an issue high on the research agenda. Yet, the influence of organisational culture and institutional context is crucial to the success of any HE e-Learning initiative. It is therefore useful to take a few moments to explore the literature in this area. Organisational culture can be described as values, beliefs, philosophies, ways of doing things and relating to other people exhibited by members of an organisation (McPherson and Nunes, 2006a). Van Bentum and Braaksma (1999) claim that universities are unique because they are establishments where scientific research is combined with education. The endurance of the university system is almost unparalleled in history in that they have survived wars and catastrophes with relative little influence by changing boundaries or destruction and merger of states (Skiadas, 1999). Thus this type of institution could be said to be remarkable insofar as they have been serving the needs of society in all its various forms and guises for over nine centuries. Yet during their long existence, academic institutions have undergone numerous changes, and they are currently undergoing their most far-reaching transformation to-date. Over the last few decades, universities have been driven to change because the wider socio-political environment around them is shifting. Consequently, perceptions of their functions, role and utility are being modified (Duke, 2002:7). This view is supported by Van Bentum and Braaksma (1999), who say that academic environments are being driven by both societal and technological factors, and are currently changing as a result of developments in ICT as well as because of changes in the practice of science.

## 2.1 The Changing Role of HE

Since the implementation of e-Learning involves a fundamental change in learning and teaching processes, at this juncture, it is appropriate to reflect on some important theoretical aspects of change management, such as relationships between organisational culture, structure and strategic management. Many theorists contend that the concept of organisational culture is of great importance in managing change. Furthermore, change and culture have also come to be seen as interlinked. For instance, Peters and Waterman (1982), influential voices in the field, state that organisational culture and organisational performance are inextricably linked. They also asserted that the manipulation of organisational culture through paying attention to its structure could facilitate changes in organisational performance (Peters and Waterman, 1982). Moreover, organisations are as different and varied as nations and societies of the world, and made a link between culture and structure as follows:

“They have different cultures - sets of values and norms and beliefs - reflected in different structures and systems. And the cultures are affected by the events of the past and by the climate of the present, by the technology of the type of work, by their aims and the kind of people that work in them.

Handy (1993:180)

As a result, it is thought essential that those wishing to adopt, or impose, e-Learning should, at the very least, become familiar with their own organisational culture, structure and corresponding and potentially conflicting strategies, before rushing headlong into designing, developing and implementing such courses.

### ***2.1.1 Conflicting Roles of Universities***

According to strategic management literature relating (Grant and Spender, 1996), learning, knowledge acquisition and adaptation are important potential facets of organisational competitive advantage. In line with this, employers and professional associations want students to be equipped with skills in communication, problem analysis and problem solving, planning and networking, and long-life learning in order to become more flexible and self-confident professionals (Kakabadse and Korac-Kakabadse, 2000). Thus, society sees teaching as the university's primary role (as knowledge distributors). However, this conflicts with traditional views of a university as a collegiate institution, consisting of scholars that have come together to gather, generate and disseminate knowledge (Cornford and Pollock, 2003:10). In effect, universities and academic staff want to be known for their research activities (as knowledge creators):

“It is arguable that there is an inherent contradiction in academia where subject matter expertise and academic identity is most directly related to engaging in research for developing knowledge and facilitating innovation, but where there is significant reluctance to engage in social learning processes and substantial resistance to change.”

(Mavin and Cavaleri, 2004)

Various studies have established that graduates from university courses are at present not emerging with all the skills required to be competitive in their professional careers (Nabi and Bagley (1999), Lange *et al.* (2000), Goodwin (2002), Fielding (2002). Therefore external forces in society consider that their expectations of universities are not being adequately fulfilled.

The UK government is clearly conscious of these demands and is actively seeking to get universities to address this problem. Indeed, as an example of this, Henkel and Vabø (2000) found that in order to increase national competitiveness, academics and HEIs are being encouraged to develop collaboration with industry and business and to meet their educational and research needs. Thus, the remit of HE is becoming much broader and considerably more complicated. This requires not only the transfer of subject specific knowledge, but also the ability to apply these skills in the context of specific fields or industry sectors (Nunes *et al.* 2000; Grimson, 2002) and how this is to be achieved within HE can often be a source of heated debate. Thus there are already increasing and progressively more contradictory demands on HEIs, exacerbated by complex funding structures, and these are creating a conflict of purpose and causing an identity crisis in academia. The imposition of e-Learning solutions may only add to this conflict.

### ***2.1.2 Who is “The University”?***

There are a number of different views of the university’s structure, i.e. “who” the university is. On the one hand, academic staff and tutors usually think of ‘*the university*’ as senior management, senate and central administration. On the other hand, for those seeking to govern and administer within HEIs, ‘*the university*’ is out there in the form of departments, academics, researchers and students (Cornford and Pollock, 2003:10). The students themselves, however, are said to regard academics and administrators as representatives of ‘*the university*’ (Huotari and Wilson, 2001). Thus, it can be seen there is not a single view of what contributes to the culture of HE or how HEIs are structured.

### ***2.1.3 The Potential of ICT to Improve University Curricula***

The convergence of ICT and emergent pedagogical thinking has made it possible for HE institutions to develop new e-Learning curricula in order to respond to these increasing demands from both society and industry (Nunes and McPherson, 2003a; SKIP, 1998). The adoption of flexible e-Learning environments is also said to enable universities to reach an increasing number of students in both traditional distance education and further and continuing education (Jenkins and Hanson, 2003), but most research emphasises technological, design and delivery issues, with relatively few researchers discussing organisational and institutional issues, which is vital to the process at all levels.

Although there are numerous papers in journals, conference proceedings and websites proclaiming the value of e-Learning, the evidence supporting these claims emanates from a wide range of disciplines and from variable methodologies, data collection and analytical methods, there may some doubt on the universality of these findings. Since enthusiasm for introducing e-Learning is not universal, it is clear that if e-Learning is to be successful, a number of perspectives need to be aligned if the vision of 'universities without walls' is to be realised.

## **2.2 Making the Transition to e-Learning**

Despite the hype, students are still not making a mass exodus from traditional teaching methods in order to take up the opportunity to participate in online learning, facilitated by the use of ICT. However, any e-Learning failures in HE cannot simply be ascribed to the apathy and ineptitude of academics and educational institutions as some advocates and researchers would like to believe.



This problem, common to all CMC technologies as discussed by Cummings (1995), could be described as a broader set of resistance barriers. Resistance could stem from inadequate computer literacy amongst academic and/or support staff; difficulties in gaining access to ICT resources; insufficient support for design, development, maintenance and even the use of ICT resources; lack of reliability and consistency of ICT solutions and persisting outdated traditions.

Transforming delivery of courses, modules and sometimes even entire programmes into mixed-mode or multi-modal environments, requires not only changes to delivery mechanisms, but widely permeative changes to pedagogical approaches, information management, staff attitudes and organisational behaviour (Duke, 2002:94-95).

Decisions made at senior faculty levels may well impose institutional views on academics, obliging them to adopt particular course philosophies, learning models and approaches.

### ***2.2.1 Institutional Issues Related to HE e-Learning Initiatives***

With an increasing shift towards a market model, and with more emphasis on managerialism (Kogan *et al.*, 2000), the leadership of HE institutions have been given much more power at an organisational level to either facilitate or to inhibit development of any innovative academic teaching and learning initiative. Indeed, either outcome might be brought about by actively adopting a particular strategic stance or failing to provide leadership through laissez faire management, i.e. failing to provide direction and just leaving things to develop ad hoc.

However, in the case of e-Learning courses, it is suggested that simply adding online lectures to an existing course does not work. In reality, staff involved in the implementation of e-Learning can be either assisted or hindered by leadership through the availability of resources and by requirements set out in administrative procedures. Thus, strategic views and institutional policies have a real impact on realistic pedagogical models, which then affects the design of courses and may in turn restrict possible modes of evaluation.

As a consequence of external social pressure as mentioned before, there is a quest for general changes in learning and teaching, and managing this process has become a focus of activity for many academic leaders and researchers. The transition from traditional delivery methods to the implementation of e-Learning environments to support educational activities also involves a great deal of change for all those involved. However, the assumption is that if the change process can be understood and controlled, then effective strategies can be developed and success will ensue (Nunes and McPherson, 2002a).

Nevertheless, the technological link between academic studies and ICTs used for learning and teaching represents an extremely complex and multifaceted introduction of change. Thus, it can be seen that successful implementation of e-Learning is not as simple as it first sounds and it is suggested that it is essential to adopt a holistic and dynamic view of e-Learning as an information system and to be aware of all aspects relating to managing its design, development and implementation.

### ***2.2.2 The Reality of Learning Institutional Structures***

One obstacle is that academics in higher education do not believe that teaching is valued appropriately in the promotions and appointments system (Ramsden and Martin, 1996). In terms of opportunities for promotion and associated salaries, there is a great deal of emphasis on research productivity in terms of publications and grants, with corresponding less value placed on teaching activities (Vu and Doughney, 2006).

The problem is partly exacerbated by the fact that until relatively recently, HE lecturers needed no formal training in teaching and learning. This however is gradually changing, with Ramsden and Martin (1996) suggesting that by making a university teaching qualification a prerequisite for tenure and promotion, a signal would be sent to staff as to the seriousness with which a university regards teaching.

Another factor that affects innovative use of e-Learning is that of the university structure, whereby institutions are divided into faculties which contain departments. Departments provide courses, which are themselves then divided into modules and units. Eaglestone and Nunes (2004) argue that this is problematic because:

“Academic life is divided into semesters, where the lecturers tell the students what to do, check that they have done it and assess the result according to a measurable quantitative mark. Modern education aims at uniformity of teaching quality standards and curricula. Lecturers have to operate within these parameters, cope with increasing numbers of students in classes, administrative processes of assessment and student progress monitoring and comply with institutional and national policies.”

(Eaglestone and Nunes, 2004)

Due to all the issues highlighted above, the lecture remains the dominant teaching method (Eaglestone and Nunes, 2004). Furthermore, according to Brew (1999), the underlying reason for this is that the lecturer is the expert who can hand over the 'knowledge' to those that do not yet know. Thus, the learner is the 'receiver' of external knowledge, concepts or information, and the role of the lecturer is to present such knowledge in a suitably 'objective' manner (Brew, 1999). As lecturers view this teaching method to be proven, efficient and time efficient, this delivery mode remains at the heart of traditional university courses.

However, with the introduction of e-Learning and the spread of new pedagogical paradigms, changes are gradually taking place. From the literature, it is apparent that there is some support for a move toward more learner-centred approaches, but that conflicting institutional emphasis on research, combined with the Tayloristic nature of the teaching system, will hinder any real progress in this direction. Thus, it is essential to provide the right institutional leadership so that good teaching can be distributed across the university and enable best practice to be shared (Ramsden and Martin, 1996).

### ***2.2.3 The Need for Effective Leadership***

Although learning and teaching issues must be central to the adoption of e-Learning, its implementation will have a wide-reaching impact on the institution. In reality, in addition to designing and developing a sound programme structure, it is also imperative to pay attention to associated issues such as institutional strategy and management processes, since decisions made at an executive level may either facilitate or hinder development of e-Learning courses (McPherson, 2002).

The view that localised e-Learning developments can depend on enthusiasts, and that these may be lost if these do not form part of an institutional strategy, is supported by the Department for Education and Skills (2004) e-Learning consultation report. This revealed that 62% of the respondents considered that it was the role of educational leaders to drive the e-Learning strategy forward within their institutions, while a smaller number (19%) also believed that it was vital to educate and convince such leaders of its benefits. Several suggested that educational leaders had to promote the culture of change towards e-Learning, yet some of those thought that it was very often the very same people that were in a position to influence and change who lacked the IT skills to appreciate the benefits of e-Learning.

In addition, decisions about institutional technologies, administrative procedures, financial processes, security, maintenance and support issues (Al Rawas, 2001), as well as corporate views on course philosophies, learning models and strategies can present significant impact on any chosen e-Learning solution on very different levels, ranging from the choice of ICT packages to pedagogical models (McPherson, 2002). It is therefore suggested that in order to facilitate successful e-Learning implementation, HEIs need to work out how to achieve commitment, be sufficiently flexible in order for all staff involved to be able to respond appropriately *and* to put into effect the changes that will be necessary at all levels.

In consequence, it is important to decide on a suitable change management process that recognises new roles and responsibilities, and to regard staff development issues as critical to the successful implementation of e-Learning.

### ***2.2.4 Initiatives to Introduce Innovative e-Learning within HE***

Although there is much literature advocating innovative uses of e-Learning to enhance learning (Kapenieks *et al.*, 2004; Taraman, 2004; Capuano *et al.*, 2003) and many academics do now seem to recognize the need for changing practice in learning and teaching, commitment to e-Learning initiatives is neither always forthcoming nor always adequately supported (Borotis and Poullymenakou, 2004). It is considered vital that the introduction of e-Learning within HE represents a significant change in teaching practice that really needs to be carefully managed. Thus the organisational context of academia and its institutional leadership is probably one of the most critical factors in e-Learning development, and yet at the same time, possibly the most neglected by researchers and practitioners.

## **2.3 Changing Existing Teaching and Learning Practices**

By failing to alter existing teaching and learning practices or to pay attention to other associated organisational issues, Ausserhofer (1999) and Bowskill (1998) suggest, the introduction of e-Learning initiatives risks these becoming mere panaceas rather than equipping students with the necessary skills to negotiate meaning through online communication and discussion. Furthermore, academics are likely to avoid signing up to a corporate 'vision' imposed from the top without real opportunities for discourse. Therefore, if HE staff are to really embrace e-Learning, then they need to be convinced of the advantages for the advancement of their profession and their own career (Nicol, *et al.*, 2004).

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### ***2.3.1 Academic Resistance to Change***

Over the last decade or so, the role of the academic has been undergoing radical changes and academics are being asked to undertake many new tasks as well as to diversify in other ways. The attempt to alter learning and teaching processes in HEIs is complicated and can be compared to other complex societies (Taylor, 2003). The problem with this effort to update current academic practices is that there is often resistance from staff who either resent what is viewed as an additional unnecessary burden or staff who fear that this is just an attempt to turn universities into narrow, vocational training institutions. Despite this resistance, HE remains under pressure to transform its practice, from both social and political quarters (Kogan *et al*, 2000) and to offer more flexibility, both in terms of course content and in the form that the delivery of programmes might take. For example, within the UK context, the Quality Assurance Agency for Higher Education (QAA) has played a major role in defining the educational context in which ICT implementation is being debated (Goodison, 2001). Further to this, since institutions need continued financial viability to survive, academics have been under greater pressure to not only generate income through knowledge transfer activities or attracting research grants, but also to provide quality learning experiences. Specifically, Goodison (2001) asserts that QAA review success will impact upon further improvements in funding for Teaching Learning and Assessment (TLA) and universities are very conscious of this. Academics have therefore to consider these conflicting demands in the current and increasingly changing climate and need to take these factors into account when involved in curriculum design. Moreover, governments in many countries have developed educational policies to increase participation of diverse groups that have been under-represented in HE relative to the population as a whole (Naidoo, 2000).

Yet according to Davis (2003), “*students’ diversity relates not only to academic achievement, but also to ability, disability, age, maturity, experience, study mode, class, sex, race, religion and the like*”. Consequently, educationalists are being challenged to offer flexible and accessible programmes to a more varied student community, whilst at the same time offering more attractive courses that will engage students in a way that makes them take more responsibility for their own learning, thus providing them with the opportunity to acquire new skill-sets that make them attractive to employers (McPherson, 2003).

As a result of the increasing diversity in the student population, an additional key challenge is providing a quality educational experience to a very different type of student (Davis, 2003). As a result, academics have for some time been urged to consider alternatives to traditional lectures (Brown, 1995; Carlson and Berry, 1999; DeLoughry, 1995), and the use of technology to enhance learning is one such alternative (Zisook *et al*, 2005).

A further complication is that, as noted by Laurillard (1993:14), university lecturers were not required to undertake formal qualifications in education. Consequently, until relatively recently their approach to curriculum design was often built on their own personal knowledge which was gained from classroom teaching experience during their formative years, rather than taking a disciplined approach based on educational theory (McPherson and Nunes, 2004c:26). Yet, along with a growing awareness of the potential of e-Learning (Winer and Cooperstock, 2002), there is a realisation that this approach is significantly more complex than f2f lectures (Clegg,



*et al.*, 2003) and that the use of e-Learning demands a particularly rigorous curriculum design approach. Since it takes time to evolve a new way of operating and thinking, it is essential to put in place a long-term initiative in which a whole range of skills is developed simultaneously (Taylor, 2003).

### ***2.3.2 Overcoming Academic Resistance***

Although this may now be less pronounced, the resistance of academic staff to making use of e-Learning is still evident. In the past, original achievement, as evidenced by research and publication, has been given high importance in academic promotion decisions, leading to a tension between teaching and research commitments (Moses, 1985). Although there has been greater emphasis on teaching for promotion and reward in recent years, if staffs continue to believe that this is of little or no importance, it may lead to a general indifference towards teaching innovations. This being the case, any failure of e-Learning could be to some extent attributed to the secondary importance attached to teaching in comparison to research activities by the majority of academics (Darby, 1992). Thus, if e-Learning initiatives are to thrive, it is felt that the way forward is for the leadership to manage the change process by proposing and agreeing goals through consensual debate, supporting strategies appropriately and then realising these through common commitment. Hall (2003) suggests that if e-Learning is to be successful and fully exploit opportunities, the organisation and management must be supportive, with a sound learning strategy, skilled support personnel, given realistic expectations in a sensible time frame.

## 2.4 Conclusions

Managing online programmes poses a new set of challenges and problems that need to be carefully considered and researched. Although there is a considerable accumulation of experience in managing these programmes, much of this is based on practice and scattered throughout the higher education system. In consequence, increasing the success of e-Learning is dependent on effective management strategies and associated criteria emerging from this practical experience.

Yet, because academics involved in setting up e-Learning courses and programmes have tended to concentrate their research on teaching and learning issues, rather than on management issues, there is very little integrative research incorporating this element of the e-Learning process (McPherson and Nunes, 2002a; Luckin, *et al.*, 2004). Therefore, there is the need to systematise this scattered knowledge and experience, as well as to try and provide a general framework in order to support further research.

### 3 Technological Considerations for e-Learning

Traditional teaching is gradually being adapted or changed to accommodate a variety of e-Learning enabling technologies, which are composed of a combination of hard and soft technologies (Archer *et al.*, 1999). Hard technologies comprise the infrastructure, i.e. the computer equipment, systems architecture and information and communication tools and devices that underpin the delivery of learning programmes, whilst soft technologies provide the functions and features of the software that runs on the hardware. In a speech to the Board of Regents of the University System of Georgia, and within the context of technology for distance learning, Sir John Daniel (Vice Chancellor of the Open University) referred to such technology as follows:

“...hard technologies are the bits and bytes, electrons and pixels, satellites and search engines. ... soft technologies are the processes, approaches, sets of rules and models of the organisation”.

(Daniel, 1999)

The technology for enabling e-Learning falls into three main categories. This first is the universal work station, equipped with web browsers are now used (for many learners and tutors, that has until recently been a desktop multimedia PC, although technological advances over the past few years have meant that numerous other portable communications devices are now also being used). The second category is ICT, which enables widespread learner networking and access to the web. The third is the software tools which enable educationalists to author and deliver usable courses. These e-Learning technologies can be described as comprising the underlying infrastructure and software specifically adapted for learning. The discussion in this chapter will now centre on literature associated with the various technological factors, concentrating on how this affects efforts to implement and support e-Learning.

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In the context of this research, it is clear that unless sufficient attention is paid to key technological issues, the whole concept of e-Learning simply not will work. It is essential to ensure the both learners and tutors have the appropriate level of access, and if this cannot be achieved, then regardless of the quality of the course content, it will not achieve the desired result and the whole initiative will be doomed to failure .

“It is often argued that technology merely provides a ‘tool-set’ for allowing important pedagogical structures and issues to be implemented. We argue that this is not the case in many online programs we have observed. It is often apparent that technical issues actually dictate the content and its delivery. Online education has been strongly influenced by the availability of the latest technology, and in many instances colleges and universities now find themselves locked into expensive licensing contracts for software that on reflection does not seem ‘comfortable’ for subject delivery or use by students, academics or administrators.”

(Bennett and McIntyre, 2004)

Policy decisions by senior staff can result in different units having dissimilar levels of access (Dutton *et al.*, 2004) and to design and develop a course around technology that is not readily available to those about to use it, is a waste of time and energy.

According to Parkin (2001), although many people build high-tech courses and then try to dictate that learners upgrade to the required technology specifications, this is not a recommended course of action. Offering e-Learning courses to students who lack the ability or opportunity to reach Internet facilities and information resources is not viable (Guri-Rosenblit, 2005). Academics should become acquainted with their potential learning audience, choose an appropriate learning environment, and only then build courses to run in it. This will ensure that the course requires no more than is strictly necessary in terms of the available bandwidth, processing power, sound cards, audio and video plug-ins, browser generations, and local and network security settings.

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### 3.1 Key Technologies for e-Learning Environments

As e-Learning environments exist at various levels, they can be considered sub-systems, being part of larger institutional environments. There is at the present a wealth of literature describing various technological ‘environments’ available for those engaging in e-Learning and it is appropriate to discuss these in more depth, as they both shape and constrain the learning activities that take place within them, as well as being shaped by those processes (Whitworth, 2004).

Technologies intended for e-Learning are open to interpretation by the diverse actors making use of them and this may lead to many competitive views of such settings, yet with some individuals having greater power than others to influence their shape. An example of this is discussed in a critique of the UK’s Joint Information Systems Committee (JISC) “Good Practice Guide”. Johnson (2005) comments that while the JISC authors acknowledge that this guide provokes far more questions than answers, he argues that “[...] *the deception may be partly intentional, in keeping with e-Learning’s supposed “Trojan horse effect”*”, where it is thought to open up the whole teaching and learning debate”. Johnson (2005) goes on to say that “[...] *such a Trojan horse may also unleash other forces, such as technological determinism, the commercialization of higher education, and the “commodification” of knowledge*”. This type of criticism can have a significant impact on the success of e-Learning. Yet on the other hand, Archer *et al.*, (1999) argue that traditional research universities must prepare themselves for changes in the marketplace of higher education by incubating disruptive communication and learning technologies because if they fail to do so, they risk sliding into mediocrity and perhaps irrelevancy as far as the teaching function of the university is concerned.

Nevertheless, in order to reduce confusion regarding the plethora of online settings for learning and teaching, it is necessary at the outset to discuss the concepts of Learning Management Systems (LMS), Managed Learning Environments (MLE), Virtual Learning Environments (VLE) and Computer Mediated Communication (CMC). The differences between these terms are subtle, sometimes leading to misuse and misunderstandings. For example, Massey (2003), states in his White Paper that online learning technology and organisational infrastructure can be “[...] *variously referred to as Managed Learning Environment (MLE), Virtual Learning Environment (VLE), Electronic Learning Environment (ELE), Learning Management System (LMS), etc.*” and that for consistency “[...] *the term Managed Learning Environment (MLE) will be used throughout this document to describe the infrastructure side of e-Learning*”. Nevertheless, whilst all of these systems affect the design, development and delivery of e-Learning courses, they do so in slightly different ways. Since learning environments as described above are becoming increasingly important in HE, it is worth examining these terms more closely to make a distinction between them in order to outline some of the key issues involved in selecting the appropriate mode and subsequent e-Learning environment.

### ***3.1.1 Learning Management Systems (LMS)***

To start with, although the term LMS has been around for over a decade (Cincotta, and Rocco, 1993), it is still in use today. LMS appears to be the preferred commercial training providers’ term for software that distributes and administers e-training as well as planning and coordinating learning processes. For example, ‘Integrity eLearning’ (no date) explains that a LMS is an enterprise wide system that comprises the following five elements:

- Launching component (student interface)
- Course-development component (course administrator interface)
- Registration and enrollment component
- Assignment management component (manages student progress through assignments)
- Data collection component (to analyze performance).

On the other hand, in a relatively recent academic conference paper (Darbhamulla and Lawhead 2004), the following components were identified:

- a) Adaptive student interface, that provides a learner-centered environment.
- Course Creation Fellows (CCF) component, which allows authors to directly submit their concepts and sub-concepts into the system.
- Registration component, which holds the demographic details of every user.
- Dynamic Assessment component, which provides exams, quizzes and labs at each concept level.
- Clickstream component, that continuously collects data in the background, which can be mined to get important statistical and performance information of the LMS

Thus, an LMS is said to offer management and delivery of online content to learners. However, this aim is strongly contested by Jay Cross (2006), an e-Learning guru, who said in his blog-post that “[...] *LMS create a walled garden in an era when walls are falling down. Why not use the real internet and real internet technology rather than some hokey oversimplification? Furthermore, how can you manage serendipitous learning that is inherently unmanageable?*” This reference to management then conveniently leads onto an examination of the next term, MLE.

### ***3.1.2 Managed Learning Environments (MLE)***

Riddy and Fill, (2003) describe a MLE as “[...] *integrated administrative systems and processes with a user-friendly (web) interface to information-portals and facilities for learning, as well as good communication facilities*”. This is confirmed by Gray and Everett (2002), of the JISC’s MLE Steering Group, who describe an MLE as “[...] *including the whole range of information systems and processes of a college (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning*”.

Thus, a MLE, which has been said to be potentially beneficial to all concerned, can thus be considered as a conceptual information system that brings together all online learning systems with a focus upon the learner, uniting online teaching and learning environments with administrative information, and learning resources. As MLEs provide connections to external systems, co-operation from other services such as administration, cognate teaching departments, libraries and information services, as well as support from management is required. This implies that an MLE is a high-level technological solution that incorporates sub-systems within it. Yet, since at the present time each institution has to bring together a number of its technological applications in order to create this overarching infrastructure, fit for purpose ‘off-the-shelf’ MLEs are not yet widely available, and suffer from the same concerns as the LMS (Cross, 2006).

In contrast to an MLE, VLE is said to be a lower-level technology that consists of components which allow learners and tutors to interact in an online environment.



### 3.1.3 Virtual Learning Environments (VLE)

According to Davis (1998:175), a VLE includes elements such as the Internet, satellite broadcasting, video-conferencing and a whole gamut of 'cyberspace' innovations, indicating that educationalists are experimenting with a range of virtual technology as well as seeking new combinations and variants of these technologies to include in their teaching. Interactions in a VLE can take various forms including providing course content and facilitation of communication between the different participants engaging in the e-Learning activities. Having already discussed some of the components of an e-Learning environment, an attempt will now be made to provide a clearer explanation of the boundaries of an MLE or VLE. A VLE is said to be a fundamental sub-system, and is contained by the MLE, which is itself a system with much broader scope. Thus, according to the British Educational Technology Association (BECTA, 2003), MLEs include the whole range of an institution's information systems and processes (including its VLE if it has one) and relates more to the totality of an institution's processes and standards, rather than to individual products and tools. This is shown in Figure 4 below.

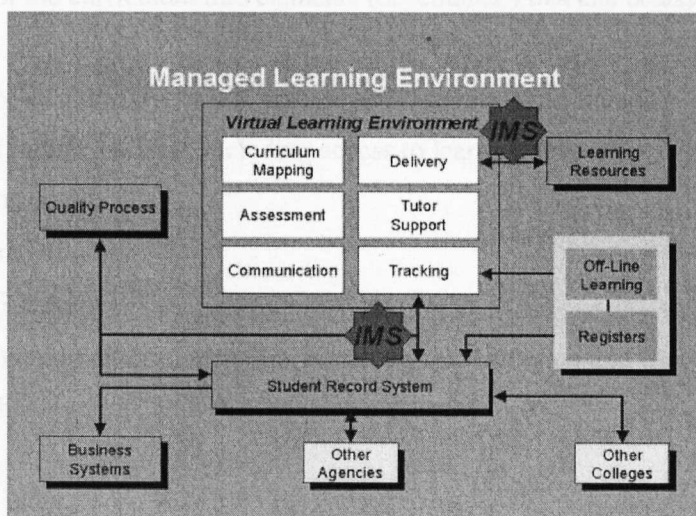


Fig. 4. The VLE as a sub-system within a MLE, Everett (2002), adapted from a diagram by Becta (2003).

However, in order to create an effective e-Learning environment, there are some fundamental activities that need to take place. Consequently, Barker (2000) identified and advocated a five step process to ensure this was addressed as follows:

1. Building a web structure and/or an Internet site (or creating a CD) to improve access to learning resources;
2. Providing an electronic communications infrastructure (based on electronic mail and/or computer conferencing) that is capable of improving learning and knowledge acquisition as a consequence of mediated dialogue;
3. Making available automated assessment tools and rapid feedback mechanisms for student self-assessment of progress;
4. Embedding appropriate, learning strategies, interactivity, multimedia techniques and metaphors within the learning resources that are developed;
5. Providing an electronic course management structure that can be used to integrate, manage and control access to the above components.

To explain the term VLE yet further, Everett (2002) listed its vital component as:

- Mapping of the curriculum into elements (or 'chunks') that can be assessed and recorded
- Tracking of student activity and achievement against these elements
- Support of online learning, including access to learning resources, assessment and guidance
- Online tutor support
- Peer group support
- General communications, including email, group discussion and web access links to other systems, both in-house and externally

Thus, as can be seen from Figure 4, the university technological infrastructure and the university administrative processes facilitated through the infrastructure, such as that of Admissions, Registration, Finance, Student Records, Quality Assurance, Registers, etc.

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are described as an MLE, whereas a VLE is a technological solution lying within the MLE, and enables specific tutor and learner interactions to take place; i.e. Curriculum Mapping, Delivery, Assessment, Tutor Support, Communication, and Student Tracking. Yet, though e-Learning activities can take place wholly within the VLE, in on-campus settings, many academic activities are blended, i.e. where learning mixes various event-based activities, including face-to-face classrooms, live e-Learning, and self-paced learning (Konrad, 2003). Clearly, the IMS (Instructional Management Systems) reference in the BECTA diagram (Figure 4) also requires some additional explanation. This term relates to a popular standard for e-Learning that has been developed in order to make it possible to integrate various technologies with one another. However, as standards are sometimes confused with specifications, this aspect needs yet further examination.

### *3.1.3.1 Interoperability Specifications and Standards*

In order to provide guidance on quality criteria for e-Learning, a number of specifications have been evolved. Specifications have not been ratified by official bodies, but can be useful in achieving de facto standardisation in the interim between identifying a need, and the relevant standard being ratified. On the other hand, according to Currier and Campbell (2002), a standard is a recognized technology, format or method that has been ratified by a recognised standards body, e.g. international bodies International Standards Organisation (ISO), Comité Européen de Normalisation (CEN) or Institute of Electrical and Electronics Engineers (IEEE), or national bodies such as BSI (British Standards Institute).

The IEEE defines a standard as “[...] a *published document that sets out specifications and procedures designed to ensure that a material, product, method, or service meets its*

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*purpose and consistently performs to its intended use*". (IEEE 2003a)

In the context of e-Learning, consideration was initially focused on the technical compatibility of materials, and this was the driver for the first set of e-Learning standards (e.g. SCORM, 2003). These developed alongside existing quality standards like ISO 9000, but the debate on the definition and quality parameters for e-Learning is not yet over, and is linked to the definition of Learning Objects and associated metadata (Littlejohn, 2003: 3ff). Whilst it is not intended that this discourse should delve into the merits of alternative standards in detail, it is worth describing why and how a few of the better known standards have come into being because these affect the success of e-Learning technologies:

- **IMS** (which originally stood for Instructional Management Systems) is an e-Learning standard that focuses mostly on metadata tagging of learning objects, but also has specifications to define how Learning Management Systems (LMS) can communicate with back-end applications
- **SCORM** (Sharable Content Object Reference Model) is an assortment of specifications, adapted from various existing e-Learning best practices, to provide a comprehensive suite of e-Learning standards that enable interoperability, accessibility and reusability of Web-based learning content
- **AICC** (Aviation Industry CBT Committee) was one of the original e-Learning standards, stemming from the aviation industry's need to create a common Computer Based Training (CBT) system, but with the shift toward web-based training, was shifted to encompass this new environment

### ***3.1.4 Learning Objects***

From the discussion above, it can be seen that over the last decade, much effort has been put into exploring the use of Learning Objects. The IEEE Learning Technology Standards Committee define Learning Objects (LOs) as "[...] *any entity, digital or non-digital, which can be used, re-used or referenced during technology supported*

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*learning*” (LTSC 2002). <http://ltsc.ieee.org/wg12/>.

However, Wiley (2002) feels that this definition is too broad, arguing that upon examination this definition “[...] *fails to exclude any person, place, thing, or idea that has existed at anytime in the history of the universe, since any of these could be “referenced during technology supported learning”*” and documents an alternative definition by L’Allier, (1998) as “[...] *a learning objective, a unit of instruction that teaches the objective, and a unit of assessment that measures the objective*”. Wiley (2002) argues that there are significant differences between learning objects and other instructional media that have existed previously and suggests that through the use of LOs, instructional designers (learning technologists) can build small (relative to the size of an entire course) instructional components that can be reused a number of times in different versions and learning contexts. Moreover, according to Phillips (2003), the benefits of the use of digital information are well established and understood. That is, it can be delivered direct to the user; multiple simultaneous use is possible with no degradation from use and with minimal storage costs; sophisticated searching techniques are available and retrieval is fast. Therefore any number of people can access and use such digital LOs simultaneously, as opposed to traditional instructional media, such as a video tape, which can only exist in one place at a time.

This has clear advantages in HE where many students may need the same learning resource concurrently, but storage of large numbers of physical objects is impossible. LOs make use of metadata and XML tags or labels within web pages to provide a machine-readable structure to documents, thus releasing the potential to allow re-usable e-Learning materials that can be easily located. However, a key problem is that when searching for “learning objects”, one is likely to encounter a vast array of terms and

ways to describe them (Smith Nash, 2005).

Furthermore, if providers do not agree e-Learning specifications and standards, portability (being able to move from one software platform to another) will be difficult, if not impossible, thus locking institutions into one learning platform. This is not a desirable state of affairs, so as a consequence, a great deal of effort has been put into developing a specific learning technology standard. Accordingly, along these lines, in November 2003, IEEE made the following announcement:

“[...] IEEE 1484.11.2(TM), ‘ECMAScript Application Programming Interface for Content to Runtime Services Communication,’ provides an ECMAScript (more commonly known as JavaScript) application programming interface (API) that enables digital learning content to obtain a learner's name, preferences and other information from a learning platform and enables a platform to receive relevant information, such as test scores and time spent on task, from the content. The API is part of the Sharable Content Object Reference Model (SCORM) and was first developed by the Aviation Industry CBT Committee (AICC)”.

IEEE (2003b)

Aiming to achieve time and cost savings, many institutions are beginning to recognise the benefits that an MLE which incorporates a VLE, together with other broader IT and administrative facilities, might bring. This synchronisation between administrative and learning systems can be described as interoperability.

#### 3.1.4.1 Interoperability

IEEE defines interoperability as: *“The ability of two or more systems or components to exchange information and to use the information that has been exchanged”* (IEEE, 1990). In terms of HE Institutions, this is the capacity for two or more systems or components to exchange information, and to make use of the information that has been exchanged, such as student records, and academic services, such as the library.

Full synchronisation of VLEs into the university's electronic infrastructure is becoming an important aim and is currently in progress within many institutions. The hope is that this will reduce the need for passing paper records, allow academics to create their courses online, as well as facilitate the full advantage of delivering learning and assessment electronically to be realised, at the same time as having the added benefit of reducing costs. However, for most e-Learning tutors and students, institutional synchronisation is not the foremost consideration. Furthermore, VLEs provide a content repository but, in many cases, limited active learner participation (Donnelly and O'Rourke, 2007). However, there are specific ICT technologies that are used to allow learners and tutors to interact with one another in a networked and collaborative fashion. These CMC technologies all exist to a greater or lesser degree within VLEs.

### ***3.1.5 Computer Mediated Communication Technologies***

The notion of using computers for communicating has been around for some time, and CMC was referred to by Bair (1973) of the Stanford Research Institute as “[...] *a new avenue for interaction*”. Thus it can be seen that CMC can in part be regarded as a socio-cultural communication tool. For the sake of clarity, the discussion in this section of the thesis will not focus on questions related to specific social or cultural issues arising from the use this type of software. Instead, in this chapter, an attempt will be made to concentrate on technological aspects of CMC. Today, the simplest level of CMC, e.g. via email and bulletin boards, is asynchronous, where communication occurs at different times. Synchronous e-Learning enables individuals to feel more like they are members of a learning society than asynchronous learning, and interaction among students and instructors is done in real-time Zhang and Nunamaker (2003).

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### 3.1.5.1 Asynchronous CMC Tools

When communicating ‘asynchronously’, participants do not have to be logged on at the same time and they are able to send messages (and replies) to each other whenever convenient. Thus, participants do not have to be available in the same space at the same time and this is considered to have benefits for those learning at a distance as well as those in different time zones. According to Steeples (1998), the most pressing reason for using an asynchronous medium is that it offers “[...] *flexibility to participants: both over time and over space*”. Examples of this type of communication are email and online conferences. Zhang and Nunamaker (2003) argue that because asynchronous e-Learning is an “on-demand” form of learning delivery, learners may have more control over the learning process and content. However, they also assert that “[...] *the majority of e-Learning systems use asynchronous communication technologies because they are simpler to develop and not too expensive compared to the synchronous ones*” Zhang and Nunamaker (2003). Thus, asynchronous communication is said to allow learners to engage in the most basic and ordinary communication activities, and the use of low-level tools can ensure that online communication is accessible to learners with slower computers using standard modem (56KB) connections. However, Donnelly and O'Rourke (2007) argue that asynchronous interaction can inhibit spontaneous development of ideas, therefore more interactive modes of communication are needed to support genuine e-Learning.

### 3.1.5.2 Synchronous CMC Tools

As a consequence, there is an increasing move towards synchronicity within e-Learning, where participants conduct interactive discussions during the same time-frame, which require more complex tools. Within ‘synchronous’ CMC, all participants are logged on at the same time and can therefore see the entire discussion (from the time of logging on).



Examples of synchronous CMCs are chat and instant messaging (e.g. MSN Messenger™). So, media synchronicity can be viewed as the extent to which a communication environment encourages individuals to work together on the same activity, with the same information, at the same time; i.e., to have a shared focus (McGrath, 1991). The problem here is that technologies that go beyond the use of basic one-to-one chat (i.e. those that allow multiple users to engage in communication activities together) require more sophisticated tools. However, tools such as chat or videoconferencing often make use of Web-browsers or email clients, which require more advanced software and superior bandwidth connections, all of which come with consequent increase in costs, both for purchase and continued maintenance.

Despite these additional costs, Riddy and Fill, (2003) say that for teaching and learning the real power of web-based conferencing is through opportunities to foster communication between remote groups of learners, and to support the development of higher-level cognitive skills, as defined by Bloom *et al.* (1956:162-195), such as synthesis and evaluation. In addition, it is felt that web-based communication not only provides opportunities for collaborative working, but it also allows participants to engage in a dialogue where everyone concerned can have the same opportunities to contribute to the debate.

On the other hand, while more technical systems may appear to add value, they may in fact introduce further problems. Whilst technologies, such as videoconferencing, allow participants to see additional visual cues, it requires significantly more sophisticated equipment, as well as needing increased bandwidth and space. More to the point, it is highly likely that user training will be necessary since the use of these more complicated

technologies is not always entirely intuitive. This is confirmed by Dutton *et al.* (2004), who argued that key social and technical dimensions need to be understood and addressed if VLE innovations are to fulfill their potential for enhancing learning and education.

The choice of CMC technologies for e-Learning, like more generic information systems, is about balancing technical requirements with organisation and task specialisms (Avison and Fitzgerald, 1993:9). Thus, the provision of CMC not only requires those tools which assist and facilitate the learning activities, but also those tools needed to produce the system, the administrative and management procedures to organize the process of deployment of resources, as well as a means of maintaining vital communication links between all those involved in supporting the system.

A further complication affecting choice of tools for CMC today is that technological advances have meant that asynchronous and synchronous modes have become much for blurred. Some email and conference exchanges can now be almost as fast as synchronous chat, while instant messaging can often be set to save discussions and then made available to people who are offline for access at a later date when they log on (e.g. Yahoo Messenger™). Thus, there is obviously some overlap between synchronous and asynchronous modes of communication.

Nevertheless, no-one should lose sight of the fact that in e-Learning environments, the purpose of using CMC is to support learning rather than get overly enthusiastic about the technology. For that reason, it is essential to ensure that CMC solutions are based on a sound pedagogy, and therefore the e-Learning development team should be sure

that CMC will actually make the learning possible, or improve existing learning. This will then help designers to decide which CMC tools should be included and whether these need to be synchronous, asynchronous or both.

One drawback of synchronous CMC is that it requires all participants to be logged on at the same time and therefore the benefit of time flexibility has to be sacrificed as well as putting control over the learning process and content back with the tutor or facilitator. Nonetheless, since the provision of CMC is merely a component of the entire e-Learning environment, a basic consideration at any particular point in time for technological choice is that it must correspond to the proposed e-Learning model and fit well with the existing infrastructure.

### **3.2 Key Issues Affecting Technological Decisions**

A significant barrier to the uptake of e-Learning technologies is teachers' refusal to change how they are teaching and/or resistance to use technologies (Donnelly and O'Rourke, 2007). However, despite the fact that there may still be a number of academics and technology support staff who have deep reservations about supporting e-Learning technologies, many now do accept that technological changes do affect the way students learn and will continue to so. Therefore, since most institutions have now adopted technologies to support learning in one form or another, the introduction and use of e-Learning technologies within Higher Education contexts is beginning to enter a more mature phase. Consequently, it is essential that the key issues affecting decisions about technologically supported learning environments should now be discussed in further detail.

In addition to highlighting general concerns which affect all information systems, i.e. interoperability; interconnectivity; security issues; internal platforms; integration; commitment and service performance, Riddy and Fill (2003) also propose four key technological concerns that merit significant consideration within a learning environment: *Access; Integration; Usability and Flexibility*.

Yet, even having identified these main technological aspects, due to the diverse nature of higher education, individual institutions are liable to have established quite dissimilar priorities and their issues of concern are likely to vary according to what they are familiar with and what they already have in place. Since the various e-Learning components must link transparently into existing systems, the literature describing this problem will now be explored in more detail.

### **3.2.1 Access**

As computers are an indispensable element of effective e-Learning, it is beyond doubt that tutors and learners require access to the resources or environment, ideally from wherever they wish to work. However, due to increased participation in higher education, large numbers of students originate from low income backgrounds and are thus unlikely to have any significant amount of disposable income to purchase computers (Holley 2002). Such students, with no computer at home, may well be disadvantaged in e-Learning environments.

On the other hand, Jeffries *et al.* (2006) disagree with this analysis, asserting that their study indicates that that physical access to technology (as identified by Bowl, 2003:135) is no longer a major barrier to the uptake of e-Learning for students in higher education.

This clearly ignores the fact that there are still wide variations with regard to students' availability of technology in the form of hardware, software, telecommunications networks, and Internet services due to the rapid and continuing advances of technological changes. Furthermore, anti-discrimination laws now demand that technological access, like other forms of access, must be (as far as is possible) in a format that works for all online learners, including those with physical disabilities and/or other special needs.

Yet, it is useful to bear in mind that access barriers are not necessarily all physical. Cultural issues can and do present obstacles, as can be seen in the assertion by GEM-SET (2006), that some young women in particular settings are not encouraged to explore technology, and so do not gain the necessary skills or confidence to make use of it. Yet, on the positive side, most institutions are starting to accept the fact that access to "a set of instructional and administrative support is vital to student success" within e-Learning contexts (Hamlin, 2006). In order to assure that students do have the necessary access to learning systems, Riddy and Fill (2003) recommend asking a battery of questions:

- "Are the learners mainly campus based, full-time, part-time, or distant?"
- Is there adequate provision of computers with access to online educational resources for all learners and tutors, and is the provision in the 'right' places?"
- Does the technology conform to standards that will allow transparent communication with distributed campus locations, other sites, and non-windows platforms, and accommodate learners with visual or physical difficulties?"
- Does a single 'UserId' give a user access to all appropriate systems and resources, be they administrator, tutor or learner?"
- Are network access routes secure enough to allow wireless connections?"
- Is the specification of hardware and software adequate for the communication and distribution methods to be used? (e.g. animation, streaming video, and videoconferencing may have non-standard hardware and software requirements, and require adequate bandwidth).
- Will the system support providing learning materials to mobile devices, e.g. PDA's?"

Thus, online student services must provide those special structures and features required to reach students with varying capacities for working online. Yet any further increase in the use of technology for teaching and learning within HE will not only depend on better student access, but on all staff (academic, support, library and information staff) updating their technical skills, both in the use of such facilities and use of ICT within teaching and learning contexts.

### ***3.2.2 Integration***

Some scholars (Jones, *et al.*, 2005) posit that “[...] *the relation between the design of technology and the use of technology is crucial*”, particularly in relation to CSCL.

However, it could be argued that these intertwined technological concepts are equally applicable to other more generic areas of e-Learning.

“Effective technological infusion requires learning environments designed to achieve greater academic performance by students through the alignment of standards, research-proven practices, and contemporary technology”

(Davenport, E.K and Davenport, L.; 2003).

Essentially, this means that technology used for administration, information provision, communication processes and learning and teaching environments should be properly integrated, regardless of any particular institution’s chosen platform. Riddy and Fill (2003) concur, therefore advising those involved to ask the following questions about integration:

- “Is there an e-Learning environment (e.g. MLE/ VLE), and what is the scope of learning resources and/or interactions it will support?”
- Can it be easily integrated with other applications, such as administration?
- Is the technology and communications infrastructure adequate to interact with all required learning resources (e.g. may web-based resources require special ‘plug-ins’)?
- Do tutors have access to all the tools they require to produce and publish learning resources, or facilitate their development?”

The need for interoperability in e-Learning has already been mentioned earlier in this chapter, and Koper (2003) emphasises that not only are there too many architectures but that these are incomplete in terms of network facilities, servers and applications, and many underlying protocols and standards are missing. The implementation of large interconnected networks and collaborations depend on interoperability specifications and are in fact crucial for learning networks and the GRID. Koper (2003) also considers that the lack of standardisation and the lack of valid and accepted ideas about e-Learning requirements and specifications are major problems in this regard. Despite this, technologists cannot be overly prescriptive because practitioners and institutions want the ability to design, deliver and implement their own distinct form of learning.

The JISC have proposed an e-Framework [online - last updated on 15/02/07] which draws on two key technology developments - the service oriented approach and web services. A service-oriented architecture is an approach to joining up systems within enterprises. It is a relatively new approach, but is rapidly gaining popularity because of the lower costs of integration coupled with flexibility and simplification of configuration. Service-oriented architecture builds upon the experience of using Web Services for integration.

Wilson *et al.* (2004) assert that service definitions need refinement and expansion and many of the details have to be worked out by institutions. Since that point, according to Mason (2006), the JISC has further developed this e-Framework and is guided by several underpinning principles:

- a service-oriented approach to system and process integration;
- a commitment to open standards;
- a recognition of the central importance of community involvement;
- the need for open and collaborative development activities; and
- the deployment of these approaches in a flexible and incremental way.

This framework is intended to provide a map of the areas of development against which specifications, standards, software tools, applications and services can be aligned and it will be interesting to see whether institutions do in fact adopt and find this a useful guide.

Finally, e-Learning depends on appropriate and attractive user-interfaces. The reason for focusing on this issue is that such interfaces form the principal means by which e-Learning is achieved. If students and/or tutors do not find this aspect of the technology to their liking, there will be an understandable reluctance to make use of e-Learning. Unfortunately, educational systems may not develop at the same pace as that of technological changes, and therefore there is likely to be a delay between availability and adoption (Megarry, 1978; Martins *et al.*, 2003).

### **3.2.3 Usability**

If e-Learning developers are seduced by technological processes rather than considering pedagogical issues first, it is likely that they will produce unusable products which will frustrate the learner, in which case the whole e-Learning intervention will be a failure.



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Conlan and Wade (2004) concur with this, saying that “*Twenty years of using ICT for learning has shown repeatedly that favoring technological solutions over pedagogical soundness results in beautifully crafted systems that are unusable*”. This is further emphasised by Laurillard (2002) who says that “[...] *it would serve to challenge the technology-driven e-Learning services and applications standards to meet the requirements of effective learning and teaching*”.

Yet, according to Ardito *et al.* (2005), one of the main goals of e-Learning application developers should be to ensure usability and accessibility to the largest number of users possible, and that developers should ensure that users can profitably exploit such applications. Dix *et al.* (2006) go even further, declaring that e-Learning applications should become smart enough to adapt themselves to the students’ learning styles and to assure high standards of usability, in order to make learners’ interaction with the systems as natural and intuitive as possible. Riddy and Fill (2003) believe that e-Learning developers should determine usability criteria by asking the following questions:

- “Do all users find the system easy to access and use?
- Can learners complete all activities/tasks required?
- Are different media well handled, including those using full sound and vision?
- Do systems accommodate different learner styles, and tutors and learners with visual or physical difficulties?
- Is the tutor/developer interface consistent between tasks, and does it allow the same ‘UserId’ to facilitate various roles (e.g. tutor, moderator, assessor, learner)?
- Is input and organisation of learning resources straightforward (e.g. uploading new materials, linking internal and external resources)?
- Are assessment /testing tools easy to use and integrate with learning resources?”

It is hoped that by answering these questions, it will increase the likelihood of creating learning environment and resources which really do meet the usability needs of the learner, but with technology changing at an ever-increasing pace, developers need to pay close attention to new and emerging usability issues that have not yet been identified. On the other hand, even with all the issues of implementing usable interfaces addressed, e-Learning developers will still need to attend to the issue of flexibility. This will be discussed in the next section.

### ***3.2.4 Flexibility***

In terms of this research, flexibility is being used to describe e-Learning systems which are adaptable enough to fulfil current needs and to serve future pedagogic requirements. An example of the flexibility which is thought to be afforded by technology is illustrated by Partridge and Edwards (2004) who described how Queensland University of Technology (QUT) would “[...] *make a coordinated and strategic effort to use the increasing capacity and flexibility of technologies to transform our teaching and learning environment in ways which engage and challenge students, and which enable different learning environment, on-campus and off-campus, to be used in ways which are complementary and mutually reinforcing*”. This could imply that such innovation is new, but Clegg, *et al.*, (2003) assert that “[...] *the pace of technological change obscures considerable continuity of practice among HE practitioners*” whereby academics have been able to draw on their knowledge, experience and relative control of the curriculum to shape the ways in which innovation is implemented. Conversely, it must be recognised that the speed of technological changes is endemic in today’s society and a solution that is wholly adequate one year may not be sufficient the next.

With this in mind, Riddy and Fill (2003) recommend preparing for this type of flexibility in e-Learning settings by: checking whether there will be access from many different kinds of platforms; whether learners will be able to customise their learning environment; if course designers and tutors can use and re-use learning resources, customise learning pathways, and group learners as required; and finally to check whether the technology will still work with developing and foreseeable standards, incorporate higher bandwidth applications, and allow new types of resources and models of learning (e.g., streaming video, network access points/wireless networking, for e-Lectures). Thus, to ensure successful technological implementation of e-Learning, the literature clearly indicates that that the appropriate level of attention must be given to issues of accessibility, integration, usability and flexibility, as well as to establishing acceptable answers to the pertinent questions under each of these headings for any particular educational setting. However, these are not the only considerations and there are further technological resources that require contemplation.

### ***3.2.5 Further Resources***

In a visionary article, published in *Scientific American*, Berners-Lee *et al.* (2001) proposed the Semantic Web - a new form of Web content that is meaningful to computers, thus unleashing a revolution of new possibilities:

“The Semantic Web, in naming every concept simply by a URI, lets anyone express new concepts that they invent with minimal effort. Its unifying logical language will enable these concepts to be progressively linked into a universal Web. This structure will open up the knowledge and workings of humankind to meaningful analysis by software agents, providing a new class of tools by which we can live, work and learn together.”

Berners-Lee *et al.* (2001)

The Semantic Web makes use of the Resource Description Framework (RDF) to build webs of related information and makes use of agents, software programs that can search the Web to find specified information. These new capabilities, released by the Semantic Web, may “[...] herald a new era of collaborative developments, enhancing tutors’ abilities to work within e-Learning environments and providing learners with what they want, when they want it” (Riddy and Fill 2003). With the advent of interactive technologies (dubbed ‘Web 2.0’), this prediction seems to be now within the grasp of those charged with the responsibility of providing learning technologies. However, despite some cause for optimism, there are still a number of challenges to be faced.

### **3.3 Challenges Associated with Learning Technologies**

Firstly, the development of learning technology and resources by commercial providers denotes a significant cost that needs to be recouped from its customers. Consequently, suppliers may not wish to make use of open source technologies that enable reuse or sharing of materials, even if this is in the best interests of the institution.

Secondly, many academics both wish and need to retain control over pedagogical issues, even when related to the design, development and delivery of e-Learning. However, buying into a commercial product that ties academic staff to a particular approach is detrimental to its students and in particular, as pointed out by Currier and Campbell (2003), a lack of adherence to standards can raise many problems within HE contexts. Therefore, an institution should avoid being locked into the “upgrade trap”, and HE learning technology systems should be ‘standards compliant’, to allow academic users the freedom to choose a different system in the event that their educational needs change.

Thus, those responsible for selecting and maintaining learning technologies really need to seek academic participation and validation when buying into a particular system. It is vital to keep in mind the fundamental need to consider appropriate pedagogical models and correspondingly of delivery support models, because needs may vary from one educational setting to another, even within one institution.

Thirdly, without sufficient time, inclination, and skills to use these environments to the full, academic staff may be unwilling or unable to provide the students with learning opportunities enhanced by technology. Therefore, quite apart from the essential provision of training, staff must be encouraged for their efforts with appropriate recognition.

Finally, and by no means least, due consideration must be given to organisational issues and change management processes because, as argued by Currier and Campbell (2003), "...without different institutional arrangements, we fear that not only will these technologies be underexploited, but they may well reinforce the current limitations of our higher educational system". This is succinctly reinforced as follows:

"Rapidly expanding information requires a highly informed workforce and citizenry who need more than traditional approaches to training and education. Yet the need cannot be met by merely placing a veneer of technology over an inadequate traditional approach."

Long (2004)

It can be seen that it is not sufficient to simply pay attention to technical issues because, as the literature (McPherson, 2003; Stensaker and Skjerski, 2003; Fox and Hermann, 2000) suggests, technical innovations have and are continuing to radically alter employment patterns around the world and course design for higher education needs to be transformed to accommodate these changing needs.

In a discussion of issues around introducing e-Learning into Higher Education, Roscoe (2003:4) concluded that “[...] *a major investment in infrastructure and the design and development of e-Learning is required. The facility will be needed to update both materials and the e-Learning platform to accommodate new learning about the effective use of e-Learning...*” This is reinforced by Jones and O’Shea (2004) who assert that universities need to change to accommodate the impact of technology on learning and believe that institutions have thus far placed much focus on technological advancement but much less on how technology impacts on strategic planning, and therefore this is a critical aspect that needs to be addressed.

### **3.4 Conclusions**

This chapter has investigated the range of existing technologies that make up e-Learning environments and explored how the various technologies and systems have evolved to meet learning needs. The infrastructure needs to be robust and reliable because if technological factors such as malfunctioning hardware, poor software configuration, down-time or slow servers, busy signals and lack of access are not attended to, students will become frustrated and this will ultimately affect the learning process (Volery and Lord, 2000). However, it has been emphasised that focusing on technology alone will not lead to success, and therefore, it is suggested that, quite apart from the technological aspects, every institution currently engaged in adopting, adapting or pushing forward the boundaries of e-Learning must seriously think about some of the other generic key concerns as outlined earlier in the e-Learning Framework presented in Chapter 1. The next three chapters will consider some of the essentials for successful online learning and teaching.

## 4 Curriculum Design and Development

### 4.1 What is Curriculum Design?

To begin with, an explanation is needed for what is meant by this term. In its most basic terms, curriculum design could be described as “a planned approach to course development” – and this could be said to be the case whether applied to e-Learning or to other learning contexts. This process (Nunes *et al.*, 2001), consists of deciding the aims and learning objectives of a course, and how these may be achieved. Referring to the Educational Management Action Research (EMAR) model as proposed by McPherson and Nunes (2002), whilst the whole cycle of e-Learning comprises four basic building blocks: the *Organisational Context*, the *Pedagogical Model*, the *Educational Setting* and the *Evaluation Process*, it is suggested that curriculum design is a combination of determining a suitable pedagogical model and deciding on the details that can be used to translate these ideas into the educational setting as shown in Figure 5:

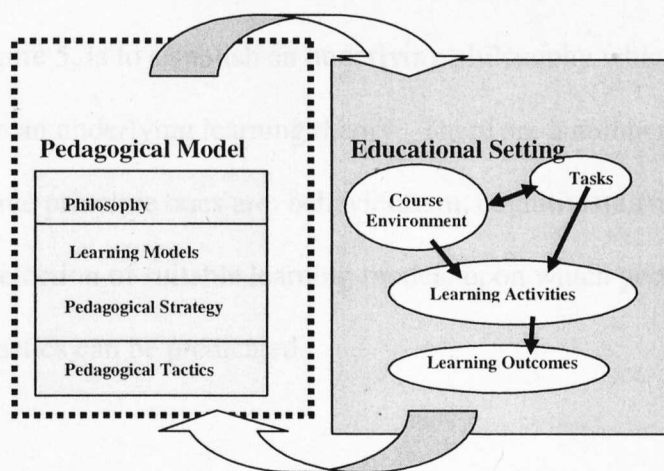


Fig. 5 – Curriculum Design Components  
Adapted from McPherson and Nunes, 2002)

However, before beginning to explore the critical issues that may affect the design of a curriculum within an e-Learning context, it is fitting that this should be put into context by exploring the history of learning in more general terms.

## **4.2 The Influence of Learning Theories and Models**

Pedagogical models for e-Learning are usually chosen on the premise that the delivery mode is at least in part based on some sort of learning technology and that the target audience are to some extent capable of independent learning (Nunes and McPherson, 2002b). However, because of the wide diversity in human nature, instructional settings, and fields of study, no general theory has been formulated that is applicable to all educational psychology. Instead, psychologists work on developing theories about particular phenomena in learning, motivation, development, teaching, and instruction.

The different theories of learning help educators to understand, predict, and control human learning and behaviour, and therefore shape the way instruction is designed and facilitated. Consequently the adoption of a particular theory of learning also influences the way educators design, develop and use learning technologies and more specifically e-Learning environments. Therefore, the first step in the proposed pedagogical model, as shown in Figure 5, is to establish an underlying philosophy which is usually predicated upon an underlying learning theory. There are a number of learning theories, of which the three principle ones are: behaviourism, cognitivism and constructivism, that allow the selection of suitable learning models upon which pedagogical strategies and matching tactics can be predicated.

### **4.2.1 Behaviourism**

As a learning theory, the origins of behaviourism are said to go as far back as *Aristotle*, who wrote about memory, and there are a number of philosophers such as *Bacon* (1561-1626) and *Hume* (1711-1776) that are said to have followed in his footsteps. Pre-twentieth century views of behaviourism are said to accord with realism (discovering



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the way things are) while radical behaviourism (which makes no distinction between subjective and objective phenomena in the traditional sense and questions whether there is a real, unchanging world out there) is associated with pragmatism (Baum, 2003:17-28). *Pavlov* (1849-1936), who coined the term “reinforcement”, provided a pre-cursor to radical behaviourism with his legendary classical stimulus-response experiments whereby a dog was conditioned to salivate without the stimulus of food. Yet this type of animal experimentation clearly had limitations in predicting human behaviour and consequently, at the turn of 20th century, *Thorndike* (1874-1949) took up the challenge of taking this work further and applied his theories to both animal and human learning. Thorndike developed an important theory of learning that describes how stimuli and responses are connected and the importance of this work for the practical world of education was immediately recognised. Early psychologists began to examine memory and the higher mental processes such as learning, and researchers developed new techniques for experimental study in this field of enquiry. This pioneering field of educational psychology flourished within the progressive movement in education that had begun in the early 20th century. Corresponding to the functional approach proposed by Thorndike and his so-called law of effect- the more satisfying the result of a particular action, the better that action is learned - *Watson* (1878–1958) is said to have originated the term ‘behaviorism’, asserting that physiological reactions were a result of environmental stimuli.

Out of this work, the *behaviourist* school of psychology was born. This school of thought assumed that human behaviour could be explained in terms of physiological responses to external influences and the American psychologist *B. F. Skinner* (1904–1990) became one of the foremost exponents of behaviourism. Skinner (1953:59-66)

argued that behaviour is, by and large, habituated and could therefore be learned or unlearned through a process of reward or punishment. Thus, behaviourism adopts an approach that is based on repeating desired behavioural patterns until they are embedded in the learner's own observable actions and deeds. Thus, educational psychologists became increasingly interested in how people receive, interpret, encode, store, and retrieve information and in attempting to understand the cognitive process, tried to interpret human problem solving, memory, and creativity.

Since behaviourism reduces all behaviour to the level of a correlation between an external stimulus and an internal response, critics of this approach argue that it ignores the importance of higher cognitive processes, which focus on internal process such as perception and learning from reflection. These have a major part to play in facilitating an understanding of learning (Peel, 2005). However, this focus on reductionism also enabled behaviourism to be easily understood and made it compatible with the dominant Tayloristic and functional views of the world in the early 1900s. Thus behaviourism became a hegemonic pedagogy in educational systems (Hildebrand, 1999) and in combination with functional and objectivist philosophies has governed educational practices for most of the 20th century (Jegede, 1991).

#### *4.2.1.1 Objectivist Beliefs in Education*

At the end of 19th century, mass schooling was introduced, denoting the ending of the apprenticeship model in an education environment. Cognate subject domains were identified; with social and professional knowledge separated into discrete subjects such as mathematics, social studies, reading, language, science and art (Honebein *et al.*, 1993). Knowledge, contained in lessons or textbooks, was transmitted from teachers to

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their students. According to Lakoff and Johnson (1980:210-225), objectivists maintain that the world is completely and correctly structured in terms of entities, properties and relations. In a similar vein, there is an assertion that reality is objective and external to the individual and consequently learning is dominated by the communication metaphor Cunningham (1995).

Thus, behaviourists regard knowledge as external to the learner and believe it can be contained in a reliable source, such as a textbook, a teacher's lecture, or even a computer-assisted learning (CAL) lesson. Learning takes place when this knowledge is transmitted to and received by the student. As Kay (1991) claimed, students are seen as empty vessels that must be given knowledge, drop by drop, from the full teacher-vessel.

“Thus hegemonic pedagogy draws on a model of learning that largely operates from the transmission end of the learning continua, where students are perceived as acquiring or collecting knowledge and skills and are passive recipients of frequently didactic teaching.”

(Hildebrand, 1999)

Moreover, according to an objectivist view, learning takes place in classrooms, not elsewhere (Cunningham, 1995), and the primary concern of educational institutions consists of transferring knowledge as an integral, self-sufficient substance, which comprises abstract decontextualised formal concepts (Brown *et al.*, 1989). Jonassen (1991) concurs, claiming that objectivists believe in the existence of reliable knowledge about the world that is received by learners passively from authoritative sources. The activity and context in which learning takes place are thus regarded as merely ancillary to learning, pedagogically useful of course, but essentially distinct and even neutral with respect to what is learned (Brown *et al.*, 1989). Consequently, traditional curricula for face-to-face HE courses have conventionally emphasised declarative knowledge in

specific subject areas. In this convention, instruction is seen as a process of engineering learning environments so that transmission of this knowledge from authoritative sources to the student is efficient and effective (Knuth and Cunningham, 1993). This effort led to ‘programmed instruction’, a teaching technique in which the student is presented with a series of ordered discrete bits of information, each of which he or she must understand before proceeding to the next stage in the series – this could be regarded as an early form of curriculum design. The behaviourist approach can be aligned with Reinforcement Theory as described by Michener *et al.* (2004). Yet, the behaviourist approach, emanating from positivist reductionism, has been criticised by the educational community as no longer being appropriate for today’s needs.

#### 4.2.1.2 *Criticism of Objectivism and Behaviourism*

This process of learning has been condemned as the notorious “sage on the stage” approach (Jones, 2006). Allen (1992) shares Jones’ criticism, noting that the idea that knowledge can be objectively validated and prioritised, transmitted, and acquired is a folk metaphor of the industrial and post-industrial age. Furthermore, since according to academic learning philosophy, knowledge domains are not readily separated in the world, information from many sources bears on the analysis of any particular subject matter and it is not possible to isolate units of information (Nunes, 1999).

Yet, despite the fact that knowledge cannot be seen as a commodity, set apart from individual understanding, and experience, the objectivist view of knowledge as something tangible and transmissible reflects the epistemological assumptions of the philosophy that still prevails in educational systems around the world today. Thus, this philosophic method, rather than the scientific, is still the predominant mode of curriculum design.

This situation has been condemned by educationalists, who argue that the combination of objectivism and behaviourism emphasises observable external behaviour and avoids reference to meaning, representation and thought (Peel, 2005). In support of this criticism of behaviourism, Fosnot (1996) proposes that rather than concentrating on achieving simple behaviour changes or skills acquisition, the focus of learning should be on concept development and developing deep understandings. Yet, despite all criticisms, until the late 1990s, formal education continued to be grounded in the traditional normative, campus-based, linear teaching experience, which is dominated by lectures occasionally followed by smaller group seminars (Gulati, 2004).

However, returning to the study of learning carried out in the early 20<sup>th</sup> century, such limitations of behaviourism led researchers to question the usefulness of this approach and noteworthy scholars such as *Edward Chase Tolman* (1886-1959) began to question the validity of the overemphasis of reinforcement theories (Tolman, 1922) and the exploration of alternative theoretical avenues began. In consequence, the proposal of alternative learning philosophies and approaches was formulated, one of which was cognitivism, said to explain human conduct in terms of mental states (Leroy and Ramanantsoa, 1997).

#### ***4.2.2 Cognitivism***

Psychologists in the cognitivist tradition are said to believe that the mind consists of discrete, internal mental states and that learning is the development of conceptual representation that can be manipulated. Among the most famous names associated with cognitivism is Piaget (1959), who began asserting in the 1920's that learning came

about as a result of both genetic and environmental factors. Piaget's view was that when a child acts on the world with an expectation of changes and these are not met, a state of cognitive conflict arises (Shayer, 1997:45), which he/she seeks to resolve by accommodating new data into his/her experience by making new mental models (Ravenscroft, 2001). In this tradition, cognitive psychologists see learning as an internal process and claim that the acquisition of knowledge or skill involves the use of memory, motivation, and thinking, and that reflection plays an important part in learning (Ally, 2004). Bruner (1960:53-65) claims that the learner needs to work through the surface structure of meaning in order to reach an underlying or ideal or deep organization, thus providing a richer or more generalisable representation of reality. Bruner (1960:150) also notes that doing [a job] shapes the problem solving process, thinking and how problems are formulated.

Other significant cognitivists were Ausubel (1968:212-215), who felt that learning experiences could be represented by cognitive structures and proposed "advanced organizers" to help with the acquisition of knowledge, and Vygotsky (1978:116-119) who recommended that the curriculum should be designed to emphasise greater interaction between learners and their learning tasks. Yet cognitivism was considered to have its limitations, and in the 1930s, Dewey was advancing a very different philosophy with a premise that personal experience is at the centre of education.

#### 4.2.2.1 *"Learning by Doing"*

Dewey (1938:58-59) described learning as an active process, not something done to someone, but rather something that a person does. This gave rise to the term "learning by doing" where learning takes place within the context of a whole experience in which

the learner is completely engaged, and results from the combination of acting and reflecting on the consequences: reflective experience and reflective thinking. Thus, learning can be thought of as a constant process where an individual actively constructs a personal view of the world by reflecting on experience. This has played a part in the development of the approach now known as constructivism.

### **4.2.3 Constructivism**

One of the key pioneers of constructivism was Bartlett (1932:192-200), who proposed that “schemas” were constructed through coming into contact with the environment, and that such knowledge structures can be modified by experience. Bartlett (1932:811-814) is said to be one of the earliest researchers to describe the construction of meaning as a social activity. Constructivism is derived from the field of cognitive science, founded in particular on the works of scholars such as Jean Piaget, Lev Vygotsky, Jerome Bruner, Howard Gardner and Nelson Goodman. Since those early days, there has been a myriad of papers discussing variations on the constructivist theme, and various versions of constructivism are proposed in the literature (Windschitl, 2002). In its most elemental form, constructivism can be considered to be the development of knowledge by actively making sense of information in relation to the context and environment in which the learning takes place. Constructivists believe learners shape reality from their own experiences, but personal views are modified by coming into contact with reality of others. Consequently, a learner’s comprehension of the subject matter could be said to be rooted in the experience of that individual (Brown *et al.*, 1989).

The constructivism school of thought considers that “*knowledge of the world is not a simple reflection of what there is, but a set of social artefacts; a reflection of what we make of what is there*” (Schwandt, 1997:20). Thus, according to Jonassen (1990), learners

attach meaning to newly acquired knowledge in association with experiences of the environment of which that learner is a part. Basically, constructivists assert that learning is dependent on the use of prior knowledge in the construction of new meanings. Spiro *et al.* (1991) claim that a new element of the constructive process must be added to those that are already recognised, i.e. the use of pre-existing knowledge in the active construction of new knowledge. In this scenario, previously constructed knowledge structures are summoned up from memory and connected to unfamiliar information and different experiences in order to develop new insights.

“The role of education in a constructivist view is to show students how to construct knowledge, to promote collaboration with others to show the multiple perspectives that can be brought to bear on a particular problem, and to arrive at self-chosen positions to which they can commit themselves, while realizing the basis of other views with which they may disagree.”

(Cunningham, 1992:36)

The implication of constructivism is that learning experience is personal and the process of knowledge acquisition may well differ from one person to another. In consequence, pre-existing knowledge is brought together from diverse areas of understanding and reassembled into knowledge structures that can be used to interpret and construct new meanings from the new situation presented. Kirkwood (2000) explains that this process of knowledge construction by imposing meaning on learning experiences develops metacognitive skills, higher order thinking, deeper understandings and a greater motivation to learn. This then reflects the basis of the constructivist epistemology.

### **4.3 Behaviourism or Constructivism: A Dichotomy?**

In the literature, constructivism is often discussed in opposition to the well-established behaviourist philosophy. On the one hand, the behaviourist approach advocates changes in behaviour and development of skills, derived from drill and practice, as the



goals of instruction, whereas constructivism defends the notion of internal knowledge construction and the development of deep understanding of concepts, theories and artefacts as its objectives. Fosnot (1996) describes the latter as constructions of active learner reorganisation.

To discuss and characterise either behaviourism or constructivism objectively is not an easy task. As Reigeluth (1992) explains, this is due to the ideological fervour that borders on evangelism that is so characteristic of some of the authors who advocate constructivism. All other perspectives are rejected as “heresy” (Reigeluth, 1992), and according to Barab and Duffy (2000), behaviourism in particular has become a pejorative label given by constructivists to the offending ‘others’. Consequently, although few in educational technology would admit to being behaviourist or objectivist, the old concepts, methods and attitudes still prevail and many so-called constructivist environments continue to revert to objectivist models (Allen, 1992). This creates additional difficulties when trying to understand and characterise the different uses of these opposite approaches (Nunes and McPherson, 2007). Thus, although the behaviourist and constructivist positions are often reduced to a simple dichotomy, Jonassen (1992) asserts that in reality these two approaches should be seen as polar extremes of a continuum in order to contrast their assumptions as opposite underlying philosophies or ways of seeing the world.

Hence, according to Wilson (1993), very few people hold radical positions of either persuasion, and probably neither side is absolutely right. Moreover, both perspectives share a vision of education where the role of ‘teaching’ is to help students to learn about the world they live in (Allen, 1992). Objectivism and constructivism hold opposing

views as to how the learners perceive the world: the nature of reality, the nature of knowledge, the nature of human interaction and the nature of science (Wilson, 1993). Spiro, *et al.* (1995) concur that there is a continuum of potential constructivist viewpoints, although they reject any view that says either that there is no objective reality or that reality that can be “captured” in any single and absolute way.

In contrast, there are others for whom constructivism has become a metaphor for learning (Fox, 2001), likening the acquisition of knowledge to a process of building or construction. Jamieson *et al.* (2005) think the learning experience and the process of knowledge construction goes far beyond formal classroom learning and that learning also occurs during participation in informal learning activities. These then comprise the set of principles that form the epistemological basis of these opposite theories. As a consequence, curriculum designers need to be aware of the differences and implications of these basic perspectives in order to avoid implicitly incorporating inappropriate models in their learning artefacts.

### ***4.3.1 Developing Academic Learning***

This is another somewhat problematic area as it is not easy to categorically define academic learning. However, in the context of HEIs, it could be described as a series of activities that promote acquisition of high level knowledge (McPherson and Nunes, 2004c:2-4).

Accordingly, stemming from the impact of the Information Society, and due to the fact that both the nature of knowledge and the way it is to be acquired is changing, learning in HE must be assumed to be much more than a passive process of acquiring inert and

abstract facts and concepts (Hansen, 2000). Decontextualised definitions, algorithms and routines, etc. are of little use if the learner does not have the understanding to apply them in appropriate settings. Thus, according to Anderson (1997), the aim in HE must be to go beyond the mere gathering of concepts and to develop the learner's critical faculties, understanding and independence of thought.

This view of academic learning implies the rejection of the classical tradition of transferring some body of knowledge in the form of unchangeable and authoritarian ideas, concepts or definitions to the learner, as defended by the objectivist school of thought (McPherson and Nunes, 2004c:2-4). As described in the previous chapter, according to the objectivist view, concepts are considered external to the learner and received through a process of communication. This process focuses on behaviour and its modifications, rather than on cognitive or mental processes that facilitate learning (e.g. constructing, reflecting or planning).

This objectivist view of learning prevails today in many universities and is still defended by the behaviourist school of thought. As discussed above, behaviourist learning theorists do not attempt to account for any mental processes that occur in learning, the emphasis being on what the learner does in response to the knowledge transferred into her/him and passively accepted. That is, learning as a change of behaviour appears as a function of what followed that behaviour in the past (Skinner, 1953:156-157).

Consequently, Nunes and McPherson, (2003a) consider that the behaviourist view of learning embodies a strongly individualistic conception of learning, in the sense that the individual actions are modified due to the presentation of stimuli from the learning

environment. Behaviourism embodies the model of a solitary scholar seeking understanding (Jones and Mercer, 1993) and Laurillard (1993:15) assert that academic knowledge acquisition as an abstract Platonic form draws new life from information processing models of cognition. Such decontextualised knowledge should be rejected (Laurillard, 1993:28-29), because everyday learning success is achieved by situating knowledge in real-world activities. Academic learning must contain both *direct experience* of the world and the *reflection* on that experience that will produce the intended way of representing it. This stance is compatible with the recommendations of the European Commission Study Group (1997), the UK White Paper on the Future of Higher Education (Department for Education and Skills, 2003) and what learners actually experience in university environments nowadays.

The argument above reinforces the view that academic learning is more than a mere process of passive reception and acquisition of knowledge. Academics see student learning as more than a product, and the way learners approach their subject is as important as what they end up knowing (Laurillard, 1993:15). Thus, knowledge has a contextualised character, wholly connected to the situations in which it is used. Therefore, learning should revolve around realistic and intrinsically motivating problems situated in some meaningful real-world context (Hadjerrouit, 2005). Decontextualised learning remains inert, that is, the learner has the information available in memory, but fails to recognise when it is relevant (CTGV, 1991). Acquisition of concepts is of no use if the learner cannot apply those concepts and transfer knowledge across different settings (Nunes, 1999).

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To put this succinctly, apart from the gathering of facts and concepts, academic learning involves the acquisition of high-level skills of critical thinking and problem solving. It consists of the individual actively constructing knowledge and developing responsive awareness. Thus, the learner becomes an active processor of information. Thus, learning is said to occur through engagement with rich learning environments, and results from taking part in authentic activities, and social interaction and negotiation. This view of learning reflects the constructivist learning theory insofar as it is founded on the belief that knowledge is personally constructed from internal representations (Pope, 1982), which in turn are developed by using prior knowledge as a foundation.

Thus, prior knowledge that is brought to bear is itself constructed, rather than retrieved intact from memory, on a case-by-case basis (Spiro *et al.*, 1991). Moreover, it is thought that individual learning is linked with internalisation of knowledge that was negotiated inter-personally, that is, individual thought is internalised from communicative interactions with others in a particular social context (Hammond, 1993). Hence, knowledge is based upon individual constructions that are not tied to any external reality, but rather to the *knower's* interactions with the external world (Jonassen, 1992). This suggests that individuals impose their own meaning on the world. There are many ways to structure the world and there are many meanings or perspectives for any event or concept (Duffy and Jonassen, 1992). In other words, reality can be what the individual conceives it to be (Jonassen, 1992). The significance of such views is that meaning can be seen as rooted in and indexed by experience (Brown *et al.*, 1989). Honebein *et al.* (1989) suggests that experience not only includes the physical context in which the learner acts, but also both the cognitive and physical tasks that the learner engages with while the experience is taking place.

However, since Brown *et al.* (1989) assert that knowledge is indexed to the experience from which it was acquired, it is thought that context is a significant determinant of what is learned and how it is organised in memory. Grabinger and Dunlap (1995) suggest that there are two kinds of link, internal and external, that need to be developed during the learning activity. They claim that internal associations reflect learners' understanding of a concept whilst external associations refer to connections between the concept and social context. This means that the usability of a constructed concept in the future will depend on these external associations.

### ***4.3.2 Implications for Curriculum Designers***

If learners must acquire knowledge in ways that will help them use it in similar situations in the future, then there are two major implications for curriculum designers:

- learning activities must be “authentic activities” which must be embedded in realistic and relevant contexts (*situated learning*);
- learners must be provided with the opportunity to explore *multiple perspectives* on an issue, that is, one activity is not enough to acquire a comprehensive view of a particular concept.

According to Hammond (1993), the notion of situated learning raises another important issue in constructivist learning, i.e. the nature of the learning situation and previous learning activities have an impact on the way an individual learns, and the cognitive resources which are called upon. Additionally, exploring multiple perspectives may result in several interpretations of the same concept, event or fact. It can even result in multiple manifestations of the same interpretation, but in different contexts (Muirhead, 2006). Through this process, learners are expected to gain both cognitive flexibility and transferability of knowledge.

Therefore, as indicated by Brown *et al.* (1989), any learning activity is framed by the domain specific perspectives such as language and culture. Consistent with this theory, Barab, and Duffy (2000) believe that meaning and purpose must be socially constructed through negotiations among present and past members of the society that surrounds the domain. Knowledge acquisition takes place in a social context and conceptual growth comes from the sharing of perspectives and testing of ideas with others. Learning then, in the sense of reaching common understandings and shared meanings, can be said to result from social interaction and negotiation with peers and teachers (Grabinger and Dunlap, 1995).

### ***4.3.3 Knowledge Construction through Interaction***

Duffy and Jonassen, (1992) contend that if knowledge does not exist independently in the world and any situation can be understood from many perspectives, then there is no 'correct' meaning to strive for. However, Jonassen (1992) maintains that even though one person 'constructs' knowledge from experiences, perceptions, and constructions, it does not mean that it is impossible for a group of individuals to construct essentially the same understanding for any object or event in the external world. If this stance is accepted by the curriculum designer, then the process of social negotiation becomes of paramount importance. This implies that the construction of knowledge by individual learners is based on the processes of interaction with peers, facilitators and experts. During such interaction, personal views and ideas are compared, confronted and discussed, allowing all participants in the process to modify their views in order to achieve a common understanding. Therefore, Boyle (1997:74-75) proposes that dialogue and the negotiation of meaning provide the basis for the individual to develop, test and refine their knowledge. Basically, and according to Palloff and Pratt (2001:52-53), there are two very different types of interactivity.

One is an individual, private activity between the learner and the learning materials, which may range from traditional textbooks to computer-based simulations. This interaction with the learning and conceptual materials is likely to promote learning by provoking 'cognitive restructuring' (Shulman and Ringstaff, 1986). As described by Rogoff (1990:202-203), cognitive restructuring takes place when learners, faced with discrepancies between their own ways of viewing the world and new information, revise their habitual thinking to provide an improved fit to reality.

The other type of interactivity is social, and takes place between the learner and the tutor / facilitator, or between the learner and other learners. On the one hand, social interaction with tutors and facilitators promotes development through the guidance provided by interaction with experts skilled in solving the problems emerging from the learning activities (Rogoff, 1990:191). On the other hand, social interaction between peers is likely to promote learning by joint problem solving and meaning negotiation between partners working with independence and equality on each other's ideas (Rogoff, 1990:173-176).

Both private and social interactivity are required in the process of social negotiation and have to be supported by the learning environment. According to Stahl (2005), "*All human learning is fundamentally social or collaborative; language is never private; meaning is inter-subjective; knowledge is situated in culture and history*". Thus, as maintained by Zucchermaglio (1993), learning consists of the creation of a communal understanding through a collective and constructive social process. This then should be considered in the design of the curriculum.



## 4.4 The Process of Curriculum Design

Essentially, curriculum design is said to be a process that determines what knowledge, understanding, skills, abilities, values and attitudes a particular course is aiming to develop in its participants, and the ultimate goal of curriculum design should be to move the learner into thinking in the knowledge domain as if s/he were an expert user of that domain (Bednar *et al.*, 1992). Yet, the above definition certainly does not negate the usefulness of the processes proposed by Tyler (1949:1-2), who suggested that those involved in curriculum development should consider four main aspects:

- *Purposes*; defining the educational attainment being sought
- *Experiences*; establishing learning experiences likely to attain purposes set
- *Organisation*; effective coordination to arrange suitable learning experiences
- *Evaluation*; determining whether learning experiences are producing desired results

Oliver (2003), in a relatively recent Higher Education Academy (formerly LTSN) document, *“Integrating online learning into your course”*, recommended this same basic model. However, there is a weakness in Tyler’s model in that it is rather general and does not consider learner input explicitly. Conversely, Heinich *et al.* (1982:34-57) proposed a learner-centred model (ASSURE) which was intended to act as a *“procedural guide for planning and conducting instruction that incorporates media”* and recommends a six-step procedure:

- *Analyse* learners,
- *State* objectives,
- *Select* methods, media and materials,
- *Utilise* materials,
- *Require* learner participation,
- *Evaluate*.

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Thus, curriculum design emphasises what is supposed to be learned; why it is relevant to a wider learning programme; what learning and teaching strategies should be adopted; learner input; and finally what evaluation and assessment strategies need to be in place in order to achieve the desired aims and learning outcomes (McPherson and Nunes, 2004c:103-104).

#### ***4.4.1 Modernising Curriculum Design***

Accordingly, curriculum design must define a core body of information that is central for the course, but boundaries of what may be relevant should not be strongly imposed and it is proposed that learners should emulate experts in that knowledge domain in real life contexts (McPherson and Nunes, 2004c:60).

With these processes in mind, Eklund *et al.*, (2003) suggest curriculum reforms wherein the focus of teaching should be about knowledge management for learning and integrated with subject-specific materials, with a reduced emphasis on declarative knowledge in specific subject areas. Furthermore, over the past decade, the rising use of ICT has led to what has been termed globalisation. This has had a profound effect on the world of work. The Department for Education and Skills (DfES) (2003) support this view, suggesting that innovation and enterprise in the economy and society will materialise from the development of self-directed learners and the ongoing improvement of their skills.

“Individuals are operating in increasingly complex environments where their ability to navigate and utilise information, learn new skills and feel comfortable in ambiguous work situations, has become as important to success as academic achievement.”

Abell and Oxbrow (1999)

The changing nature of the work environment has put significant pressure on the HE systems, because without a guarantee of a “job for life”, students not only need to acquire an understanding of a particular field as it currently stands, but they must also develop essential skills for lifelong learning through their experiences in HE, and to graduate with a commitment to continual professional development.

This is reinforced by Champy (1995) who states that employees need to be able to “[...] *display the imagination, the resourcefulness, the steady willingness, and the sensitivity to the marketplace needed in today’s changing environment.*” Accordingly, businesses and other institutions require a workforce with a much more diverse set of skills and expertise than previous generations. Employers are now seeking potential graduates with a greater ability to demonstrate what has become known as ‘transferable skills’. This implies that individuals not only need to demonstrate greater creativity, resourcefulness, but also an ability to put new knowledge into practice. Since many occupations now involve the use of ICT in some form, this is another of the skills in high demand. Consequently, it is deemed that a correspondingly different curriculum is now required than was previously considered to be satisfactory. This new emphasis implies that learning experiences, in the form of appropriate learning tasks and activities mentioned previously, need to be reconsidered in the curriculum design.

#### ***4.4.2 Assessment as a Component of Curriculum Design***

In this regard, assessment could be viewed as a key component of both f2f *and* e-Learning, and that inclusion of appropriate types of assessment is needed by both tutors and learners to reveal progress (or lack of it).

Formative assessment is useful for planning that takes place prior to the course and can be useful to determine the level of learning at the outset, enabling planning for and adjustment to learning activities and behaviours. Ongoing or situated assessment allows learners the opportunity to see the progress they are making during the course (Mccombs and Vakili, 2005). On the other hand, summative assessment refers to measurements made through coursework or tests which yield judgments as to whether an acceptable level of student learning has been achieved by the end of a unit, module or course (Moran, 1997: 11).

It is not by any means suggested that these types of assessment are limited to the design of an e-Learning curriculum, but it does beg the question of whether technology can be effectively used as an assessment tool. Indeed, Macdonald (2004) considers that if a suitable assessment strategy can be found, it will provide students with opportunities for learning at critical points in an e-Learning course.

#### **4.5 e-Learning: A Good Opportunity to Review the Curriculum?**

Academic resistance to e-Learning may be accounted for by the “Not Invented Here” syndrome offered by Simon (1991). Many academics might recommend a colleague’s textbook, but may not take on video or computer-based teaching material developed elsewhere, as the teaching philosophy would be unlikely to match their own. This is an important point and should not be dismissed as being simply the protectiveness of lecturers of their own teaching. Such strong arguments would justify the current generalised status of ICT in HE where, according to Collis and van der Wende (2002), the commonplace use still seems to be for email, PowerPoint, word processing and web resources, in a way that is only gradually stretching traditional on-campus practices.

The role of e-Learning too is still for the main part under-used, being normally restricted to the set of online lecture notes or simply lists of resources available on the web. This current situation shows an extraordinary discrepancy between educators' perception of the high value and potential of e-Learning and its real use. Such inconsistency of perceptions cannot exclusively be justified by the factors described above. However, responsibility for the current situation may just as easily be attributed to those who so unyieldingly defend e-Learning. Indeed, this has been a prevalent situational state of affairs since the early 1980s when Clark (1985), with regard to computer based instruction and televised instruction, pointed out that media advocacy is one of the more predictable, recurring enthusiasms in education. For example, Christensen *et al.* (1993) highlighted 'hypermedia' as just one of the latest ICT buzzwords of that time and the use of the term 'Web 2.0' seems to be the latest fad (Cross *et al.*, 2007).

While academics are considering a variation of the conventional face-to-face curriculum delivery, it might offer a good opportunity to review whether a variant of e-Learning might or might not make a significant improvement to the current modes of teaching and learning. As noted by Hall (2003), "[...] *lectures, discussions, self-directed learning, self-organized learning, small group work, projects, and case studies all have their place in the online world and are subtly different to their face-to-face counterparts within on-campus courses*". Yet, the consequence of an inappropriate emphasis on what technology can be made to do, rather than on how this technology can empower the learning process, results in neglecting educational and pedagogical issues, as well as the systematic analysis and design of the technologies for specific learning purposes. As a result, e-Learning often results in poor and ineffective applications.

McKendree (1994) uses an analogy with the camcorder to characterise the resulting situation:

“It lets amateurs make movies about themselves which they and their immediate family and friends can enjoy. However, it is unlikely that you or I will want to rent it from the video-store and watch it. The professionals are much better able to design and make something, for a wider audience. [...] It is fine if some lecturers want to take time to hack together some on-line material for themselves and their students. They will probably have the pride and commitment to get them to use it. However, the material they produce will possibly not be as flexible or as widely applicable as something crafted professionally.”

(McKendree, 1994)

In an attempt to resolve these problems, researchers and practitioners have focused on two main areas when implementing, delivering and evaluating e-Learning:

*Instructional Design* - focused on identifying and implementing a learning environment combining pedagogical, subject matter and tutoring issues (Moore, 1991; Croft, 1993; Nunes, 1999), and *Learner Support Systems and Resource Design* - which include tutoring and counselling (Burge *et al.*, 1988), as well as specially prepared self-study learning materials, already available learning resources (including web-based resources), locally accessible resources (e.g. local library), local face-to-face teaching from travelling teachers and/or local tutors, teaching by correspondence or electronically mediated, and even student group activities (QAA, 1999:21-22).

Nevertheless, it would seem that these two main areas are inextricably intertwined and any model or framework specifically aimed at supporting e-Learning development must provide clear links between them. Again, there is a rich and extensive body of research addressing issues related to instructional design, learner support systems and

resource design, most of which addresses issues of learning and teaching, i.e. learning experience, pedagogic approaches, tutoring strategies, design of online environments, etc. and this will be discussed in further detail in the next chapter.

## **4.6 Conclusions**

One of the challenges faced in creating e-Learning environments is that a move toward more learner centred approaches requires strategies that support self-directed learning by allowing learners to work on authentic problems and tasks of their own choosing, and yet learners still need to be provided with learning support which is contextualised to their chosen subject matter (Fisher and Sharf, 1998). As a consequence, the curriculum must be sufficiently detailed to allow the components of the course to be developed out of sequence by experts from within the course creation team and iterated over a number of delivery cycles to an optimum solution.

As a result, the process of curriculum design and instructional systems design is both complex and interconnected. Therefore, it has been suggested that the front-end activity of curriculum design for e-Learning needs to be thoroughly planned and may need to be carried out by a multi-disciplined team. However, whilst McPherson and Nunes (2004c:19-22) suggest that action research is one approach that could be eminently suitable in this regard, this is clearly not the only way forward and it is entirely possible for e-Learning curriculum development to use other frameworks found in more traditional teaching and learning courses that may be deemed more appropriate for the local context.

Furthermore, since demand on resources is becoming increasingly competitive and funding increasingly scarce, there is a need to prevent wastefulness. It is thought essential to have some form of management framework to guide the iterative process of curriculum design into the e-Learning environment. For that reason, it has been suggested that it is crucial to have a much more detailed specification of the course up front. In addition, this activity is best coordinated using reliable project management practices so that it does not usurp the detailed activity required later in the development and implementation process, either in content development or technical support, and to ensure that precious resources are not wasted.

Finally, through the discussions in this chapter, it can be seen that there is a considerable overlap between the process of curriculum design and the creation of the learning environment. However, the latter goes beyond curriculum design, involving the practical process of interpreting the curriculum and transforming this into a course along with the activities this entails, and this will now be discussed in more detail in the next chapter.



## **5 Creating the Learning Environment**

The review of literature in this chapter corresponds to the fourth dimension of the e-Learning Framework presented in Figure 2, i.e. 'Instructional Systems Design'. In the last chapter, it was proposed that it is essential that curriculum design for e-Learning environments be underpinned by a suitable pedagogical model. However, in addition to identifying a pedagogical model and basing the design of the curriculum around this, this model must also correspond to a specific educational scenario. In order to realise a real appreciation of the various component of the subject matter at different levels of abstraction, it is important to translate this theoretical representation into a concrete learning environment. Therefore, attention in this chapter will be turned to how the curriculum design is converted into the design and development of the e-Learning educational setting, i.e. how the theoretical tasks and learning activities will be translated into reality within the course environment. However, before doing so, it would be of use to examine the influence of ICT in this context.

### **5.1 Effects of ICT on Learning**

Over the last quarter of the 20th century, the convergence of IT and telecommunications, resulting in what is now commonly described as ICT, has transformed society beyond recognition. A new 'Information Society' has emerged, characterised by an unprecedented information explosion. As noted by Petruk (1989), "frequent colourful quotes dramatise the exponential growth of new information that our society is generating each year". The Information Society has resulted in rapidly increasing and changing information and a proliferation of different media for its communication. The impact on educational institutions was slow to begin with, but is now building up momentum.

Until relatively recently, the goal of being able to store information and to recall it has been central to the mission of formal education and graduates thought they could rely upon that knowledge for the rest of their life. Technological evolution and change did not occur quite so rapidly, and for most, direct access to information, primarily books, was relatively limited Petruk (1989). However, this is no longer sufficient and it is vital for successful participation in a modern and competitive society, that graduates learn how to think critically as well as to analyse and synthesise information to solve technical, social, economic, political, and scientific problems Grabinger and Dunlap (1995). Apart from basic skills (numeracy, literacy, and communication abilities), Abbot and Ryan (1998) suggest that the emerging knowledge economy requires young people to acquire additional personal competencies (ability to be self-starting, quick-thinking, problem-solving, risk-taking, collaborative). Smith (2000) concurs, asserting that due to the use of sophisticated technologies and immediacy of information resources, workplaces are likely to become increasingly complex environments. It is therefore inferred that knowledge is no longer static in nature and is expanding exponentially, conflicting with the behaviourists' view that information can simply be organised, stored and made available by transference when required. Nunes and McPherson (2002c) also advise that in this continuously and rapidly changing society, successful individuals must be creative and flexible problem solvers. These characteristics are not merely based on gathering and memorising skills, but require complex knowledge construction skills (Grabinger and Dunlap, 1995). Thus, if learners are to be prepared for the changes to come, it is desirable that they are given the opportunity to engage in authentic e-Learning tasks and activities that make use of contemporary and fast-changing ICT systems. This then leads to an examination of the speed of technological change and how it affects e-Learning.

## 5.2 Speed of Technological Change

The use of ICT in education is rising, but it is widely felt that there is an acute problem relating to the sheer speed of technological development. This is emphasised by Wulf (2002:18), who says that “[...] *the extraordinary pace of evolution in information technology is likely not only to continue for the next several decades but to accelerate*”. This is a real problem, even for academics that are willing to take on the role of e-Learning designer.

At present, there are many time-strapped academics that simply do not have the time or inclination to acquire the technical skills required for development and if pressed, would probably like to hand over the development of e-Learning to someone else. Yet, as course curricula are usually only formally designed at the highest outline level, with module details rarely being fully documented (and often taking the form of one or two page documents – see Appendix 2: Sample Module Outline), e-Learning course development cannot be merely handed over to learning technology designers. Therefore Taylor (2003) suggest that it is essential that learning designers work with academics and subject experts, if such a curriculum is to be successfully transformed into a course. This is further explained by Segrave and Holt (2003) as follows:

“While academic teaching staff will focus primarily on the design of their own e-Learning environment for developing their own field of professional capabilities, the education designer working on overarching design challenges across multiple professional fields and across significant periods of time will bring to bear unique perspectives in relation to specific applications as they arise.”

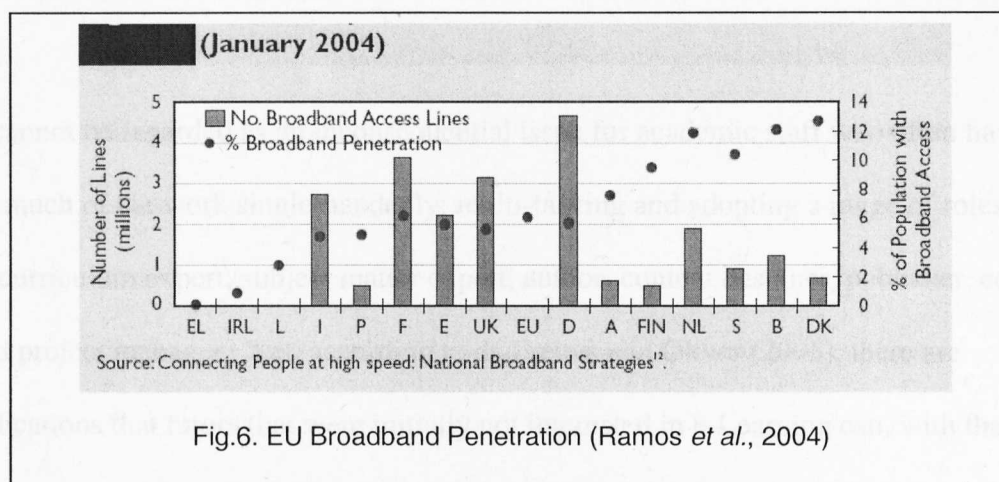
(Segrave and Holt, 2003)

Another complication, according to Chan *et al.* (2006), is that technological advancement is much faster than its adoption and that to really meet the challenge for its use, the time frame for thinking, anticipating and planning should be in terms of decades. On the other hand, the implication of the speed of change for e-Learning designers is that the technology available at the development needs to be matched with technology at the delivery stage in order to ensure that particular requirements be identified sooner rather than later and properly resourced (Hall, 2003). Therefore, Hall (2003) suggests there are a whole range of issues that need to be clarified:

- “Is there a need for formal online assessment? If so, the security demands are formidable.
- What authoring tools will be used, which image, sound, video editing software is available, and are there skilled practitioners?
- Are the designers and subject matter experts knowledgeable about the concepts of page design, layout, navigation, and the acceptable levels of complexity to match the available technology?
- Will there be technical support for delivery? Ultimately, technical issues should not interfere with the learning process.”

### ***5.2.1 Access to Appropriate Levels of Technology***

As discussed in the Chapter 3, any choice of media and tools will be influenced by learners’ connection rates and the bandwidth available to them. Despite general advancements in broadband use and availability, it is evident that even within the European Union (EU), access is not uniform. This is confirmed by Ramos *et al.* (2004) who state that “[...] *although the share of the broadband access is increasing in these [EU] countries, narrowband is the most common form of Internet access.*



Speaking of a number of EU initiatives in progress and drawing on the table showing broadband penetration in Europe in Figure 6, Ramos *et al.* (2004) conclude that despite recognition of the key role of broadband, that no single initiative provides a complete solution that will bridge the digital divide, and whilst there are improvements, these differences are likely to remain for some time to come. If this is the case in the EU, then broadband access in less developed countries cannot be assumed. In addition, differences in the e-Learner's own technology will also have an impact, and even quite minor differences between the capability and behaviour of browsers will affect learners' access to vital resources.

### 5.2.2 Skills for Designing e-Learning Environments

Although many of the same issues apply to both on-campus and e-Learning course development, there are some significant differences and it is particularly difficult for lecturers who have recently taken up the challenge of designing curricula for e-Learning. Hall, (2003) asserts that numerous obstacles remain, such as the fact that learners and tutors must be skilled in the use of the technology in order to exploit the potential of ICT. Academic staff also need to be prepared to make the changes in their

role that this demands (McPherson and Nunes, 2003b).

It cannot be regarded as an inconsequential issue for academic staff who often have to do much of the work single-handedly; multi-tasking and adopting a range of roles such as curriculum expert, subject matter expert, author, content designer, publisher, editor and project manager. Yet, according to de Freitas and Oliver (2005), there are indications that tutors that were initially not interested in e-Learning can, with the necessary training and support, find that their own teaching practice positively affected by new approaches to delivery and increased online and asynchronous support.

As Segrave and Holt (2003) put it, getting to grips with the complexity of e-Learning does not necessarily come naturally:

“... teachers need to be better informed by quality design goals, and guidance on how best to manipulate the system functions in ways supportive of quality learning.”

(Segrave and Holt, 2003)

In this regard, Segrave and Holt (2003) believe that education designers can help academics to understand the breadth of the issues needed to improve integrated e-Learning practices that are now quite central to HE. This concurs with the views of McPherson and Nunes (2004c:66-67) who argue that in order to transform the curriculum into an e-Learning environment, it is likely to require a more professional team approach, taking into consideration the needs of a more diverse learner group, the planned lifetime of the course, the experience and ability of the tutor group, and the envisaged delivery modes, with a correspondingly high resource commitment.

Discussing the design of the learning environment, Segrave and Holt (2003) militate against the construction of “[...] pre-packaged teaching resources based on pre-ordinate instructional design approaches”, and go on to assert that when designing contemporary learning settings “[...] new forms of education design leadership are now required” to assist with the design process to incorporate educational vision, technical knowledge, practical know-how and emotional intelligence. This corresponds with the constructivist views suggested by Fosnot, (1996), who believes that:

“No ‘cookbook teaching style’ or pat set of instructional techniques can be abstracted from the theory and proposed as a constructivist approach to teaching. Some general principles of learning derived from constructivism may be helpful to keep in mind, however, as we rethink and reform our educational practices.”

(Fosnot, 1996)

### ***5.2.3 Framing e-Learning as an Information System***

Some e-Learning researchers have expressed the need for broader awareness regarding the implementation of Information Systems (IS). According to Gunasekaran, *et al.* (2002), understanding the importance of information systems is essential to the development of a framework for success with e-Learning. In many instances, central university computing services seem to regard e-Learning as a particular type of information system, albeit with its own particular peculiarities. Spil and Salmela (1999) seem to be of the opinion that that the introduction of information systems requires a new type of strategic planning, indicating a need to draw on wider research relating to management.

An example of this type of thinking can be seen in the audit report by the Australian Universities Quality Agency (AUQA, 2003) of the University of Western Australia. In this case, an overall strategy for the deployment of ICT had been adopted and ICT issues affecting the whole university considered. The main driving force behind this type of initiative was to avoid needless duplication, to identify opportunities for concerted or central action that would be of benefit to the whole University, and to ensure that the basic ICT infrastructure and policies were in place so that local initiatives were unhindered. This is all consistent with the University of Western Australia's overall ICT strategy which is:

“To fully exploit information and communication technologies to further its goal of demonstrating the highest international standards in teaching, learning, research and administration”.

(AUQA, 2003:10)

To that effect, a number of action points were decided upon with regard to teaching and learning matters, to ensure that both staff and students would be equipped with the necessary ICT skills required to make optimum use of technology to support scholarship. Yet despite institutional efforts to encourage, and occasionally impose the use of e-Learning, there are still a number of deep-rooted barriers that seems to be inhibiting any such innovation. This then begs the question as to why e-Learning has, as yet, failed to become a normal learning activity?

### **5.3 Moving Away from the Behaviourist Teaching Model**

Despite the characterisation of academic learning as a constructivist process, HE lecturers and academics are often constrained by a number of practical limitations intrinsic to the educational system we have inherited (Nunes and McPherson, 2007). HE institutions were designed according to a decidedly 'Tayloristic' system combined with a legacy behaviourist approach.



### ***5.3.1 Limitations of Constructivism in Higher Education***

As explained in Section 4.2.3, constructivism advocates the acquisition of a set of knowledge and skills. Yet, as Minocha and Sharp (2004), explain, “[...] the pragmatic constraints of learning and teaching in higher education (HE) institutions pose clear restrictions on the use of pure constructivism”.

Due in part to the semesterisation of modules in HE, teaching and learning has to happen in blocks and in short periods of time. Thus, if a high level of understanding is to be achieved, then students cannot be supported by limited flexible scaffolding. The time required for personalised knowledge construction and social negotiation is not inconsiderable. For example, how could a 2nd year Physics undergraduate student be expected to develop an understanding of the ‘Theory of Relativity’ in a semester without the support of explicit materials?

The implication of the above for development of e-Learning environments is that there has to be a mix of social negotiation, coupled with objectivist and explicit tutor input. This is based on the fact that HE students anticipate they will graduate with a clear and comparable quantitative mark. In a study by Rowley and Purcell (2001), graduates indicated that they not only needed a degree to get their current job, but that the class of degree was important. Moreover, the deep-seated behaviourist nature of HE is, at least to some degree, due to the fact that stakeholders; parents, employers, society in general, and students themselves, expect their development to follow the time-honoured process of completing a set of modules with a measurable and comparable classified grade.

Some further difficulties arising from the adoption of a constructivist approach arise because modules taken during the semester are then often assessed through traditional objectivist examinations, confusing students and failing to reward effort intensive and time consuming processes of skills acquisition and knowledge construction (Nunes and McPherson, 2007). Yet while it is commonly considered that assessment drives student learning, O'Reilly *et al.* (2005) note that the adoption of innovations in online assessment has been slow to diffuse through HE, and put this down to its critical importance to learning. Thus, because assessment is likely to continue being important in the learning process according to so-called constructivist principles, e-Learning in HE still needs to balance traditional teaching approaches with moderate constructivist learning processes (Nunes and McPherson, 2007).

### ***5.3.2 Moderate Constructivist Learning Processes***

If those adopting constructivist approaches want to avoid disappointing student expectations and societal demands, it may be necessary to adopt pedagogical models that are not fundamentalist in nature and allow for complementarity with objectivist delivery (Nunes and McPherson, 2007). Such pedagogical models should adopt moderate constructivist approaches, based on active and problem-based learning (Nunes and McPherson, 2002b). Designers and educationalists may be able to better understand pedagogical models which are rooted in real practice and therefore may be able to incorporate these notions into the design of learning environments. As noted by Gunasekaran *et al.* (2003), for e-Learning to be successful, effective and of a sufficiently high quality, it must be designed with care. It must therefore not place the focus on the technology at the expense of the consideration of a suitably aligned pedagogy.

Therefore, delivering e-Learning is not simply a matter of designing pedagogically sound learning environments, integrating these in efficient educational settings (that may even be very traditional) and selecting a tutoring team with subject matter expertise and/or technical skills, but it is also about choosing skilled and motivated educationalists with appropriate pedagogical, information and communication skills that are required to manage and facilitate online learning.

“The *instructional designer* might design the E-learning environment in a way which may not be appropriate and as per the information architecture (pedagogical structure) envisaged by the educator. The instructional designer will apply his prior experience and knowledge to the design of E-learning environments. These previous experiences will influence the structure and content of the E-learning environments, which may be inappropriate or inadequate for the learning that was planned by the educator.”

(Minocha and Sharp, 2004)

There are strong arguments for ensuring that the e-Learning designer creates constructivist environments with opportunities for situated learning, social negotiation and multiple perspectives. This then implies that a number of different learning strategies must be adopted to assist the learner in the construction of knowledge.

### ***5.3.3 Constructing an e-Learning Environment***

In accordance with some of the constructivist arguments set out in the previous section, it is proposed that learning should be interactive and that e-Learners must be provided with a learning environment that encourages communication and negotiation processes between members of a social community inserted in a rich learning environment.

Hughes and Hewson (1998) seem to concur, contending that while in the classroom or lecture hall, personal contact allows for rich extra-linguistic elements, non-verbal and verbal aspects of teacher/student communication. This provides a range of possibilities for the design of educational experiences in an online environment and specialised communication tools. These support the specific micro-genres of classroom interaction that are needed to facilitate the richest possible classroom interactivity. In order to effectively design the learning setting, the adoption of these different strategies creates the need for a different conceptualisation of rich learning environments.

### ***5.3.4 Rich Environments for Active Learning***

Grabinger and Dunlap (1995) devised the term “Rich Environments for Active Learning” (REALs) to describe environments that promote learning within authentic contexts, and encourage the growth of learner responsibility, initiative, decision-making, intentional learning and ownership over the acquired knowledge.

Additionally, REALs should provide an atmosphere that encourages the formation of knowledge-building learning communities (Nunes and Morón-García, 2002). These communities encourage collaborative social negotiation of meanings and understandings among the members of the community (peers, tutors, subject matter experts). In particular, REALs can be said to comprise five criteria: student responsibility and initiative; generative learning activities; authentic learning contexts; authentic assessment strategies; and co-operative support (Grabinger and Dunlap, 1995). Therefore a number of requirements have been proposed for REALs (Carr *et al.*, 1998):

- 
- “Provide support for active learning - Learners are active because knowledge is permanently being constructed through interaction with the environment;
  - Provides authentic, real world learning experiences. Knowledge that is taken out of context during instruction is not authentic, so learning must be supported by means of real world activities;
  - Provide multiple perspectives – although reality is constructed by each individual, the process of learning is the consequence of the interaction with multiple information sources (e.g. experiences, conceptual materials, teachers, peers and authors);
  - Provide support for communication and social negotiation;
  - Provide support for collaboration, not competition;
  - Focuses control at the learner level. Since learners are expected to be active, learning in context and collaborating with other learners and the instructor, they are more in control of their learning.”

(Carr *et al.*, 1998)

As observed by Jonassen (1995), most constructivist learning environments, including cognitive flexibility hypertexts (Spiro and Jeng, 1990), anchored instruction (CTGV 1991), goal-based scenarios (Edelson, 103:144-145), and causally modelled diagnostic cases Jonassen (1995), share a common goal: the construction of advanced knowledge by learners that will support complex performance, such as problem solving and transfer of learning. These environments stress situated problem-solving skills, because that is the nature of skills that are required and rewarded in the real world. People are paid to solve problems in most professions, not to memorise information (Jonassen, 1996).

Having established the nature of academic learning and found a compatible learning theory is not enough to support actual design and development of online learning environments. The design and development of these environments requires explicit and clear pedagogical models that can be translated from theory into practice.

A designer, solely faced with constructivism as a learning theory, would have difficulty in translating this epistemology into an appropriate conceptual model, and ultimately in developing a constructivist online learning environment. Yet, according to Wilson (1993), “[...] *constructivism is a philosophy not a strategy*”. Therefore, in order to translate the pedagogical philosophy into a real learning setting, REALs are said to be able to provide the necessary translation from general constructivist theory to an understandable design model and the REAL needs to be explicitly set out in a pedagogical model as it relates to the e-Learning setting.

#### **5.4 Pedagogical Thinking and the Design of e-Learning Settings**

In practical terms, the precursor of e-Learning environments goes back to the 1950’s, and was described as Computer-Assisted Instruction (CAI). One of the earliest influential names involved in the research field of computers and learning was the cyberneticist, Gordon Pask (1928-1996).

Pask (1975a) proposed the highly abstract “Conversation Theory”, that has since informed later work by eminent educational researchers such as Laurillard (1993:104). Additionally, Pask proposed learning models for teaching machines (Pask 1975b:100-131). According to Boyd (2001), Pask identified some essential characteristics of learning entities and the relationships involved, thus formalising these ideas into a broadly scoped recursive learning theory, albeit along behaviourist lines. Not strictly an educationalist, Pask and his colleagues established methodologies which they felt would allow the construction of models that indicate how bodies of knowledge are structured (Pask, Scott and Kallikourdis, 1973; Pask, Kallikourdis and Scott, 1975).

CAI for education and training contexts was first carried out in the 1950's and resulted in much of the early CAI "drill and practice" applications that were designed as substitutes for human instruction, a form of instruction that has not proved popular. Yet in early attempts at Computer-Based Instruction (CBI), as Kay (1991) explains, designers continued to treat knowledge as a "*fluid*", which was poured into the "*student-vessels*" and thus used a learning theory that does not match modern pedagogical thinking behind current educational settings. This mismatch raises some questions about perceptions of learning and acquisition of knowledge, and how these perceptions influence educational systems. The answers to these questions are therefore crucial to understand the role of pedagogical thinking in instructional design.

Knowles (1998:61-72) asserts that the design of learning settings for adults requires a change of pedagogical thinking and the adoption of andragogical models that support active and collaborative learning, based on authentic, project-based activities as well as informal learning in spaces adjacent to formal learning settings. However, if as stated above, educational designers call on their prior perceptions of knowledge acquisition as well as their prior educational experiences when developing their applications, then these previous experiences may hinder the understanding required to produce appropriate e-Learning environments. Most online learning environment developers reproduce into their applications the traditional classroom approach as they experienced it, deliberately or accidentally (McPherson and Nunes, 2004c:40). In point of fact, this is likely to be based on the behaviourist paradigm that characterised their own education. In effect, recent adjustments in education denote a paradigm shift, both in educational psychology and epistemology of learning.

This inflexible connotation of knowledge transmission causes a corresponding rigidity with regard to the educational uses of these applications (Zuccheromaglio, 1993). One focus of online learning research is to support learning at HE levels while avoiding the rigidity identified by (Zuccheromaglio, 1993). Thus, prior to engaging in online learning environment design and development, it is important to clearly characterise academic learning in order to create a suitable pedagogical model for the e-Learning setting.

#### ***5.4.1 Pedagogical Models for Designing e-Learning Environments***

An example of an online pedagogical model is described by McPherson and Nunes (2004c:66-67). The action research that led to this model was based on a study of the MA in Information Technology Management (ITM) (McPherson and Nunes, 2004c:30-35). This programme was offered by the University of Sheffield from 1995-2003 and aimed to develop more qualified and experienced ICT managers and consultants and to equip them with good communication, interpersonal, business and management skills.

The initial development of the programme was started in 1992 with the support of WiTEC (Women in Science, Engineering and Technology in European Countries) and was funded by the EU's COMmunity program for Education Teaching and Training (COMETT). The programme attracted students from all over the world (e.g. Malta, Mozambique and Norway, to name but few) and primarily appealed to professionals with a technological background who need higher level skills and qualifications specific to the management of ICT environments.



Initially, it was designed as a traditional paper-based distance education programme. This pragmatic approach was linked to organisational restrictions and to a lack of appropriate ICT infrastructures for either the university or the students. Nevertheless, as Internet-based and WWW technologies permeated into HE and become more accessible, the university decided to endorse WebCT as its VLE. Thus, a decision was taken to evolve the programme into an online distance learning programme. An explicit example of a pedagogical model (McPherson and Nunes 2004c:53), designed from the principles set out in the course aims and its intended outcomes is shown below in Figure 7:

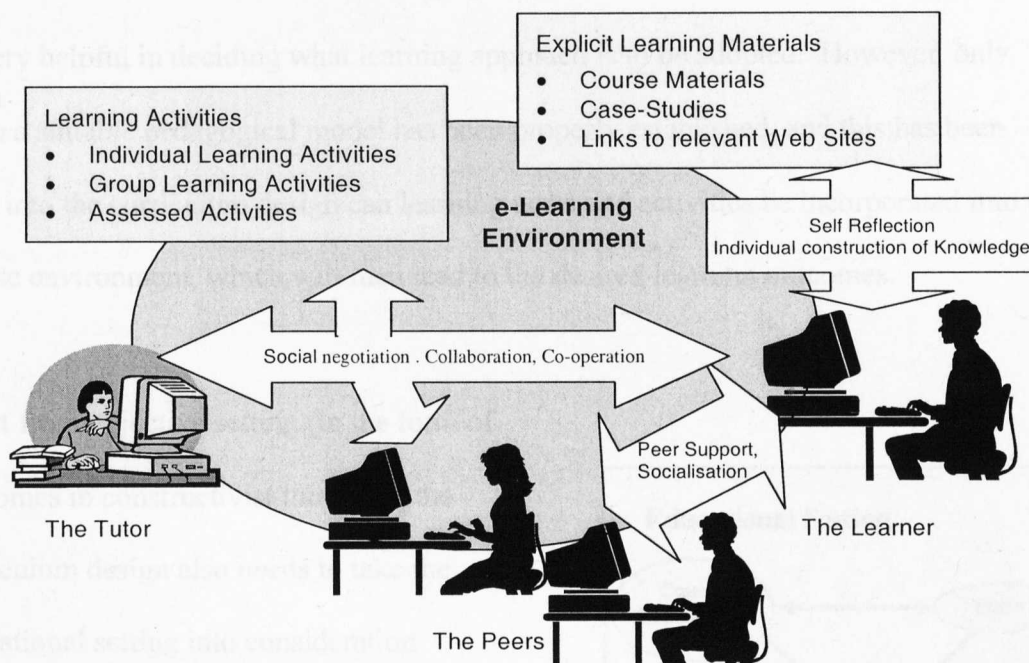


Fig. 7. Example of a Pedagogical Model for e-Learning (McPherson and Nunes, 2004 c:53)

The pedagogical model for this particular e-Learning course aimed to not only provide subject matter expertise (i.e. ICT Management), but to enable students to work together in an authentic way which would provide them with life-long learning transferable skills in their field of expertise (McPherson and Nunes, 2004c:79).

This concurs with Koper's (2001) view that it is essential that the chosen pedagogical model takes into account the characteristics of the content domain. Therefore, it could be said that the issue of the selection of a suitable pedagogical model is critical and would be a crucial factor in establishing a suitable educational setting.

#### 5.4.2 Designing Learning Experiences and Activities

Conole *et al.* (2004), in an attempt to summarise relevant theoretical concepts to the context of e-Learning, offer a useful table outlining the principal theories and models, their characteristics, and how these might be realised. These underlying principles can be very helpful in deciding what learning approach is to be adopted. However, only when a suitable pedagogical model has been properly established, and this has been built into the curriculum design can learning tasks and activities be incorporated into the course environment, which will then lead to the desired learning outcomes.

Apart from objective setting (in the form of outcomes in constructivist thinking), the curriculum design also needs to take the educational setting into consideration (McPherson and Nunes, 2004c:28). The consequent creation of the specific course setting, which stimulate learning experiences, can then be designed. This is achieved by building on the pedagogical model to devise practical 'tasks' and 'learning activities' as shown in Figure 8.

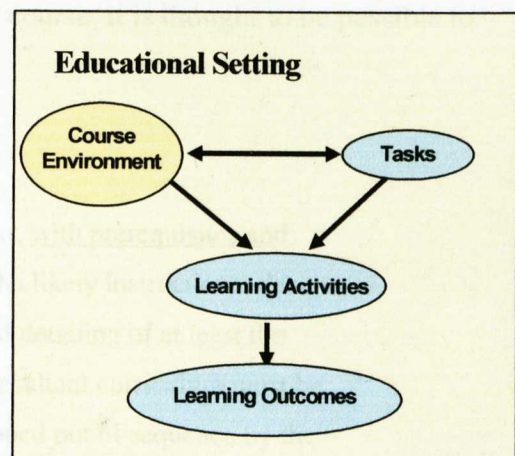


Fig.8 Creating the learning experience (adapted from McPherson and Nunes, 2004)

### ***5.4.3 Establishing Learning Outcomes***

Generally speaking, before the educational setting can be designed and developed, it is thought vital to not only take into account the potential requirements and aspirations of a more diverse learner group, but also to consider the wishes of those who are funding their learning. An example of external expectations is the sentiment expressed by the US 'President's Committee of Advisors on Science and Technology' (1997) that education today should ensure that students are equipped with "...the capacity to readily acquire new knowledge, to solve new problems, and to employ creativity and critical thinking in the design of new approaches to existing problems", a view supported by researchers in other fields (Bürger, *et al.*, 2003; Pearce, J., 2005).

Traditionally, before setting any learning objectives, instructional-design process models have relied on a 'needs analysis' as the starting point (Reigeluth, 1999:12 and 430) for identifying learners' requirements. Through the process of establishing the characteristics of the target learner group, and by determining the required level, knowledge and skill to be developed in a particular course, it is thought to be possible to shape the curriculum to meet the learners' needs.

"More account must be taken of learning context, with prerequisites and objectives more fully defined, a knowledge of the likely instructional design route(s) to be implemented and the selection and detailing of at least the formative assessment to be incorporated. The resultant curriculum must be sufficiently detailed for the content to be developed out of sequence by the different specialist members of the course creation team."

(Hall, 2003)

Following on this line of thought, by signifying the new knowledge and skills to be acquired, the desired outcome of the course under development can be isolated, thereby setting boundaries for the content. However, in an era where technology allows learners to take alternative routes, and there is an increasing emphasis on personalisation (Holt and Segrave, 2003; Pivec and Baumann, 2004), such rigidity may not be appropriate.

According to Melis and Monthienvichienchai (2004), “[...] *personalisation needs to take into account a particular student’s current psychological states and understanding, and constructs the personalised learning experience to deal with the specific needs of that student*”.

This is consistent with views held by Ehlers (2003), who considers that quality in e-Learning curriculum development can only be achieved by placing an emphasis on the learner’s needs. This implies that more flexibility is required in e-Learning design, but it also means that it can frequently be harder to decide what should be excluded from the curriculum than what should be included at an early stage of curriculum design.

## **5.5 Creating the Educational Setting**

As explained in Section 5.2, it is highly recommended that learning designers work with academics and subject experts, if such a curriculum is to be successfully transformed into a course. Thus, the team should decide which of a range of learning approaches should be accommodated in the learning environment. Some of the choices open to educators and e-Learning designers will now be discussed in further detail.

### 5.5.1 Apprenticeship

The earliest form of learning that people have engaged in is by observing others and mimicking their actions. The modern day equivalent of this active type of learning is sometimes described as “Sitting by Nellie”, where students are guided along a route that embraces information sources and practical enquiry or investigation (Goddard *et al.*, 1999). Traditionally, apprentices become skilled in a particular discipline under the guidance of an expert (Honebein *et al.*, 1993) and apprenticeship learning (Jordan, 1987) could be characterised by the following:

- “The progressive mastering of tasks by apprentices is appreciated not as a step towards a distant, symbolic goal (such as a certificate), but for its immediate value in getting the work done;
- Apprentices start with skills that are relatively easy and with mistakes that are least costly;
- Learning is focused on performance. It involves the ability to do, rather than the ability to discourse about a subject;
- Standards of performance are embedded in the work environment. What constitutes expert execution of a task is obvious, and judgments about the learner's competence emerge naturally and continuously in the context of the work. The apprentice owns the problem of moving on to the acquisition of the next skill;
- Teachers and teaching are largely invisible. In apprenticeship, learning and informal job training in workplaces looks as though little teaching is going on. Whatever instruction the apprentice receives, originates not from a teacher teaching, but from a worker doing his or her work that the apprentice observes.”

(Jordan, 1987)

In this scenario, learning is based on hands-on activity and physical experiences (Viau, 1994) where apprentices are initiated into a community of expert practice where the *Master* is an authority in the skill being learned or the knowledge being sought and whereby this expert's performance constitutes the standard for the apprentice (Berryman, 1991). In contrast to this applied engagement with the real world, intellectuals were not expected to learn practical skills (Viau, 1994).

In view of the fact that this type of learner has access to a reservoir of information, organised and stored in books, their educational experience has consisted of a scholarly process, acquiring knowledge through reading, and separated from the real world. However, this latter approach to bookish-learning has recently been denounced by some educators and educational philosophers, who maintain that it promotes shallow learning, mindless memorising and regurgitating, and the decontextualised acquisition of definitions and facts (Madden *et al.*, 2007). In short, this could be dismissed as being a tool for:

“[...] jogging the memory, not for remembering... [providing students] with the appearance of intelligence, not real intelligence... they will seem to [have] wide knowledge, when they will usually be ignorant.”

It would probably have come as no surprise if the quotation above were to be attributed to a modern educationalist, mistrustful of new technology, however, it is in actual fact much older than that, having been adapted from Plato's 'Phaedrus' (p.69), in which the author recalls Socrates' criticism of the impact of reading and writing in educational systems.

### ***5.5.2 Cognitive Apprenticeship Approach***

Consequently, as the flood of information continues to inundate modern society, educational objectives, approaches and technologies are changing. Viau (1994) rationalises this view, saying that since information has become a dynamically changing, random access flood, it does not help to try simply to learn about it, today's students must learn how to *shape* it. That is, students need to be able to select and shape information as our forebears shaped and selected wood and clay.

These emergent learning needs point to a return to the apprenticeship model, where students learn how to learn, how to think and how to solve problems embedded in a larger functional context, i.e. learning by doing. Kolb (1984) popularised the phrase “*learning by doing*” and this corresponds to what is described as apprenticeship (Heller *et al.*, 2001).

The *cognitive apprenticeship* approach (Cunningham, 1995; Brown *et al.*, 1989; Collins *et al.*, 1989; Simons, 1993; Heller *et al.*, 2001) implies a paradigm shift in education and instruction and a return to basics in educational terms. Instead of promoting mere acquisition and memorisation of facts and abstract concepts and theories, instruction now means to improve the abilities of self-regulation of learning, thinking, intelligence and problem solving (Simons, 1993). Consequently, and as defined by Banathy (1991), education assumes its modern meaning: “a human activity system that provides arrangements, opportunities, and resources for learning and human development”. According to Honebein *et al.* (1993) the cognitive apprenticeship model follows the emergent epistemology of learning and understanding known as constructivism. Surprisingly, this emergent and broader theory of learning is not a new perspective.

### ***5.5.3 Experiential Learning***

In examining this approach, it is worth stepping back in time for a moment to note that at the same time Skinner was proposing and demonstrating his behaviourist ideas, the educational psychologist, John Dewey, was developing a very different philosophy of education that led to what is now known as the constructivist approach. As Kuhlthau (1993) explains, Dewey was responsible for describing learning as an active individual process, i.e. not as something done to someone, but rather something that a person does.

Consequently, the learning experience and the process of knowledge construction goes far beyond formal learning and the classroom. According to Jamieson *et al.* (2005), learning will necessarily also occur during non-class times and outside informal learning activities.

Furthermore, Dewey is said to have coined the concept of “*learning by doing*” where learning takes place within the context of a whole experience in which the learner is completely engaged, and results from the combination of acting and reflecting on the consequences: reflective experience and reflective thinking. Therefore, learning is seen as a continuous process of reflective experience in which a person is actively constructing her/his own view of the world.

## **5.6 Approaches for Designing an e-Learning Setting**

Within the context of e-Learning, one of the approaches that has been suggested as being useful in helping educators and subject matter experts to translate curriculum thinking into practical tasks and concrete learning activities within the course setting is that of information systems design.

### ***5.6.1 Information Systems Design***

It has been found that the difficulty of identifying learning needs, adopting sound pedagogical approaches, and integrating the various ICT components demands the effective use of available techniques and tools (McPherson and Nunes, 2004c:54). In this regard, conceptual models are essential because they enable the designer of the e-Learning setting to work in partnership with academic staff by enabling them to impart how the intended system is to be elaborated (Jonassen, 1995).



Furthermore, these models might also be included in the educational setting referred to earlier in order to improve the learners' conceptual retention, reduce verbatim recall, and boost problem solving transfer (Mayer, 1989). This notion is reinforced by Jonassen (1995), who asserts that such concrete models illustrate to learners how ideas are interconnected, thus enhancing the learners' cognitive models of the content being studied. Furthermore, it has been asserted that systems approaches to instructional design are believed in particular to provide help in solving teachers' problems of translating new curriculum principles into concrete learning tasks (Hoogveld *et al.*, 2002).

Therefore, the design of an online learning environment, which usually involves a complex technical component, demands a more systematic *development methodology* to translate those pedagogical models into the reality of practice (McPherson and Nunes, 2004c:61-67). Consequently, this process can be facilitated by drawing on theoretical frameworks akin to those found in information systems design and development methodologies. The ISD processes involved in designing learning settings have traditionally been described as Instructional Systems Design, although questions have been raised regarding the use of this traditional term (predominantly used in the USA), because of its association with behaviourism.

According to Avison and Fitzgerald (1993:9), an information system entails maintaining an equilibrium between technical specialisms and organisational / task specialisms. As a general rule, successful information systems methodologies are said to comprise six major dimensions or categories: system quality, information quality, use, user satisfaction, individual impact, and organisational impact (DeLone and McLean, 1992).

Thus, an information systems design not only makes use of methods and techniques which facilitate activities that are essential to produce the system (i.e. analysis, specification, design, implementation, operation and maintenance), but will also involve management processes to control the deployment of resources, as well as facilitate communication between all the stakeholders involved. Therefore, it is useful at this point to explore those conceptual models that underpin this approach.

### ***5.6.2 Conceptual Models in Information Systems Design***

Information systems development methodologies are usually based on a specific philosophy or conceptual view of a particular software application; what its general purpose and future usage is, and how it should be structured and designed (Nunes, 1999:138-141). However, Hirshenheim *et al.* (1995:46) also propose that information system designers approach the development task with various explicit and implicit assumptions about the nature of human organisations, the nature of the design task, and the value of the technology as well as what is expected of them.

Yet, methodologies are not mere recipes. Avison and Fitzgerald (1993:4) consider that design assumptions need to be based on a particular philosophical view and embedded in the chosen development methodology. The resultant methodology will consist of concepts and beliefs that define the content and behaviour of the intended systems, as well as values that state what properties in the systems are good and desirable (Hirshenheim *et al.*, 1995:22). In effect, much of the development methodology and a lot of the overall structure of the architecture of the application itself will be determined by these philosophical foundations and conceptual models.

### ***5.6.3 Team Design Approaches for e-Learning Settings***

So far, a number of disparate components that comprise the e-Learning setting have been discussed. However, it is vital to establish this on a sound development framework. According to Hall (2003), this framework should include factors such as “[...] *good structure and navigation; clear objectives; small units of learning: planned learner interactions: repetitions or summaries; synthesis to tie ideas together: learner stimulation and engagement through interesting format; engaging content; non-passive navigation; self test quizzes, assignments and problems which are open-ended so learners can adapt the material to their own circumstances; regular feedback*”.

This then adopts an information systems approach, inherently involving critical and complex tasks, and therefore requiring a reliable project management approach. Hall (2003) recommends a team approach comprising a project manager, the curriculum expert with ICT skills, a web designer(s) with corresponding educational skills, a representative from ICT services, and administrative involvement as well as the support of an external reviewer. However, and again according to Hall (2003), within an e-Learning course, these activities have to be carried out with the technological constraints of the ‘course environment’ in mind, arguing that:

“[...] the curriculum must be planned and documented in sufficient detail for the content to be developed out of sequence and by different members of a development team applying their own specialist skills. This implies expanding the syllabus developed in the first phase to give much more detail of the flow and structure of the course content by breaking it down into logical sections and topics”.

(Hall, 2003)

However, this essentially conforms to a technologically driven approach as described by Hautakangas and Kiilakoski (2004). Within the context of e-Learning, this is aligned with an information systems approach, and in particular with the waterfall approach (Haag *et al.*, 288), which is a linear design process that requires a detailed specification of the learning experiences to be followed by course participants. This way of designing e-Learning is akin to the “story board” technique used in filmmaking and will be familiar to those who have experience of developing Computer Based Training (CBT). The flaw of a rigid approach is that it does not effectively produce a design that accommodates the complexity of the human experience.

Nevertheless, to be appropriate for online delivery; the projected curriculum outline needs to be pre-planned and Hautakangas and Kiilakoski (2004) propose a more “user-centred design” whereby learners are involved in a prototype design process, alongside the experts.

#### ***5.6.4 e-Learning Conceptual Framework for a Community of Inquiry***

A quite different approach is recommended by Garrison and Anderson (2003:28), who emphasise that the development of a community of inquiry is an essential component of an e-Learning setting. There are three main aspects that comprise such a community:

- Social Presence
- Cognitive Presence
- Teaching Presence

Figure 9 indicates how interdependent these components are.

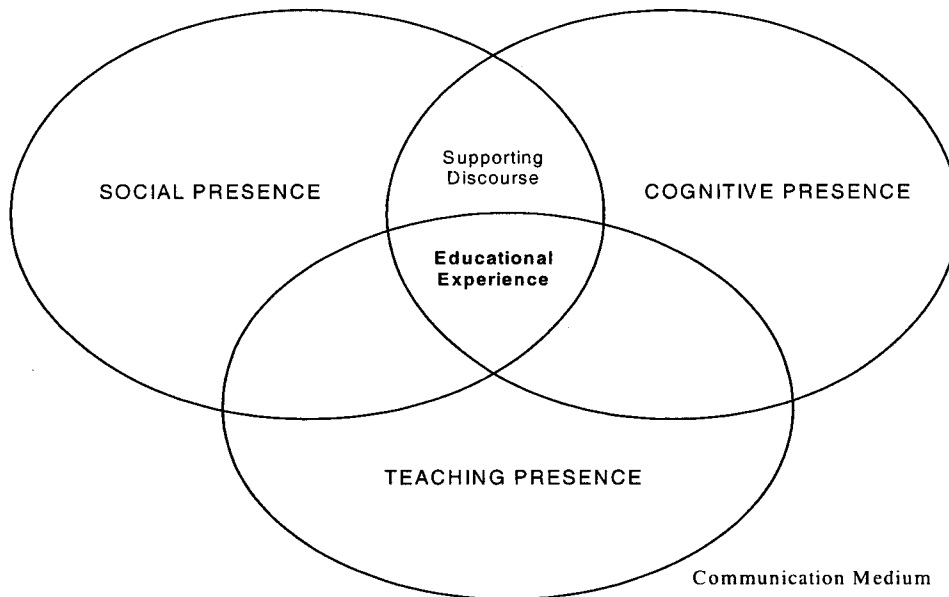


Fig.9 E-Learning Conceptual Framework: Community of Inquiry  
(Garrison and Anderson (2003)).

Here, the emphasis on is not on content, but on “... *teacher guided, non-authoritarian community where societal knowledge is revealed in an equivocal, multidisciplinary manner whose goal is to structure relationships to achieve understanding*” Garrison and Anderson (2003:27).

In this framework, the communication medium plays a significant role, and although CMC was discussed in Chapter Three, it would be useful to discuss this again in the context of designing the curriculum. Curriculum designers need to carefully consider which CMC modes will best support the chosen pedagogical model, i.e. *synchronous* (where geographically dispersed participants access the same resource and engage in some form of ‘conversation’ at the same time), *asynchronous* (where participants post thoughts within online web resources in threaded discussions about a particular topic, and are not communicating in real time), or *both*.

#### 5.6.4.1 *Benefits vs. Disadvantages of Synchronous CMC*

A key benefit of using synchronous tools is that more spontaneous conversation can be encouraged. Since the Internet is said to have the ability to reduce inhibitions among online users (Joinson, 1998), there is a possibility that participants can be encouraged to contribute more readily and as many synchronous conversations are not saved, it is possible that people are less likely to be inhibited by the fear that their misplaced words and thoughts will be saved forever. However, web tools have been developed where chat logs can be saved for future reference, making this mode similar to that of bulletin boards.

Another suggestion by Garrison and Anderson (2003:100) is that synchronous activity (voice or text) is important for student planning or group activity. A further benefit of communicating in real time is the generation of a sense of community where participants can project themselves, both socially and emotionally, as 'real people' (Garrison and Anderson, 2003:28). Carr-Chellman and Duchastel (2000) affirm that synchronous interchanges have the advantage of a more direct sense of collegial instruction, but also claim that an immediate resolution to questions can be achieved.

Apart from the benefits, the literature also reveals some difficulties related to making use of synchronous text-based CMC. One major factor relates to the sheer logistical complexity of organising synchronous meetings with the necessity of all attending teaching sessions at specific times (Frank *et al.*, 2002). Another problem that arises is a phenomenon, now often referred to as Social Cues Theory, whereby a lack of f2f interaction can adversely affect contributors (Sproull and Kiesler, 1991:50-55), leading to miscommunication and misunderstandings (Pilkington, 2003).

Additionally, a consequence of rapid synchronous text-based discussion is that it is easy to post responses out of sequence. Thus, as the dialogue moves on quickly, people have less time to think about what has been said and to consider suitable responses - inexperienced typists can find this particularly intimidating.

#### 5.6.4.2 *Benefits vs. Disadvantages of Asynchronous CMC*

The absence of time constraint is said to allow participants more time to think (Hew and Cheung, 2003) and contributors have more time to think about what they are writing, thus enabling them to post more reflective messages. In addition, when messages are created asynchronously, because of this additional time, it may well be possible to pay more attention to accurate spelling and grammar. Conversely, this also means that readers too have longer and can thus read their messages at a more leisurely pace. The benefits are further reinforced by Johnson and Brine (2000) who state that “...*Although asynchronous CMC is slow compared to face-to-face language exchanges, e-mail did provide students with safe, structured opportunities to negotiate meaning either with their corresponding partner and in a more immediate setting with their teacher*”. On the other hand, McGugan (2002) proposes that asynchronous communication presents a significant pedagogical disadvantage insofar as learners can lose a sense of immediacy when they are introduced to an unfamiliar environment.

McGugan (2002) goes on to say that participants are likely to suffer a misplaced sense of where they are in time, or whom they are relating to. Furthermore, Bregman and Haythornthwaite (2003) found that some students were keenly aware of the permanent nature of their chat and web-board postings and it led some to be highly conscious of their postings, whilst others worried about making each presentation perfect.

Asynchronous communication does not convey the “... the sociability, perceived

warmth, intimacy, and personalization of the mediated experience” brought about by the co-presence of synchronous communication in a shared space Bregman and Haythornthwaite (2003). It also lacks the realism of f2f conversation, reducing the immediacy and responsiveness of questions and replies. It is clear that whilst CMCs offer benefits, there are also drawbacks that need to be considered in each instance.

### ***5.6.5 An Alternative Framework for Online Collaborative Learning***

The framework proposed by Garrison and Anderson (2003:28) has been extended by Lock and Redmond (2006), and referring to Figure 10, which explains that their study of a forum for pre-service teachers to experience ICT integration as a way of interacting with content and people in the exploration of diversity and inclusion provided a useful model of how to capitalise on the potential advantages of ICT and to extend learning beyond traditional classroom practices as follows:

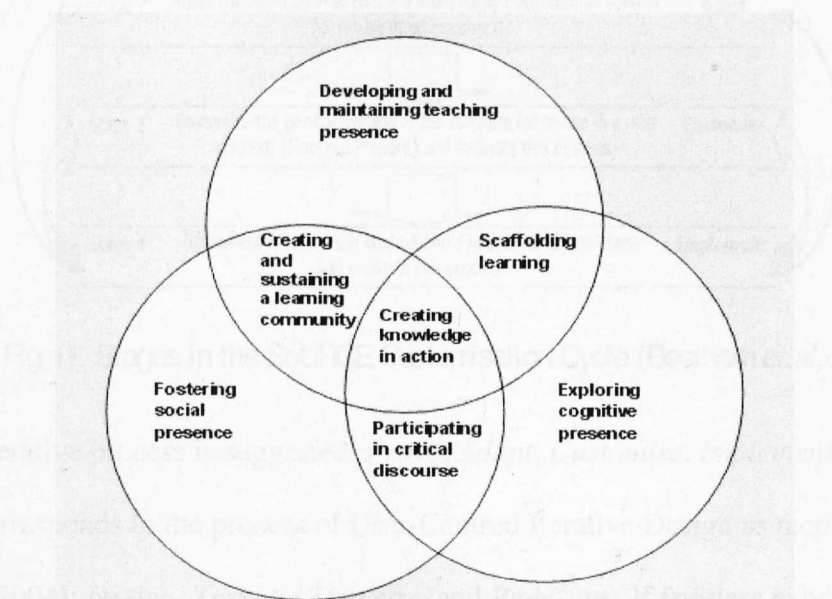


Fig.10: A flexible framework for online collaborative learning (Redmond and Lock, 2006)



## 5.7 Iteration and Revision of the e-Learning Setting

Building on Dewey's notion of iteration, it is suggested that the design of the e-Learning setting too should adopt an iterative approach. At the curriculum design stage, e-Learning developers will not yet have embarked on the process of potentially resource intensive content creation. Therefore, any framework ultimately chosen as appropriate for a particular institutional context can be further strengthened at the course development phase. The notion of iterative design for e-Learning (loosely corresponding to Tyler's recommended final step of 'evaluate and revise') has been developed in funded research such as the TLTP3 SoURCE project (Beetham *et al.*, 2001) which explores issues surrounding the re-use of educational software within (UK) HE. This is clearly illustrated in Figure 11:

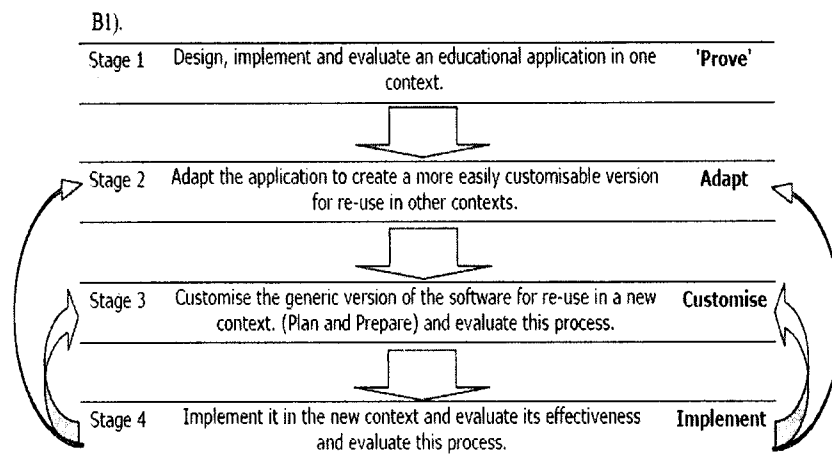


Fig.11. Stages in the SoURCE Customisation Cycle (Beetham *et al.*,

Here, an iterative process is suggested: *Prove, Adapt, Customise, Implement*; which roughly corresponds to the process of User-Centred Iterative Design as recommended by Berns (2004): *Design, Test and Measure, and Redesign*. If fruitless expenditure of effort is to be avoided, enthusiasts are advised to resist an overenthusiastic dash into development and to spend sufficient time on the initial planning. In this respect, Hall (2003) suggests that some key essentials for evaluation to bear in mind are:

- student needs, as well as desires of parents/employers or government demands
- curriculum framework and how it fits to institutional objectives, standards and aspirations
- teacher, tutor, mentor or facilitator who will work with the students during delivery their skills and training
- enabling technology and how it can be exploited to meet the needs of the curriculum without demanding unavailable skills and resources

In reality, the last point is crucial and when using a specific technology there is a fundamental question that must be considered:

“If the design of modern information systems makes a tool available, is the mere existence of the tool justification for its use in particular ways?”

(Cunningham *et al.*, 1993)

### ***5.7.1 Avoiding the Everest Syndrome***

Although e-Learning is recognised as a very promising educational approach, enthusiasts constantly seem to be falling into the trap that Maddux *et al.* (1994) called the “Everest Syndrome”. This term refers to Sir Edmund Hillary’s supposed justification for climbing Mount Everest, i.e. “[...] *just because it is there*”. This same attitude among educators is potentially responsible for the apparent failure to establish e-Learning as a creditable educational technology (McPherson and Nunes, 2004c:21).

In effect, a technologically-driven approach to the e-Learning curriculum focuses undue attention on questions about what educational technology can be made to do, thus distracting researchers, designers of the learning setting and educationalists from asking the more crucial questions. It is important to pose the question of how this technology can actually improve teaching and learning and what the role of the learning technology designer should be in the curriculum design process.

### ***5.7.2 New Roles for Designers of the Learning Setting***

Rothwell and Kalantzis (1992) assert that their role of the 'Instructional Systems Designer' is to "[...] *analyze human performance problems systematically, identify root causes of those problems, consider various solutions to address the root causes, and implement solutions in ways designed to minimize the unintended consequences of corrective action*", although they do acknowledge that some critics assert that "[...] *what may have worked for classroom-based training is not appropriate, or even desirable, for e-Learning*".

However, Hickman *et al.* (1989:34-35) counter this argument, asserting that when engaged in designing learning environments, the aim of such methodologies is to build systems that are robust, reliable, efficient, portable, modifiable and maintainable. This latter view is supported by Nunes (1999) who argued that such a methodology should consist of a collection of procedures, techniques, tools, and documentation aids that help developers in their efforts to implement a new learning environment.

Finally, although there is support that an ISD approach might be useful for creating learning settings, criticism of 'Instructional Systems Designer' as a descriptive term for this role remains. In the IT Forum (an electronic discussion list for professionals involved in design, development and implementation of learning technologies: <http://it.coe.uga.edu/itforum/>), there has been a very recent debate (May 2007) on this very issue.

The contemporary view appears to be, given the focus on learner-centred design, that there might be better descriptors for designers of learning settings, such as; *Learning Designer, Learning Technologist, Learning Professional, Learning Improvement Specialist, Learning Projects X*" (where X = engineer, specialist, developer, etc.),

*Learning Products Engineer*, or even *Workplace Learning and Performance*

Professional. A change of title for designers may encourage more emphasis on the development of the community of inquiry referred to by Garrison and Anderson (2003:31).

## **5.8 Conclusions**

Systems and environments to support e-Learning require detailed specification of learning needs, materials, activities and delivery methods needs. The complexities of integration of differing ICT components according to these learning needs and sound pedagogical approaches are said to demand frameworks not too dissimilar to information systems design and development methodologies. In this approach, the design and production of educational online environments involves collaboration between subject matter and education experts participating in the curriculum and learning activity design, and technical development experts involved in the ICT application implementation. Hence, the communication between these agents becomes paramount.

These groups usually speak different “languages”, use very different representational artefacts and adopt quite different philosophical stances and thus often have difficulties in communicating and negotiating meanings. An efficient design must therefore integrate and support the dialogue between these different groups. However, the gap between expert/professional and non-expert/non-professional developers is narrowing, due to the increasingly more comprehensive and easy-to-use authoring facilities, such as VLEs and ‘drag&drop’ authoring tools. Current authoring tools aim to support both professional quality and do-it-yourself endeavours, so that the developer of an educational application is now often the educator her/himself.

Nevertheless, the need for an adequate conceptual view of the process of design and development should always be present. It is strongly argued that academic learning should be seen as a constructivist process, i.e. a process of acting upon what has been learnt and reflecting upon that learning and doing to contextualise the knowledge gained.

By acting and reflecting upon the knowledge acquired, learners construct their own views of the world in relation to that new knowledge and put it into a useful context. This differentiates them from the passive learner who soaks up information without applying it and then never knows when it is appropriate to use it. Without a context in which to place what has been learnt, newly acquired knowledge becomes meaningless and irrelevant. Constructivist REALs may therefore be crucial to provide students with learning environments in which they may contextualise the information they are taught, be this within lectures, tutorials or even through explicit e-Learning materials. This should enable them to develop deeper understandings of topics being studied and longer retention of subject knowledge thus acquired.

Educationalists and designers need pedagogical models in their practice, rather than mere enunciations of learning epistemologies. These models, although reflecting the philosophy of the learning theories they are rooted in, need to address the pragmatic aspects of teaching in HE institutions. Using pedagogical models that do not consider these constraints may be as damaging for the emerging field of e-Learning as not using pedagogical models at all. Potentially, the fate of e-Learning may become as ephemeral as so many other ICT technological applications in education.

Yet, using constructivism in e-Learning settings is not intuitive, either to learners or tutors since both groups were in all probability educated in a highly objectivist educational system, and are thus often ill-prepared for the independence, action and interaction required by this epistemology. Successful online learning courses require much more than well-designed environments, motivated tutors and interested learners.

Constructivist e-Learning requires a set of information, communication and social skills that need to be acquired prior to engaging with the online learning activities.

Additionally, and during the delivery process, both tutors and learners need the support of adequate learning resources, designed explicitly according to a constructivist approach. Failing to address these issues may compromise the success of any online learning initiative.

## 6 Issues relating to Delivery of e-Learning

It is only at the point of delivery that the true *raison d'être* for e-Learning is revealed. If the institutional motive for using this technology is merely to save money, then this will become apparent to both tutors and learners, and this will affect whether e-Learning will be accepted. If this process is determined by enthusiastic technologists, this too will be revealed as the tools may well not be built with the learners or how they really engage with their learning in mind. Another level of complexity, as mentioned in Chapter 2, can be introduced when e-Learning makes use of a VLE. Technology can add an extra layer between the learner and tutor, between the learner and the learning material, between the learner and the peer group, as well as introducing added problems of maintenance, communication and support for tutors. Additionally, for delivery to multiple locations or to numerous students, it must be possible to decouple time and/or place between teacher and learner which can be difficult to manage.

However, if the curriculum design has been transformed into an educational setting with suitable pedagogical thinking and with appropriate use of learning technologies, then the tutor and the learners can begin to make use of the facilities therein in order to work towards the learning outcomes agreed upon. Nevertheless, it would be simplistic to think that this alone would enable the learner to achieve the desired learning. If the uptake of e-Learning in HE is to be widely successful, then it is vital to deal with a host of attendant issues, such as student support, staff and development. Thus, the delivery of e-Learning must address issues relating to: online learner skills; e-Learning facilitation, tutoring and support; the effective and appropriate use of learning materials; the use of synchronous and asynchronous CMC tools to enable tutor-to-student(s), student(s)-to-tutor and peer-to-peer interaction; as well as tutor strategies, skills and training.

Yet there is also a word of caution to those who wish to use technologically rich environments for learning – Kommers (1997) indicates that the use of technological artefacts for learning must be adapted to the reality of the learning environment, and that tutors need to take associated factors such as social, organisational, time and test pressures into account. In reality, Duke (2002:27) proposes that online learning requires much more in terms of pedagogy and explains that this approach calls for more than simply “putting professors’ lectures onto the web”, i.e. that merely transforming lecture slides into web-based lecture notes is insufficient. Duke (2002:25) suggests that transforming delivery of courses, modules and sometimes even entire programmes into mixed or multi-modal environments requires widely permeative changes. The “communication and IT revolution transforms both the world and its ways of communicating and the expectations, needs and learning attributes of students, quite apart from offering the university new ways to teach and administer” (Duke, 2002:25). Some of the key changes relate to organisational structure and culture, management of information systems, and pedagogical approaches, and these have already been discussed in previous chapters. Thus, the focus of attention will now turn to the role of the tutor and staff attitudes as well as examining learner perceptions and behaviour, within the context of actually engaging with e-Learning technologies.

Given that this research has revealed that there is considerable support for a constructivist approach to e-learning, it is appropriate that traditional theories on learning support should again be contrasted with the constructivist learning epistemology and specific requirements and constraints posed by the latter debated. This chapter therefore discusses the various support mechanisms that must be made available to those engaging with constructivist e-Learning environments and literature related to this will be thoroughly examined in this context.



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## 6.1 Delivery Approaches for e-Learning

The creation of an educational e-Learning setting that incorporates situated learning, social negotiation and multiple perspectives, as described in 5.5, implies a number of different delivery strategies that must be adopted to assist the learner in the construction of knowledge (Nunes and Fowell, 1996). The use of Grabinger and Dunlap's (1995) REALs to provide authentic learning contexts and encourage the growth of learner responsibility, initiative, decision-making, intentional learning and ownership over the acquired knowledge is problematic, as this may conflict with the institutional norms of knowledge acquisition processes. Yet, as stated in 5.3.4, REALs should offer an environment that facilitates the formation of knowledge-building learning communities. Collaborative social negotiation of meanings and understandings among the members of the community (peers, tutors, subject matter experts) must be fostered by e-tutors (Nunes and McPherson, 2004a). Accordingly, e-Learning within REALs requires a number of specific skills from both tutor and learners and has to be supported by appropriate resources (Dunlap and Grabinger, 1996). This need for learner support clearly requires a different approach from conventional theory. This can be described as an Online Learning Support (OLS) and may be defined as a computer-mediated approach to support and facilitate learning (McPherson and Nunes, 2004a). OLS involves using a combination of skills that encompass information and ICT expertise, as well as expertise in the educational uses of online learning resources, environments and communication technologies (Nunes and McPherson, 2006). In the light of this characterisation of the delivery of e-Learning, it is then possible to distinguish a number of different issues that may yield critical success for e-Learning: *delivery modes for e-Learning, e-Tutor skills, e-Learning skills*, as well as specifically designed *e-Learning facilities and e-Learning resources*.

## 6.2 Delivery Modes for e-Learning

### 6.2.1 *e-Learning for Part-time vs. Full-time Study*

The necessity to offer opportunities for students to study part-time in HE has long been recognised, and numerous courses have been set up to address this need. The success of the Open University is testimony to this vital provision. However, despite the emphasis of Lifelong Learning over the last decade, it has remained difficult to accommodate such courses within traditional HE institutions. A prime incentive for taking a part-time course is that individuals have other demands on their time, such as career responsibilities and family commitments. There have been assertions that use of e-Learning solutions enabled new patterns of course organisation and delivery and that the challenge that lay ahead for professional educators and e-Learning professionals was how to establish these advantages for the part-time and professional university student into the experiences of their full-time fellow students (Hart *et al.*, 2005). There have been many attempts to embed flexible delivery, particularly at Masters levels in the form of designing courses as a part-time study programme over three years, with intermediate certificate and diploma stages at the end of one or two years of study respectively (Chivers and McPherson, 1994). Yet, despite the fact that modular structures have now been adopted into most UK institutions, their potential for flexibility of study has only been variably embraced and many universities continue to offer courses on a non-negotiable basis, within a set time frame (Henkel, 2001). This position is supported by Hart and Rush (2007), who argue that despite the possibilities offered by recent advances in ICT, the 'student voice' still fails to achieve sufficient prominence. The contention here is that within HE circles, there still seems to be an assumption that part-time (and distance learning) students must fit in with conventional delivery models, i.e. that of the full-time student.

### ***6.2.2 Distance vs. On-Campus e-Learning***

Since the advent of the Internet and in particular the web, opportunities have been recognised to obviate the difficulties caused by learning at a distance and researchers have acknowledged the value that e-Learner might offer (Furnell *et al.*, 1998; Alexander, 2001), not only to distance learners, but to those studying on site as well. Distance education, as described by Doloi (2007), has utilised educational technology because it purportedly frees the students from the classroom environment, giving them greater control or autonomy over their own learning and professional development. The personal coordination of technology obviates some of the barriers from being tied to an institutional learning system (Johnson and Brierley, 2007), allowing the learner to study when and where it suits them. However, there have been assertions that e-Learning can improve the quality of learning in the classroom too. Yet the success of e-Learning has not met with universal acclaim, and according to Gunasekaran *et al.* (2002), the technology has eclipsed the ability and motivation of institutions to support it. Despite the advantages, and the prediction of the demise of the university (Blackmore, 2001), many students still demand traditional methods of instruction. Inspired by creating e-Learning for distance students, Nunes and McPherson (2002d) reported on an initiative to drop the standard lecture-based approach in favour of a more flexible approach. It was decided that explicit knowledge would be provided in the e-Learning environment in the form of “[...] *materials, together with traditional reading lists, web links, individual activities and administrative information*” with support provided in the form of groupwork (case-study analysis and problem solving), small-group seminars and practical sessions (Nunes and McPherson, 2002d). Yet, this approach was not universally welcomed:

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“I don’t really like webct as a teaching tool. Would prefer lectures as we don’t really trust ourselves enough to be confident with our chosen approach” Q1.20

Nunes and McPherson (2002d)

Thus, the introduction of e-Learning is not a trivial matter and therefore requires a practice and evidence-based approach, and if e-Learning is to meet the needs of both on-campus and distance students, it seems clear that more thought needs to be put into the delivery process. If it is decided to adopt e-Learning for on-campus students, then Bates (2005:9) suggests that a model of ‘distributed learning’ might be used, as long as this is not conflated with the needs of distance learners. Therefore, it may be better to consider these two groups of students separately, and to devise a delivery strategy for each group.

### ***6.2.3 Blended Learning***

Bates (2005:9) explains that distance students are often older, requiring quite different support, whereas on-campus students might, if well prepared, respond well to a hybrid or mixed-mode approach which has often been dubbed ‘blended learning’. In a study by Concannon *et al.* (2004), students accepted the notion of e-Learning as an integral part of their learning process within HE, with over 70% of the students in the end-of-semester survey commenting that they were happy overall with the e-Learning aspect of the module:

“Major benefits noted included the ease of access to resources, given the limited books in the library, and the provision of a central area for students to access to find information or comprehensive resources pertaining to each module.”

Concannon *et al.* (2004)

These research findings are supported by Aspden and Helm (2004) who indicate that rather than encouraging institutions to deliver more of their provision at a distance, increased engagement with educational technology can have the effect of drawing staff

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and students closer together (both physically and virtually). Bonk *et al.* (2006) indicate that blended learning is a permanent trend rather than a passing fad in HE settings but notes there is a need to focus on the technological and pedagogical mix.

### 6.3 The Role of the Tutor

Thinking about the role of the e-tutor helps lead to a better appreciation of the various opportunities that e-Learning may have to offer.

“E-learning may change ways to learn and to teach. Instead of communication styles of “one to many” and supervision from up to bottom in a work group, we find interaction and co-operation among peers. The main character is users’ community and the most important element is their interaction with operators involved in the course.[...] Within on line course, role of tutor is an added value to traditional teacher role. He/she plays a scaffolding role offering his/her aid in different areas: intellectual, emotional, social.”

(Scognamiglio and Selvaggi, 2003)

This quote is indicative of the general interest in the ongoing debate about e-Learning approaches and methodologies which, thanks to continuing scholarly attention, is still developing and growing. The research reported by Bonk *et al.* (2006) revealed that rather than seeing the web as an opportunity for student idea generation, most respondents saw the potential of the web as a tool for enhancing student critical thinking and engagement with virtual teaming or collaboration. Neal (1998) says that whilst experienced faculty are fully aware that learning involves a very complex set of interactions between teacher and student, those advocating the use of educational technology still tend to promote delivery of information rather than providing the rich learning experience that is possible within f2f environments. On the other hand, Hadjerrouit (2007) argues that although the behaviourist model is criticised for stimulating surface learning and knowledge reproduction, there is a place for a behaviourist knowledge transfer model that can be ‘delivered’, particularly to novice

learners. However, this implies a submissive approach, rather than the constructivist learning experience that Bonk *et al.* (2006) identifies.

Nevertheless, if the trend toward rich online environments continues, it certainly will mean dramatic changes for the role of the traditional tutor who, in the past, expected to “teach” the “content” of a particular domain (Bonk *et al.*, 2006). In this delivery approach, according to Neal (1998), the role of the tutor is to enable learners to find out about and reflect on issues within a subject area. In contrast, Giles *et al.* (2006) assert that if a professor is to successfully reach the entire class, then the class must appeal to a wide range of learners. Their study to some extent supports the position of Hadjerrouit (2007), in that both student-centred and teacher-centred activities in f2f classes were essential, because switching entirely to one or the other style of teaching alienated a proportion of the class and therefore indicating the desirability of a more balanced approach to accommodate all learners (Giles *et al.*, 2006).

Yet despite all the advantages that e-Learning is said to be able to offer, there is still a considerable degree of opposition from tutors to making use of e-Learning. Slater (2005) confirms this resistance, saying:

“The use of course materials developed by others required academics to sacrifice a degree of independence and this proved to be a stumbling block.”

(Slater, 2005)

Yet this is not the only obstacle, and in order to find some answers to what would overcome such a mismatch, it is important to explore issues of tutor motivation. An additional problem is that as most tutors have not experienced online learning for themselves, they may have problems in empathising with student anxieties and thereby really being able to understand the distinctiveness of e-Learners’ support needs.

### ***6.3.1 e-Tutor Preparedness***

Innovations in e-Learning over the last decade have clearly led to a renewed interest in educational epistemologies and approaches. As already stated in 5.3.2, use of constructivist approaches, such as problem-based learning, have been identified as possible ways of maximising the potential of online learning environments. However, in such settings, learners are expected to develop high cognitive skills such as negotiation of meaning, life-long learning, reflective analysis and meta-cognition. As a consequence, tutors might feel obliged to adopt these new methods of learning provision, without being properly equipped with the basic skills required to successfully support learners in online learning environments (McPherson and Nunes, 2004a).

The recognition of these constructivist online tutoring skills poses particular challenges, since very often the tutors have not themselves undergone a constructivist learning experience. It is therefore necessary for tutors to understand that, although similar in many respects to more traditional approaches and even to f2f delivery, constructivist online tutoring is distinct in a number of ways. Gerrard (2002) proposes general differences of the online environment in reference to the f2f one:

- places greater emphasis on written skills;
- produces a more formal tone;
- does not follow a linear conversation but instead promotes multiple conversations;
- does not confine tutoring to specific times;
- places greater emphasis on student-student learning;
- requires tutors to develop new ways of encouraging participation;
- requires tutors to assess the worth of online contributions.

This requires tutor support to acquire new skills specific to the e-Learning setting.

### 6.3.2 *Online Tutoring Skills*

From the characterisation above, it is clear that even for the more experienced f2f tutor, there is a great deal of knowledge to be acquired about the skills required for online learning. However, the online tutor must, in addition to the subject matter expertise and traditional pedagogical training, be able to demonstrate additional skills necessary to be successful in a REAL, such as, the ability to:

- plan and organise delivery by clearly specifying learning objectives and outcomes;
- set learning agendas and providing leadership and scaffolding in learning activities;
- welcome and embrace diversity of learning outcomes, attitudes and styles;
- adapt supporting styles to the needs of individual participants;
- provide advice on different levels of access to learning materials according to the needs of individual participants;
- create an atmosphere of collaborative learning of which the e-tutor him/herself is often an integral part;
- be able to cope with and resolve on-line conferencing conflicts and difficult behaviours;
- encourage active construction of knowledge by being actively involved in discussions, activities and debates;
- develop and implement methods for learner feedback and reinforcement;
- present advance organisers into the content materials and advice on learning pace so as to avoid cognitive overload and information anxiety.

(McPherson and Nunes, 2004a)

As argued by Graham and Vlasamidis (2006), the focus on technology in 'e' or blended learning can be regarded as impeding the effectiveness of learning in an online setting, and they conclude that the appropriate embodiment of human factors, pedagogical, social, etc. is still key to success. Thus, both e-Tutor and e-Learner skills are needed.



## 6.4 Acquisition of e-Learning Skills

It is not enough that tutors are prepared for e-Learning - learners also need preparation.

Due to the hype associated with e-Learning, learners often feel compelled to engage with these new environments without being properly equipped with the basic skills required to be successful (Nunes *et al.*, 2000a). Students within HE are still expected to develop high cognitive skills such as negotiation of meaning, long-life learning, reflective analysis and meta-cognition without being properly trained in low-level e-Learning skills such as the basic use of computer mediated technology, online social skills, online etiquette, web navigation, and web searching. These skills were identified by Nunes *et al.* (2000b) as Networked Information and Communication Literacy Skills (NICLS). These skills are not only required to succeed in the e-Learning environment to which learners are exposed, but are also an essential part of all aspects of daily networked activity. It has been proposed that in the future, these basic NICLS will be addressed and acquired at lower levels, i.e. in primary and/or secondary schools, of the educational system. Yet at this point in time, most students currently enrolling in HE courses are already young adults, having acquired the basic educational skills, namely reading, writing, spelling, handwriting and numeracy (Bramley, 1991). Unfortunately, these traditional skills are insufficient skills to learn effectively in a REAL.

NICLS complement the traditional basic skills with a new set of information and communication literacy skills. Information literacy includes recognising information needs, distinguishing ways of addressing gaps, constructing strategies of locating information, locating and accessing information, comparing and evaluating information, as well as organising, applying and synthesising information (Webber and Johnson, 2000).

The limitations and affordances of conferencing technologies require adaptations and changes in human behaviour for successful communication to take place (Musselbrook *et al.*, 2000). The additional skills required to effectively undertake online communication can be described as communication literacy (Pincas, 2000). The conjunction of these two new types of literacy form what Nunes *et al.* (2000b) identified as NICLS. Learners must acquire NICLS before actually engaging with any online learning activity. Failure to address this issue in online learning leads to much frustration for the learners, and eventually to lower levels of success for the online learning courses (Hara and Kling, 1999). Thus, to encapsulate the essential skills that an e-Learner needs, NICLS can clearly be divided into two main categories: CMC and information skills. Firstly, CMC skills are, as previously explained, related to the interaction of the student with the learning community, and secondly, information skills are related with problems of information anxiety and overload as well as access to the learning resources.

#### ***6.4.1 Characterisation of Adult e-Learners within HE***

Much of the literature reviewed thus far has emphasised a learner-centred approach yet, as learners in HE can, by and large be regarded as adults, there is a need to examine the character of an adult learner. Whilst it is by no means suggested that all adults have the same traits, they still can to some extent be differentiated from children. Andragogy is a term, used over seventy years ago by German social scientists, to differentiate adult learning from that of children, but is not generally used in discussions about e-Learning within HE, where the term pedagogy is in common parlance.

In contrast to that of early-age learners, students' prior experiences can be regarded as having a significant impact, either positive or negative, on e-Learning in HE. As Thoms (2001) explains, in andragogy, the role of the tutor is to *manage* the learning process rather than to manage the content, with the implication is that academics should facilitate learning rather than merely lecture, and insists that two-way communication and feedback is critical. This is equally important and applicable in e-Learning.

Furthermore, given the importance of e-Learning to that other category of HE student, i.e. the part-time distance learner, Castles (2004) carried out an investigation of persistence in adult learners studying at the Open University (OU). There were three main factors that influenced such students to withdraw:

- *“social and environmental*: time and space available for study, patterns of work, ability to take part in tutorials or other institutional offerings, support of significant others, accommodation of social activities and friendship;
- *traumatic*: illness, bereavement, unemployment or lack of support from partners. This also included caring for children or the elderly and the student's level of adaptation to the everyday stresses of living;
- *intrinsic*: used in the research to cover areas such as students' attitudes, motivation and qualities such as persistence, hardiness or coping ability. It also included approaches to study and methods of study.”

(Castles, 2004)

Thus, as it can be seen from the above, there is a great deal more to adult learning than what simply happens in class (Geddes, 2005) and this could be particularly useful for supporting these learners. In Castles (2004), a model of persistence which is shown in Table 1 overleaf is also identified:

First level of importance	Support	Strong coping strategies	Life challenger
Second level of importance	Ability to juggle roles	Success in study	Love of learning
Third level of importance	Positive early educational experiences Smooth interaction with institution/ tutors	No family/ personal crises Good physical health	Strategic approach to learning Lack of new stressors, e.g. work-related/financial

This, then to some extent corroborates the assertion made by Graham and Vlasamidis (2006) to the effect that human factors, pedagogical, social, etc. are amongst the most important factors that contribute towards successful e-Learning.

## 6.5 e-Learning Facilities and Resources

As proposed by Kommers (1996), learning resources are those information resources the learner might need at a particular moment in learning, thinking or designing new ideas, while engaging with a particular learning activity. The constructivist learning approach, as discussed earlier in this thesis, assumes that knowledge is acquired through social negotiation, experience and reflection, i.e., resulting from the construction of meaning from interaction with specific contexts. This construction results from two different types of interactivity in the learning process (Palloff and Pratt, 2001:52-53) as identified in Section 4.3.3.

1. An individual, private activity between the learner and the learning materials, which may range from the traditional textbook to computer-based simulations.
2. A social activity, between the learner and the tutor, the facilitator or other learners.

## **6.6 Conclusions**

The skills required for successful e-Learning are neither straightforward nor intuitive to either learners or tutors. At this point in time, both groups probably have a background in highly objectivist educational systems and are thus often ill-prepared for the independence, action and interaction required by this epistemology.

Successful e-Learning courses require much more than well-designed environments, motivated tutors and interested learners. e-Learners and e-Tutors require a set of information, communication and social skills that need to be acquired prior to engaging with the online learning activities. Additionally, and during the delivery process, both tutors and learners need the support of adequate learning resources, designed explicitly according to a constructivist approach. Failing to address these issues may compromise the success of any online learning initiative.

Having comprehensively reviewed the literature, the next chapter will go on to explain the research approach, methodology, methods, data collection and analysis strategy.

## 7 Research Methodology

For research to be of any consequence, an explicit explanation of the philosophical stance underpinning the study, methodological approach and description of particular methods is essential. It is also clear that researchers need to reflect on their own theoretical position and explicitly define their perspective when writing up their work. According to McNiff *et al.* (2004), there is always a political dimension to doing research, maintaining that all studies are based on some fundamental assumptions about what constitutes 'valid' research and this will dictate which research methods are appropriate. According to Wilson (2002), one of the most contentious debates is whether to adopt a positivist view of the nature of social reality, in which social facts can be known with certainty and in which laws of cause and effect can be discovered, or whether to apply humanistic approaches which generally see social reality as constructed through social action on the part of people who undertake those acts because they have meaning for them. Bryman (1988:5) suggests that the basic choice of methodological approach, between quantitative and qualitative techniques, is largely influenced by the type of research question being asked. It therefore follows that the methodological choice for any investigation should bear this in mind and should be based on the most suitable method for the research question. Indeed, the chosen research methodology should be the one that is most fitting for collecting the data required for answering the research question. Consequently, it is necessary to argue the case as to which approach will be best able to help answer the research question presented in Chapter 1, which is "*What are the underlying CSFs required to support the design, development, implementation and management of e-Learning in HE institutions?*" Accordingly, the underlying reasoning on which this research is centred will be described as clearly as possible in this chapter.

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## 7.1 Philosophical Assumptions

The initial consideration for this research was to determine which philosophical stance was to be adopted. Ontological assumptions within organisational research traditionally conceive social reality to be either subjective or objective (Smircich, 1983).

Quantitative research is often, in rather over-simplistic terms, regarded as objectivist, arising from a positivistic philosophical view. Positivism is rooted in the teachings of 18<sup>th</sup> and 19<sup>th</sup> century philosophers such as Locke, Comte and Hume and assumes that research should only deal with positive facts and phenomena. The work of these philosophers was followed by Kant's critique of pure reason. According to Redding (2005), Kant distinguished *concepts* from 'intuitions', which were immediate representations, providing experiential contents *to which* concepts were applied.

Kantian reasoning infers that the crucial issue is not how we can bring ourselves to understand the world, but how the world comes to be understood by us. Guba and Lincoln (1994:108) described positivism as the "received view" that has dominated the formal discourse in the physical and social sciences for some 400 years. Positivism, with an emphasis on numerical or statistical analysis (commonly described as quantitative) to prove the case, attempts to solve problems through a deductive process. Positivist theories are rooted in the verification principle, and are based on the view that the world has an objective reality that can be captured and translated into testable hypotheses (Buchanan, 1998; Straub, Gefen, and Boudreau, 2004).

However, according to Lincoln and Guba, (1985:108), conventional 'scientific' research can run the risk of being reductionist since complex problems are condensed in order to produce models that can provide a simplified simulation of reality. Positivism has been the subject of much criticism by social science researchers because it is not always able to provide adequate answers to some very key questions concerning human activity.

It is felt that this is particularly true within educational settings since it can be argued that research involving human participants within educational contexts cannot be reduced to a large laboratory experiment. Indeed, the most vociferous critics reject positivism altogether and consider that only theories based on subjectivist assumptions, i.e. those that target human actors as their focus of attention, will do. The tension between these two opposing positions appears to rest upon the premise that they are mutually exclusive, and that theories based on one of these theoretical positions cannot inform theories based on the other (Orlikowski and Robey, 1991). However, despite these “paradigm wars” (Gage, 1989), both research approaches can and have been used whenever researchers deem that they are appropriate.

Indeed, Avegerou (2000) argues that developing societies need to recognize the limitations of the validity of techno-economic rationality and that they ought to pursue rationalities stemming from their own value systems. These concerns are perhaps equally applicable to educational contexts, where issues such as inequality of opportunity and outcomes remain as pressing concerns. Since the focus of this research is on the role of ICT within an HE context, and how this type of technology is designed, developed and used within tertiary education, it is argued that these activities are both the product of human endeavour as well as a way to facilitate human achievements. In the context of this research, the implementation of university-wide e-Learning solutions, and the adoption of teaching and learning technologies represents an extremely complex social process and is subject to numerous influences, including attitudes, perceptions, feelings and behaviours that many positivist proponents would reject as being irrelevant.



### ***7.1.1 Post-positivism***

As a result of the arguments set out above, it was felt that in this particular investigation, positivist research approaches would be inappropriate, and in addition, that eliciting research data purely in the form of figures or statistics would simply not provide the new perspectives and insights being sought. Given that e-Learning is essentially a human activity system, it was felt that in this particular research, the processes and implications of implementing e-Learning into HE institutions required an in-depth and holistic understanding. It was therefore thought that post-positivism might signify a step forward in that it:

“[...] represents efforts in the past few decades to respond in a limited way (that is, while remaining within essentially the same set of basic beliefs) to the most problematic criticisms of positivism.”

(Guba and Lincoln, 1994:108-109)

This is supported by Reason (1998) who goes on to say:

“[...] Post-positivism thus softens the edges of positivism by recognising that “reality” can only be known imperfectly, by recognising that inquiry takes place within a community which sets standards, and by emphasising methodological multiplism and triangulation as a way of falsifying rather than verifying hypotheses.”

Reason (1998)

Consequently, since this investigation focused on the process for designing, developing and implementing successful e-Learning in HE, a holistic and qualitative methodological was needed. Such an approach would allow a more comprehensive consideration of this complex environment and all stakeholders that populate it. Thus it was decided that an essentially interpretative approach would be most appropriate.

## 7.2 Rationale for Adopting an Interpretivist Research Approach

This research set out to discover the underlying CSFs required to support the design, development, implementation and management of e-Learning in HE institutions and the stress is on the human activity systems that support online learning. Therefore, the rationale for describing this research as *interpretive* rather than *qualitative* is because as Vrasidas (2001) puts it, interpretive research is a broader term insofar as it encompasses qualitative and other participant observation approaches. Participant observation could include methodologies such as ethnographic, phenomenological, constructivist, and case studies, which generally try to gain insights into particular problems which would perhaps not come to light through quantitative approaches.

A compelling justification for adopting a more interpretivist approach is that when one is undertaking enquiries concerning attributes such as attitudes, beliefs or judgements, then it is often neither possible nor desirable to engage in research that is purely based on quantification. This view is supported by Denzin (1989:8) who adopts a philosophical stance that assumes that “... *in the world of human experience, there is only interpretation*”. Interpretivist theories sacrifice the researchers’ determination to “get it right”, and instead attempt to “make it meaningful” (Green, 1992). This approach was chosen because it was felt that it would provide a deeper insight into organisational strategies, processes and information needs that are critical for managing e-Learning. This is relevant to studies that are investigating underlying causes for human issues, for example ethnicity, gender and many other forms of inequality. Such a methodology would consider factors such as socio-political, socio-technical, geographical, interpersonal and gendered contexts of research. This approach would make it possible to carry out a causal analysis that would indicate specific factors that might increase the likelihood of implementing high-quality e-Learning programmes.

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### ***7.2.1 Potential Interpretative Research Methodologies Considered***

There are numerous interpretative research approaches available to educational researchers. Some of these alternative approaches will now be discussed and reasons explored for the final approach chosen. *Surveys* are a popular research approach and, depending on the questions chosen, can be structured to gather interpretative responses. However, contrary to popular belief, surveys can in fact be “saturated with theoretical and value-judgements” (Huberman and Miles, 2002: 85). Therefore, this approach is not necessarily wholly impartial and may not be sufficiently flexible to elicit the emancipated ideas being sought. Furthermore, time pressures on Higher Education staff and the number of questionnaires staff are requested to complete on a regular basis, could make it difficult to elicit the required number of responses to produce valid results. Another possibility was to conduct a *case study*, as this is said to be able to make a unique contribution to our knowledge of individual, organisational, social and political phenomena (Yin, 1984:15). However, the drawback with this as an approach is not only the difficulty of gaining access to all the relative stakeholders within institutions, but that there may be sensitivity around technological changes for teaching and learning, making potential research participants reluctant to make their real feelings known. Whilst a *phenomenological study* may have allowed the possibility of direct observation of the HE environment and human interactions therein engaging with e-Learning, the risk in adopting this approach was that an artificial boundary might be placed around the subject’s behaviour and that a narrow micro-sociological study may not provide the breadth being sought (Cohen, *et al.*, 2000). Nevertheless, to gain a grasp of some of the complex and ambiguous issues that influence the success of e-Learning, it was still felt that an interpretivist approach would yield the insights being sought.

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### 7.2.1.1 Co-operative Inquiry

Consequently, after exploring alternative approaches, it was strongly felt that co-operative inquiry (a particular form of interpretative enquiry which involves doing research with individuals working in the field), would be most likely to throw light on underlying matters of interest. Heron (1996:29) commends co-operative inquiry as a way of doing research with people where the roles of researcher and subject are integrated. He goes on to describe co-operative inquiry (CI) as a unique and comprehensive form of participative research in which people use the full range of their sensibilities to inquire together into any aspect of the human condition.

This view is supported by Reason (1988:1) who believes that the simplest description of CI is “[...] *a way of doing research in which all those involved contribute both to the creative thinking that goes into the enterprise—deciding on what is to be looked at, the methods of the inquiry, and making sense of what is found out—and also contribute to the action which is the subject of the research*”. According to this rationale, CI in its fullest form enables participants to act as both co-researchers and co-subjects.

“[...] Co-operative inquiry is therefore also a form of education, personal development, and social action.

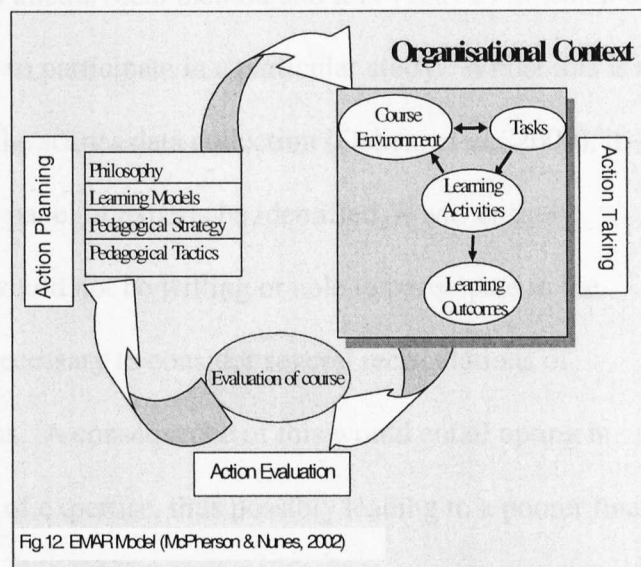
Reason, P. (1988:1)

In view of the fact that this study intended to establish the CSFs for e-Learning as a human activity system, it was thought that CI could be a very relevant approach for an investigation of this nature. For instance, Alexander (1998) felt that a CI framework could be used as a general method for reaching a shared understanding within an environment that deals with technological development. He highlighted the fact that projects that do not involve their users thoroughly in all decisions, especially in requirements, and where a focus on tools and methods distracts designers’ and

developers' attention away from users, is taking a serious risk. Therefore CI can be described as a methodical approach to establishing understanding through engaging in cycles of action and reflection, thereby offering the possibility of involving users intimately in all aspects of requirements engineering. Accordingly, in line with this argument, an Action Research (AR) approach was originally considered for this study.

### 7.2.1.2 Action Research

Originally, it was thought that this research could elicit CSFs for e-Learning by making use the Educational Management Action Research (EMAR) model, as devised by McPherson and Nunes, (2004c:27-29) and shown in Figure 12, based on a



successful CPDE Masters e-Learning programme within an academic environment, i.e. an ongoing programme. Regrettably, soon after initiating this research, for strategic reasons, the particular course upon which the research was to be centred was scheduled for closure, which meant that this form of action research approach was no longer feasible. Nonetheless, it was clear that the identification of CSFs, as discussed in Chapter 1, was still a valid research goal, and therefore possibilities offered by other similar research methodologies were explored. Therefore, an alternative to the above action research approach, the Delphi Study Methodology, which emerged from work carried out at the RAND Corporation in the USA in the 1950s and 1960s, was also considered as a possible alternative.

### 7.2.1.3 Delphi Study

Delphi is often used to bring together geographically dispersed experts to work as a group and to systematically explore a complex problem or task. The Delphi generally involves an iterative multistage process where a series of rounds are made, with participants' contributions being fed back to the group, and with the aim of reaching a consensus if at all possible. However, despite the fact that this methodology has been around for many years, this is not an unequivocal method and it is vague as to which or how many experts should be chosen to participate in a particular study. Whilst this is a useful means of conducting behind the scenes data collection (Cohen, *et al.*, 2000), it was felt that even should an optimal panel of experts be identified, it was entirely possible that at least some of them would not be willing or able to participate in the study due to the time commitment necessary to consider several recirculations of responses in order to reach consensus. A consequence of this would entail opting in substitutes without the desired level of expertise, thus possibly leading to a poorer final consensus of opinion. There are also a number of criticisms of Delphi. For instance, Rennie (1981) suggests that this approach may generate bland statements that represent the lowest common denominator. Additionally, (Sackman, 1975:712) believes anonymity, a key principle of the Delphi, may lead to lack of accountability of views expressed and encourage hasty decisions. Thus, although Delphi could be a valid research approach to elicit and interpret views from human subjects, for this particular study, it was decided to identify alternative methods that might be applicable to the research problem in considered in this thesis. Furthermore, it was felt that the chosen research methodology in this case should be "... *more than a mere collection of procedures, techniques, tools, and documentation aids*" (Avison and Fitzgerald, 1995:10-11).

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An additional consideration was that any chosen methodology should be based on the researcher's own philosophical stance, otherwise it simply becomes a recipe for action as described by Avison and Fitzgerald (1995:10-11). Consequently, different researchers addressing similar problems will establish different methodologies based on individual epistemological and philosophical assumptions. In the case of this particular research, the specific methodology selected was finally chosen in order to challenge current values, culture and power structures within HE settings which may not be compatible with e-Learning. Therefore, in order to arrive at a deeper, holistic and emancipatory understanding of e-Learning, it was decided that the adoption of a critical research approach, in the sense proposed by Wainwright (1997), that is, a dialectical interpretivist approach, would critically address all elements represented in the e-Learning framework (Figure 2).

### ***7.2.2 Critical Research in e-Learning***

Critical research is based on the theory and practice of interpreting and understanding human activity within social contexts. The choice of espousing a critical research in e-Learning is justified by Sanders (2006) "*as a means to counterbalance the onslaught of advertising rhetoric extolling the supposed virtues of instructional technologies*". However, the crucial reason for adopting this approach is that this type of inquiry seeks to achieve emancipatory social change by going beyond the apparent, and is intended to reveal hidden agenda, concealed inequalities and tacit manipulation occurring in complex social, political and organisational contexts Cecez-Kecmanovic (2001). Therefore, and as referred to by Nichols and Allen-Brown (1997), the infusion of e-Learning as a cultural phenomenon is an ideal field of study for critical research.

It could be argued that the implementation of e-Learning within HE settings is not necessarily guided by conscious, empirical, or theoretical knowledge about learning as much as by progressive, productive and revolutionary mentalities that may have detrimental and often unseen effects.

Historically, critical theory has its roots in the Frankfurt School, founded in 1923, and has been led by influential proponents such as Max Horkheimer, Theodor Adorno, Erich Fromm, Anthony Giddens and Jurgen Habermas. Critical research includes both dialectical synthesis and critical theory. The latter addresses the question of revealing the intentions, ideologies and reasons behind human action. While early research using this approach focused on class oppression and political issues “*developed under the historical shadow of totalitarianism and the rise of the consumer society*” (Giroux, 1983:10), more recent works have argued that focusing only on one form of oppression (class vs. race, gender, sexual preference, etc.) denies the frequent interconnections to be found between them.

Therefore and as further argued by Giroux (1983:10), current research with a critical thrust aims to promote critical consciousness and struggles to break down institutional structures and arrangements, the focus being on the “*issue of how subjectivity was constituted, as well as the issue of how spheres of culture and everyday life represented a new terrain of domination*”. The use of critical research in e-Learning aims to reveal interests and address agendas of privileged or established groups, and to enlighten investigators as to how these interests and agendas are supported or hindered by particular institutional settings, groups, designs or uses (Cecez-Kecmanovic, 2001; Nichols and Allen-Brown, 1997).



Therefore, critical research enables researchers to address oppressive theoretical stances and principles, which may be dominant at institutional and ideological levels and may constitute obstacles to successful e-Learning infusion. Similarly, critical research will address those social inequalities, which are sustained and produced by these institutional structures and deep-seated socially constructed beliefs, thus allowing for emancipatory solutions.

Within critical research, Habermas (1971:32-37) distinguished three forms of knowledge and associated cognitive interests: the technical, the practical, and the emancipatory. Each of these forms of knowledge is rooted in elemental human activities: work, symbolic interaction, and power. This research attempts to express the three different forms of knowledge in terms of understanding the relationship between societal and institutional structures and ideological patterns of thought that constrain the adoption of e-Learning and which limit innovation and opportunities for confronting and changing current practices.

Accordingly, in order to reach emancipatory knowledge and be able to propose and recommend change, this study is intended to understand the complexity of such relations. It is hoped that the knowledge developed in this research may serve as a first step toward addressing change management problems and difficulties. As an approach with a normative dimension, this research aims for a transformative and emancipatory outcome, and is not merely interested in “*knowledge for knowledge’s sake*” (Clark, 2004). To explain how the researcher in this investigation attempted to achieve this outcome, the research design will now be discussed in detail.

### ***7.2.3 Strengths and Weaknesses of a Critical Research Approach***

It is opportune that Critical Research, founded by the Frankfurt School in 1923, has risen in prominence over the last few years, as there is now some fairly recent literature discussing the merits of using this as an approach. It must be pointed out while the majority of those making use of Critical Research reside in management or business school rather than education, this does not in any way diminish its potential value within an educational management context. Yet Critical Research has both strengths and weaknesses, and these will now be examined in light of the investigation discussed here.

McGrath (2005) presents three main arguments as to why the theory of conducting critical IS research does not seem to be informing practice. She takes the stance that the methodological descriptions of many critical researchers reporting on their field studies, fail to offer any explicit and substantive distinguishing traits from those found in interpretive or positivist research. Her first argument is that although interpretivism has done much to challenge the dominant normative IS literature and practice, the understanding and rich description thus gained do not provide the whole answer and therefore, in her view, critical research offers a possibly promising approach for addressing some of the more complex and thus far intractable issues faced today. Her second point is that while some critical researchers fail to fully contemplate on their research methods because they say it makes no sense to subscribe to a normative regime that they do not believe in, this lack of reflection raises doubts in their readers' minds. Her third point is that critical researchers do not submit to publications that hold normative views, and that by failing to tackle such normative views head on, this research approach is not given the prominence it needs to be taken seriously.

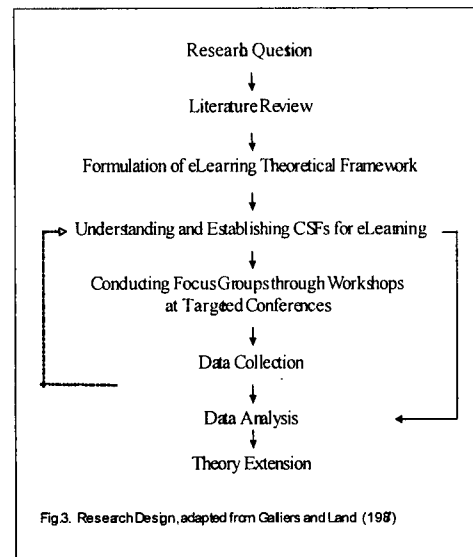
Avgerou (2005) voices two potential risks to making use of Critical Research as a methodological approach. The first is potentially misrepresenting the way the research has been carried out by revealing only the more formal cognitive aspects and failing to discuss the tacit aspects of the research process, and secondly, by not debating legitimate research results, valuable critical research results are not revealed. More seriously though, Avgerou (2006) takes the view that the current weakness of critical research does not arise from methodological unaccountability, but from the restricted contributions it has made to substantive social issues with regard to the increasing spread of ICT.

On the other hand, Walsham (2005) makes it clear that in his view, personal views are shared with research subjects at various stages and through various means, and thereby mutual changes take place. He acknowledges that these methodological attributes would apply equally well to 'interpretive research' as to 'critical research'. He therefore proposes that critical work involves being open to what participants are saying, and uses theory to explore their perceptions and the context within which they are embedded.

### **7.3 Research Design**

Since this is a study of issues that affects the successful management of e-Learning, in order to ensure that this investigation was conducted in a sound way, it was necessary to generate a sound research design. The resultant research design (Figure 3 - shown again here for ease of reference) was adapted from an original framework proposed by Galliers and Land (1987). As can be seen from the diagram, the first stages comprised the normal process of establishing an appropriate research question, and then by

conducting a corresponding literature review, an appropriate e-Learning framework was identified and established as a suitable basis for the study. The next section will describe the process of data collection and analysis through focus groups at selected international conferences.



## 7.4 Research Methods for this Study

Since an important aim was to gain a holistic view of CSFs for managing the design, development and implementation of e-Learning, it was decided that the best way forward would be to work directly with educationalists intimately involved in e-Learning. Since this investigation adopted a critical research approach, it was felt that obtaining emancipatory views from educational specialists' would be best achieved through f2f debate outside their own institutional environment. Focus group discussions are deemed to be the most adaptable approach to generate discussion and reveal diverse opinions as well as a means to collect such views.

### 7.4.1 Focus Group Research

Stewart, *et al* (2006:163) hold the view that the use of focus groups represents a flexible research tool that can be adapted to obtain information about almost any topic, in a wide array of settings, and from very different types of individuals. According to Krueger and Casey (2000:33-34), one of the situations in which a focus group study should be considered is when the research is trying to understand diverse perspectives held by different groups engaged in a particular process. Given that e-Learning initiatives

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involve a number of individuals in distinctive educational roles, i.e., management, IT and administrative staff, academics, educational systems designers and practitioners; it was felt that focus groups could provide opportunities to elicit CSFs from a number of viewpoints. In general terms, a focus group can be described as a semi-structured discussion with more than one moderator or participant, in which the direction of debate is kept under control by utilising a list of questions set by the researcher or convenor.

Merton *et al.* (1990) proposes that there should be four broad criteria for conducting focus groups: cover a maximum range of relevant topics; provide as specific data as possible; foster interaction in order to explore participants' feelings; and take into consideration participants' personal contexts. Furthermore, as pointed out by Morgan (1997:10-16), 'group' interviews differ from focus groups in that the latter specifically require participant interaction with each other. In particular, they are often formed to explore participants' personal knowledge and experiences that might have been gained in the past and to discuss issues around those experiences. With regard to the process of conducting focus group discussions, Stewart *et al* (2006:163) claim that the organization of these can be relatively highly structured or rather more loosely structured, and explain that moderators may choose to make use of visual stimuli, demonstrations, or a number of other activities in order to provide a basis for discussion.

#### *7.4.1.1 Advantages of Focus Groups*

The focus group is said to be a flexible methodology for qualitative data collection insofar as it allows researchers to examine basic ideas or plans. Morgan (1997:3) suggests that focus groups can serve either as a primary, supplementary or multi-method data collection tool. Focus group moderators can facilitate genuine interaction with participants, thus enabling researchers to use, interpret and make sense of contributors'

views. The role of a moderator is crucial to make sure that debate feels relaxed and natural, with participants having plenty of opportunities to speak openly within the limits of the focus group topic.

Focus groups serve as a research technique that collects data through group interaction on a topic determined by the researcher. In essence, it is the researcher's interest that provides the focus, whereas the data themselves come from the group interaction.

Morgan, D.L. (1997:6)

Moderators can also make use of penetrating questions to aid participants to think in more depth, and since contributors to the discussion have time to respond at greater length, they can further refine their answers. This flexibility allows the researcher to follow-up important points raised by participants or to clarify any confusion in the group. In addition, in this situation, participants are free to respond using their own expressions and turn of phrase. This is, in part, due to the fact that people feel less self-conscious when talking in a small group (4-6 participants) situation, and as a result, focus group responses can often be more comprehensive and less restrained than those from individual interviews. As a result of the relaxed atmosphere, a remark from one individual can spark off ideas in the other participants, leading them on to a lively debate, enunciating ideas about issues that would not have been forthcoming otherwise.

However, it is acknowledged that there are also disadvantages to the use of focus groups when conversion of ideas is not desirable. In fact, there are known effects of dominant voices and convergence of opinions around those voices that would be counter-productive in emancipatory research. This is discussed further in more detail in Section 7.6.2.

### ***7.4.2 Focus Groups as a Data Collection Process for this Research***

This study sought to elicit views from a wide range of educational experts, but it would clearly have been extremely expensive to try to hold f2f individual interviews with them. Thus, one justification for considering the use of focus groups was that the costs involved in collecting data could be substantially reduced. However, another more compelling reason is that it would also have been extremely difficult to fit this part-time research programme into a workable schedule of such a large number of busy academics. Consequently, as educationalists involved in the development of e-Learning were likely to attend international conferences on this subject, it was decided that holding focus group workshops within such conferences would be highly apt.

Additionally, it was anticipated that each workshop would attract somewhere between fifteen to twenty five participants, allowing the formation of between four and six break-out groups with four to six individuals in each group, thus enabling the researcher to collect a wide range of empirical data from academics with minimum costs all round. By conducting these participative conference research workshops, it was felt that it would be possible to spend less time on trying to personally recruit respondents and preparing the workshop setting, and to spend rather more time on organising the format of the focus group session, i.e. producing scene setting presentations and drafting probing and meaningful questions based on the e-Learning framework.

With regard to the process of data collection, as Stewart *et al.* (2006:5) explains, because of the flexibility offered by focus groups, researchers who adopt this approach as a means of data collection have often modified data recording techniques to meet their own research aims. In order to overcome the potential disadvantage of 'dominant

voices' in this research, it was decided that rather than carrying out a tape or video recording of participants' interchanges during the group discussions, responses from participants would be recorded on an individual response sheet (Appendix 1). These response sheets were structured to elicit views around the key areas identified in the e-Learning Framework. However, there was also an open-ended section for responses that did not fit under these headings. The completed response sheets were duly collected by the moderator at the end of the session.

## **7.5 Essential Research Considerations**

### ***7.5.1 Research Validity***

Validity can be defined as 'truth' or 'soundness' (Barnhart, 1972:2295). In other words, it is meant to be something supported by facts or authority, and free from defects or errors in reasoning. This implies complete objectivity, but given that that the researcher plays a critical role in the process of deciding which option to take in any research, the question has to be asked whether this can really be achieved in any research approach. According to Knight, (2002:9-11), the questions asked and the answers sought by researchers are inextricably linked with value constructs of the person or persons carrying out the investigation. Maxwell (2002) concurs, noting that:

“As observers and interpreters of the world, we are inextricably part of it; we cannot step outside our own experience to obtain some observer-independent account of what we experience.”

(Maxwell, 2002)

This effect is particularly noticeable in qualitative approaches, when adopting the position of participant observer, where researchers, in the same way as their subjects, can be seen to hold attitudes, beliefs and values that may well affect their views of the



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'data' they have collected. Within focus group discussions, having necessarily become part of the group as facilitator, it is understandable that the researcher's presence is likely to have some sort of effect on both the results and on the data (Punch, 1986:15). In this situation, Punch (1986, 15) believes that researchers should not only clarify the nature of their relationship with the research setting and with the 'subjects' of the investigation, but need to describe how and where the data was collected, how reliable and valid it is thought to be, in addition to revealing the successive interpretations placed on it by the researcher.

Indeed, it is essential in qualitative approaches, just as in quantitative research, to select ways to collect convincing and accurate data, i.e. that data collection methods are relevant to the research question and will generate acceptable data. Just as important, is to analyse the results in a rigorous fashion, and to draw relevant inferences which will provide new insights into what underpins successful e-Learning. Punch (1986:28) notes that:

“a sophisticated and self-critical reflection on the nature of the research enterprise should [...] not only serve to strengthen and illuminate the foundations on the craft tradition in fieldwork, but also help to shed light on the social, moral, and political processes through which social science gets conducted”.

(Punch, 1986: 28)

Therefore, for research to be of any significance or value, it is not only vital to approach the study in a systematic fashion, but it is crucial to apply meticulous and concrete reasoning to any data collection and analysis methods that the researcher has chosen to adopt. To that end, it is important to look at how validity might be achieved.

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Silverman (2000) advocates one view of validity where researchers attempt to achieve more valid findings through the use of five interrelated concepts. The first of these is the *refutability principle*, where researchers seek to disprove their initial assumptions about data. The second is the *constant comparative method*, where attempts are made to find other cases through which to test provisional hypotheses. The third is *comprehensive data treatment*, where all data (no matter how seemingly trivial) are included in the analysis. The fourth is *deviant-case analysis*, where analysis is carried out iteratively to derive a small set of recursive rules that incorporate all data in the study. Finally, *using appropriate tabulations*, i.e. making use of quantitative methods to survey the whole corpus of data which could be lost in intensive, qualitative investigations. However, all of these concepts are strongly associated with positivist research and were therefore not thought to be appropriate in this particular investigation. On the other hand, Maxwell (2002) suggests an alternative framework which includes five broad categories of validity relevant to qualitative researchers:

1. *Descriptive validity*, where there is a necessity for a framework to resolve disagreements about taken-for-granted ideas about time, space, physical object, behaviour and perceptions of these;
2. *Interpretative validity*, where inference, drawn from words and actions of participants meaning, must be treated as potentially fallible;
3. *Theoretical validity*, which in addition to a description or interpretation, requires explanation;
4. *Generalizability*, where findings related to persons, events, and settings are related to those that were not directly observed or interviewed or might be indicative of other communities, groups, or institutions; and finally,
5. *Evaluative validity*, where the accuracy of findings is critically judged.

Of relevance to this interpretivist research, is Reed and Roskell Payton's (1997) opinion of what a focus group is "... *the process of developing a group perspective or position among a particular set of people*". These group perspectives and positions are subject to change over time, so in order to establish validity in this research, Maxwell's framework seemed more appropriate and therefore efforts were made to focus on descriptive, interpretative and theoretical validity as described above.

However, since the value of information is gauged more frequently by the ability to draw valid conclusions about the topic than an ability to replicate findings across a number of groups (Stewart and Shamdasani, 1990), only a limited attempt was made to generalise findings, i.e. to establish *what is*, *what may be*, and *what could be*, as described by Schofield (2002). Finally, evaluative validity, where the accuracy of findings is critically judged, is seen as central to Critical Research and therefore Chapter 9 is devoted to a critique of the current state of e-Learning within HE.

### ***7.5.2 Reliability of the Research***

Reliability, relating to both the research methods used and the interpretation of the data, is another important consideration in research. In conventional terms, Kidd and Parshall (2000) explain that reliability implies stability, equivalence, internal consistency, or dependability. As a means of testing for stability, it may be useful to ask the participants to rank a group of related issues in order of importance (Kidd and Parshall, 2000). Equivalence is mainly an issue when multiple moderators or coders are used (Kidd and Parshall, 2000). In this case, difficulties may be caused by inconsistent interpretation or changing criteria for analysing data half way through the study, but

failing to acknowledge the implications. Internal consistency is greatly enhanced if one researcher has the primary responsibility for conducting the analysis and participates in as many groups and debriefings as possible (Kidd and Parshall, 2000).

Other problems may occur if conditions in which information is collected are allowed to change in some way that may affect the data. Silverman (2000: 188) believes that *“for reliability to be calculated, it is incumbent on the scientific investigator to document his or her procedure and to demonstrate that categories have been used consistently”*.

In this investigation however, by making use of the same framework and response sheet in each of the four workshops, it was considered that a reasonably high degree of consistency could in fact be achieved.

### **7.5.3 Research Ethics**

Although not an obligation at the inception of this research, due to changing attitudes within the research community towards eliciting data from human sources, it was felt necessary to consider research ethics in respect of requests for personal and professional confidentiality. Burbules (1992) regards educational research as engaging persons in a process that is directly responsive to their understandings and situation, i.e. *“directed toward the modification of systems of belief and value, but as a dialogue within which all parties can expect to be considered with respect and reciprocity”*.

Thus, if the aim is to discover underlying causes for events, and particularly when dealing with human subjects where outcomes may reflect back on participants, researchers need appreciate that such individuals taking part in investigative studies

have a right to comment on, amend or withdraw their contributions. For this reason, all participants in this investigation were told that the focus groups formed part of a larger research project, and were provided with an opportunity to examine the data collected before analysis and final publication, although none chose to alter or remove their own information from the study.

## **7.6 Limitations of this Research Design**

At the time that this research was being formulated, there was no significant holistic research in the field of e-Learning. Additionally, there was a noticeable deficiency in the choice of an appropriate theoretical proposition upon which strategy-makers and practitioners in HE could base decisions for effective design, development and delivery of e-Learning, and it was intended that this investigation should go some way toward addressing this state of affairs. However, it is fully appreciated and acknowledged that the approach and methods adopted for this research have limitations, and these will now be discussed in further detail.

Quite aside from the normal restrictions associated with carrying out a part-time PhD research study, i.e. time and resource limitations, one particular obstacle for this study that had to be overcome was the difficulty in applying what is normally thought of as a business technique (i.e. CSFs) to the rather more academic environment of HE.

However, from the literature, it would seem that many other researchers have deemed this to be an eminently suitable tool for investigating other unrelated educational research questions.

The decision to hold focus group discussions within international e-Learning conferences made it possible to bring together a greater number of professionals with suitable backgrounds had had already decided to come together and enabled a productive discussion around the topic of e-Learning. However, as the use of this data collection method can introduce an element of bias, the question of partiality will now be discussed.

### ***7.6.1 Partiality***

In this investigation, there were indeed some limitations identified as being associated with the use of a focus group approach. The argument against the use of focus groups is that potential insights held by those outside the constructed sample will not be heard and taken into consideration in the final analysis. There is a possibility of partiality and of potential constraints resulting from the sample attending each of the four workshops. As the respondents themselves chose to attend the focus groups, i.e. the participants were self-selected insofar as they chose to firstly to attend these particular conferences and secondly to attend these workshops, they cannot definitively be said to represent the population from which they were drawn. Therefore, in this research, the data collection method can be described as purposive sampling, and whilst it is acknowledged that this may not represent the same degree of accuracy as might have been achieved with more quantitative methods, it is felt that greater insights have been achieved.

### ***7.6.2 Dominant Voices***

Another factor that may be considered an issue is that of uneven group dynamics. In this regard, Krueger and Casey (2000:111-112) acknowledge that where there are dominant voices within a group, it is possible that less vocal participants will not be able

to have their say. However, a justification for adopting a critical approach in this research was that since participants were less likely to be well known to each other, established hierarchies within their familiar settings (i.e. outside their own organisation) would be less of a problem, thereby giving an opportunity for individuals to speak up without fear of repercussion. The use of the individual

Consequently, in accordance with focus group guidelines, a decision was made to keep the focus groups fairly small (four to six individuals), and given that the audience was composed of professionals within academia who are often more willing to vocalise their own views, the issue of dominance was therefore not seen as a major difficulty. In order to ensure that all views were captured, every participant was given a response sheet so that individuals could record their own personal perspective at the end of the session, rather than just accept the opinions of the principal actors.

### ***7.6.3 Competence of Moderators***

Focus groups may be over-reliant on the moderator's competence because his/her ability to lead a focus group interview determines its outcome. However, the role of the moderator is to observe discussions and diplomatically manage conversations before they get out of hand, rather than explicitly direct the conversation (Krueger and Casey, 2000:100).

Thus, structured questions guide respondents in the right direction, but without allowing participants to over-generalise or stray from the issues in question.

Accordingly, moderators have to be sufficiently skilled to:

1. know when to stimulate discussions;
2. ask appropriate questions;
3. steer discussion away from unrelated topics when required; and,
4. encourage all participants to engage in the debate.

In this research, it is thought that with these points properly observed, the situation where the moderator becomes a 'variable' in the research process was minimised.

#### ***7.6.4 Environmental Concerns***

However, it should be noted that the problem of bias is not confined to focus groups, and indeed can also be found in many other research methods. In this study, an attempt was made to achieve balanced feedback from the focus group respondents. Therefore, in order to try and reduce the possibility of bias in this investigation, it was decided to collect data in as comfortable and stress-free environment as possible, whilst the moderator attempted to avoid imposing solutions in order to allow participants to make up their own minds as to the fundamental issues that contribute to the success of e-Learning. Although a general criticism of focus groups is that in some topic areas over-analytical discussions may occasionally result, in this research it was actually desirable and was therefore not considered to be a major obstacle.

#### ***7.6.5 Merits of the Chosen Research Design***

From the outset, it was clearly understood that taking an interpretative approach can be beset by many difficulties and in some ways was probably the harder approach to take. However, it was also recognised, given that numerous researchers would be conducting investigations into various aspects of e-Learning in similar and allied fields, that it was necessary to identify a unique perspective for this study. It was strongly believed that



eliciting research data purely in the form of figures or statistics would not provide the new perspectives and insights being sought and that quantitative research would not reveal underlying CSFs as affected by attitudes, beliefs or judgements held by key stakeholders within the complex environment of HE. In an attempt to make this investigation more meaningful, the research method had to take a holistic and methodological approach that would consider the processes for designing, developing, implementing and delivering successful e-Learning.

By going further and adopting a critical research approach, it could well be possible to provide the necessary emancipatory social change by going beyond the apparent and stepping out of institutional contexts in order to reveal hidden agendas, concealed inequalities and tacit manipulation that normally occur within complex social, political and organisational environments. Through making use of focus group discussions, it was felt that it would be possible to collect data on the topic determined by the researcher, while group interaction would provide opportunity for dialogue, yet still allow opportunity for reflection for individual responses. Indeed, the individual reflection and opinion is where the researcher expected to find the emancipatory contributions. The focus groups in this research aimed at generating discussion but not at convergence of ideas. Therefore, the research was designed to provide individuals an opportunity to voice their own concerns and express their personal opinions through the form of an individual open response sheet as discussed in Section 7.9.2.

## **7.7 Method for Analysing Data**

After extensive reflection, it was decided that it would be appropriate to adopt thematic analysis for organizing the raw focus group interview data, since this approach for

analysing data has been said to be a natural and frequently used methodology in a variety of such disciplines as educational research (Kaufman, 1992). Items identified through the thematic analysis as being relatively close to one another, as described above, will be grouped and coded as clusters. These clusters are defined as sets of related CSFs brought together by the interviewees from across organizational boundaries into a grouping that makes sense to them as practitioners. Furthermore, to define a set of e-Learning CSF concepts, ontological analysis (Gruber, 1993) would signify and provide a knowledge representation of the connections between these concepts, while a visual representation would illustrate the resultant research findings in an accessible form for the concluding discussions.

It is then intended that these results should be visually represented in a Conceptual Thematic Cluster Map. Although such representations will necessarily be a considerable simplification of the research results, it will be useful to illustrate the final interpretations which have been derived through a complicated cognitive process. As this study is essentially based on a qualitative research method, the visual depiction of CSFs will be used to provide a conceptual representation rather than looking for statistical significance and will attempt to illustrate meaning rather offer generalizability as described by Kunkel *et al.* (1999).

Therefore, in the overall category of CSFs, a cluster here is a subset of CSFs, within the overall universe of e-Learning, which are closely related to one another, and relatively far and separated from other CSFs. The next section will now discuss the data collection and analysis process in more detail. The next section will begin with an explicit outline of the aims and objectives of the e-Learning CSF workshop, which will be followed by a detailed description of the data collection process. Subsequent to this,

a comprehensive report of the data analysis will be provided, and finally a representation of the findings will be proffered.

## **7.8 Aims and Objectives of the CSF Conference Workshops**

These research workshops were intended to attract educational experts dealing with e-Learning within HE, from a wide range of administrative and academic roles, to discuss and debate how well HE staff, both academic and administrative are coping with changes being incorporated in learning and teaching in the form of e-Learning.

Accordingly, within each call for participation (CfP) in this workshop, it was pointed out that some degree of heterogeneity was desirable so that discussion coming from participants with different backgrounds and points of departure could be established and encouraged. Some of the more general questions that were explored in these sessions were as follows:

- How effective has the introduction of new IT technologies in its many forms been?
- How well are staff coping the changes they are required to make to effective use of IT?
- Does the use of technology actually allow HE to widen access to include students who would not formerly have participated?
- Is the promise of e-Learning really fulfilling the hype?
- How can the use of technology be changed to be more effective?

## **7.9 Process of Data Collection**

As stated in the research methodology chapter, in order to collect the data required for this study, it was decided that the most effective way to do this would be to submit proposals for workshops in international e-Learning conferences. Given that during the data collection period, e-Learning expertise in HE was still confined to a relatively small number of educationalists, i.e. educational practitioners, researchers,

administrators and technologists, the best way of bringing these experts together was seen as being through specifically targeted workshops within conferences.

Since these groups are generally the most active drivers of e-Learning in HE, it was decided to select conferences that would attract participants from each of these broad groups. Moreover, since the knowledge being sought was to have an emancipatory nature, it was felt that having participants from different cultural backgrounds, as well as having a varied institutional and academic ethos, would be beneficial for the investigation. In contrast with conventional quantitative research, cohesion and consistency of the sample is not paramount in critical research. This homogeneity is not even desirable in a study that aims at obtaining emancipatory and transformative knowledge.

Furthermore, following the review of the literature, it was concluded that the majority of e-Learning problems and opportunities facing educationalists internationally would not differ substantially from those faced by colleagues in the UK so it was also decided not to limit the choice of conference to this location.

Thus, after much consideration and debate, it was decided to conduct these focus group interviews at widely dispersed e-Learning/educational technology conferences, and hoped to attract between 15-25 participants in each of four separate workshops. To that end, groups of interested and experienced e-Learning educationalists (practitioners, academics, researchers and educational specialists) attending these events were invited to come together in four international conference workshops in order to discuss CSFs relating to issues within the context of the e-Learning.

The 1<sup>st</sup> focus group was held at the Association of University Administrators Annual Conference in Southampton, UK (*AUA 2002*). There were twenty two participants at this event and attendees were, by and large, either in managerial or administrative roles within their institutions.

The 2<sup>nd</sup> focus group was held during E-Learn in Montreal (*E-Learn 2002*), and twenty five participants registered for the workshop, the majority being interested in Instructional Design.

The 3<sup>rd</sup> focus group was held during the International Conference on Advanced Learning Technologies in Kazan, Russia (*ICALT 2002*), and many of the twenty two participants at this event appeared to have a significant interest in the technological aspect of e-Learning.

The 4<sup>th</sup> and final focus group was held during the International Conference on Computers in Education Conference in Auckland, New Zealand (*ICCE 2002*), and the twenty registered participants seemed to be interested in enhancing student learning through technology.

Each workshop was therefore designed to specifically explore and elicit what researchers and practitioners considered to be the most significant CSFs were in relation to the five key aspects of e-Learning as presented in the expanded e-Learning Conceptual Framework (Figure 2) set out in Section 1.6.

### ***7.9.1 Structure of the Workshop Sessions***

The strategy for data collection and exploration of participants' views in each workshop was devised in several stages. At the start of each workshop, participants were familiarised with CSF Analysis (Rockhart, 1979) as a management research method for identifying factors that are required for an organisation to thrive and cope with change. This was followed by a brief presentation to present the e-Learning conceptual framework for the implementation of online learning shown in Figure 2.

The next phase of each workshop consisted of presentations by on behalf of the authors of the five 20-minute position papers which had been a requirement by conference organisers in order to be able to offer the workshop. Each of these five papers was correlated to organisational infrastructure; enabling technologies; curriculum development; instructional design; and finally to course delivery.

The starting point for the focus group discussions was a theoretical stance as presented in these position papers. These papers were intended to propose theoretical views of what CSFs for each of the distinctive themes of the framework might be. Presentations corresponding to these position papers were then made to the participants in order to further elaborate CSFs proposed within each individual topic area. The rationale behind this is that it is not possible to discuss or negotiate a complex phenomenon like e-Learning, unless a degree of commonly accepted pre-understanding has already been established. This, coupled with the systematic processes of facilitated group dynamics and negotiation of meanings, was intended to enable deep understanding of the data (Franklin and Bloor, 1999) and so that the participants could have the opportunity to form a "common will discursively" as described by Habermas (1971:37).

In terms of this research, the first objective was to establish this pre-understanding through initial position paper presentations which were correlated to each of the five aspects of the e-Learning framework presented in Figure 2. The main part of the session was in fact set aside to form focus groups. In essence, this was the most important part of the workshop and was intended to enable participants to discuss a considered response to the position papers in relation to their own experiences. In order to achieve a full debate between participants, group members were asked to divide into small workgroups of four to six people and were then invited to discuss and negotiate their own views among themselves. However, discussion was not strictly limited to the theoretical arguments as highlighted in the position papers, and participants at each workshop were, in addition to organizational, technological and human factors that may have been mentioned in the presentations, encouraged to further propose and explore supplementary facets, such as implementation, risks and quality standards.

The rationale for this format and subsequent analysis of data collected was devised in accordance with a critical research approach as previously discussed, and it was necessary to try to ensure that the setting of these group interviews was conducive to socially negotiated, transformative and emancipatory outcomes.

Once participants had completed group discussions around the various e-Learning issues, they were then asked to draw up CSFs related to each aspect of e-Learning implementation from their own perspective in the tabular form provided and to submit these to the workshop organiser for analysis and eventual dissemination.

However, it should be noted that although the form provided space to comment on the five main areas outlined in the e-Learning framework, participants' were also

encouraged to add any additional comments that lay outside this framework in a sixth box and to use the other side of the sheet if needed. Finally, each workshop was concluded by all participants rejoining a plenary discussion, moderated by the researchers, where they were invited and encouraged to engage in further discussion and the gathering of any additional comments.

### ***7.9.2 Elaboration of the Focus Group Data Collection Process***

Since this research as presented in this thesis is essentially qualitative and exploratory, the questions posed to elicit data from focus group participants were totally open-ended, aiming at enabling total freedom of expression and individual formulation of opinion of their principal CSFs, within each category of the conceptual e-Learning framework.

The results from participants at all the research workshops (AUA 2002=15, E-Learn 2002=17, ICALT 2002=22, and ICCE 2002=20, i.e. 75 respondents in total) were thus gathered through the open-ended structured response sheet (Appendix 1) which had been filled in by each individual participant at the end of one of the focus group discussion session as outlined above.

Subsequent to each event, all participants who had provided contact details during the workshop were contacted to allow these focus group members the opportunity to validate, change or even to take the option of withdrawing their own data submitted at the end of each workshop. However, only two participants who had submitted their CSF questionnaire clarified their data and no one opted to withdraw.



The research design, as outlined and described in Section 7.3, represented an effort to try and instantiate a critical research process using focus groups and this design was successfully used to guide and support the data collection in this research. Once the CSFs were elicited from the workshops' focus group participants, the analysis of the data collected commenced and the next section will present the analysis of this data.

### **7.10 Strategy for Data Analysis in this Research**

The purpose of analysis in this research was to identify similarities within the professional practice that emerges from e-Learning. The raw data collected from each focus group participant formed the initial basis for the analysis of e-Learning CSFs as proposed by the participants. Since this research intended to bring to light characteristics relating to the successful implementation of e-Learning, it was essential to use an analysis method that befitted this aim.

Therefore the primary method chosen to identify the emergent principal e-Learning CSFs in each category was a form of thematic analysis (Onwuegbuzie, 2003). In this sense, themes are detected through a process of "bringing together components or fragments of ideas or experiences, which often are meaningless when viewed alone" (Leininger, 1985:60). Thematic analysis is said to allow the recognition of patterns that formed identifiable themes (Aronson, 1994). However, due to a deliberate choice of open-ended responses, and in order to identify the patterns that would then emerge, it was decided that a process of selective coding would have to be applied to synthesise findings and establish relationships between the different codes identified. This process could then be used to allow the distillation and characterisation of ideas that could be better understood.

The concept of selective coding in this research was adapted from Grounded Theory as proposed by Strauss and Corbin (1998:145), whereby the researcher “*constructs . . . a set of relational statements that can be used to explain, in a general sense, what is going on*” (Strauss and Corbin, 1998:145). It should be noted that this does not at all imply that this is a ‘Grounded Theory’ study which involves concurrent data collection and analysis; it merely means that the concept of selective coding will be used in order to interpret and understand data in the open-ended responses and that the various code clusters will be treated in a selective fashion.

In this sense, selective coding involves the *integration* of the categories that have been developed to form the initial theoretical framework (Pandit, 1996). Additionally, selective coding was used in this study to identify the properties, conditions, and relationships between the emerging concepts and categories at each stage of data collection (Dearnley, 2003). This selective coding process implies first the choice of one category to be the core category, and then to relate all other concepts to that category.

Once the e-Learning CSFs in each category were identified, they could then be grouped in thematic clusters, grouped according to their similarity to this main category. For this to be helpful to both academics and practitioners when devising e-Learning strategies, it was felt best to try and begin with the most *generic*, move to the *shared* and then progress further down to the *specific*. In the context of this research, a thematic cluster is defined as a subset of CSFs within the overall universe of e-Learning, which are closely related to one another and relatively far and separated from other CSFs (McPherson and Nunes, 2007).

However, after careful consideration of the various ways that the data in this research could be analysed, it became apparent that thematic clustering CSFs for e-Learning through the selective coding process on its own would not be sufficiently robust.

Accordingly, it was decided that a further stage was required and that CSFs identified in this research would be best represented using an ontology as defined below:

“An ontology defines a common vocabulary for researchers who need to share information in a domain. It includes [...] interpretable definitions of basic concepts in the domain and relations among them.”

Noy and McGuinness (2001)

The term “ontology” has its roots in Greek philosophy and was used to refer to the branch of philosophy dealing with the nature of reality. Ontologies are now frequently used within the domains of computer science and information science to refer to a data model that can support information exchange across various networks (Fensel *et al.*, 2001), and associating ontology with Artificial Intelligence, Gruber (1993) characterized an ontology as a specification of a representational vocabulary for a shared domain of discourse, i.e. definitions of classes, relations, functions, and other objects.

Gruber’s (1993) definition of an ontology as an explicit specification of a conceptualization is drawn on in this particular research to express the common vocabulary in which shared knowledge is represented.

Yet, in this research context, the ontology is not being used in the philosophical sense of ‘the study of being or existence’, nor is it being used in the strict sense of providing a representational vocabulary for data modelling. In contrast to use of the term as described above, ontologies are also often developed (Noy and McGuinness, 2001; McPherson and Nunes, 2006a) in order to:

- Share common understanding of the structure of a particular subject domain;
- Enable reuse of domain knowledge;
- Make explicit domain assumptions underlying a change process;
- Separate the general domain knowledge from operational knowledge;
- Analyse domain knowledge and establish relationships with other ontologies or re-use existing ones by extending them.

In this study, ontology is being used to provide an interpretation of what the collective view of what CSFs for e-Learning might be to signify a set of e-Learning concepts and to provide a knowledge representation of the connections between these concepts. Accordingly, once the participants in the various focus groups submitted their individual CSFs for e-Learning, the analysis consisted of looking for taxonomic relationships within the various responses provided and to allow knowledge representation of the results which will be easily understood and be meaningful to stakeholders considering the design, development, implementation and delivery of e-Learning within HE contexts.

Furthermore, in order to reveal explicit, declarative and strategic knowledge, the results from the focus group discussions regarding e-Learning were analysed using iterative selective coding to create this CSF ontology. For this research it was decided that a multi-tier ontological model should be used (Kabilan *et al.*, 2003:692) which enables a stratified representation of information showing interdependencies and relationships between the components.

## 7.11 Description of Data Analysis Process

At the end of each of the research focus groups, all the participants' individual response sheets were collected and all statements were coded according to the research workshop from which the response had been elicited and integrated into a master list. Once a full master list had been compiled, all of the workshops' results were then manually separated and physically redistributed into thematically related groups according to each category of the e-Learning Framework (as proposed in Figure 2). To cluster a set of CSFs thematically is to identify similarities within the professional practice that emerges from e-Learning (McPherson and Nunes, 2007). As mentioned before, in the case of this analysis, selective coding was used to identify sets of related CSFs brought together by the interviewees from across organizational boundaries into a grouping that makes sense to them as practitioners, which could be of use for both academics and practitioners when devising e-Learning strategies.

Table 3 gives some idea of the breakdown of the e-Learning CSF statements provided by the 75 respondents during all four CSF workshops:

CSF Category	<i>No. of Statements</i>
Organisational Issues	245
Technological Issues	241
Curriculum Design Issues	209
Instructional Systems Design Issues	178
Delivery Issues	204
Other Issues of Professional Importance	49
Total	1118

Table 3. e-Learning CSF Statements

However, during the application of the selective coding process, it was found that a

number of responses replicated or duplicated one another, i.e. from time to time a number of interviewees identified identical issues, and on other occasions, the same interviewee referred to the same CSF more than once in his/her response by rearranging words with different emphases. In order to remove repetition of ideas and concepts, it was decided to apply the following rules:

- CSFs that had a frequency of at least two were retained.
- CSFs that were very similar (i.e. with slight variations in wording) were merged.
- CSFs that were mentioned only once, but were nonetheless thought to be important to the domain of e-Learning, were retained.
- Single CSF statements that contained multiple and independent CSFs were separated.
- CSFs that were exact duplicates were eliminated.
- CSFs that were completely unrelated to e-Learning were eliminated.

As a result, the thematic identification and formulation of the individual CSFs was made by iterative coding of similar terms and ideas in the responses of interviewees. For example, although there were many references to “money” as an issue (rule 5), this was included as one statement. Accordingly, it can be seen that frequency of terms or repetition of ideas and concepts were given no particular relevance.

Thus, the process of clustering here is not a quantitative one derived from descriptive statistics, such as that used by Wopereis *et al.* (2005) in this same context, but has in fact resulted from a qualitative coding approach aiming at an ontology built through an inductive process.

## 7.12 Conclusions

In the next section, the research findings will be presented in accordance with this data analysis strategy. However, once the thematic analysis using iterative selective coding and ontological representation was been carried out, it was decided that it would be extremely useful to summarise the resultant CSFs in each of the five framework categories visually to give researchers a succinct view of the findings. Thus, although these diagrams were created as a result of the analysis, for presentational purposes, the ontologies for each area (presented in tabular format) will be preceded by a visual representation that sums up how educationalists and developers construe the various e-Learning CSFs categories. These summaries will help set the scene and will be used to discuss the e-Learning CSFs identified.

## 8 Research Findings

The research findings discussed in this chapter describe CSFs that have a strong impact on the design, development and delivery of e-Learning. All the findings of the research were analysed in accordance with the strategy set out in the last chapter.

In conducting this analysis, the main CSFs were initially identified through thematic analysis of crucial issues as indicated in statements made by focus group interviews with practitioners, administrators and academics relating to the five categories identified in the extended conceptual e-Learning Framework (Figure 13), to which typical knowledge required has been added (McPherson and Nunes, 2007). This is a graphical representation and abstraction of the literature review presented in Chapters 2-7 and forms the first output of this study.

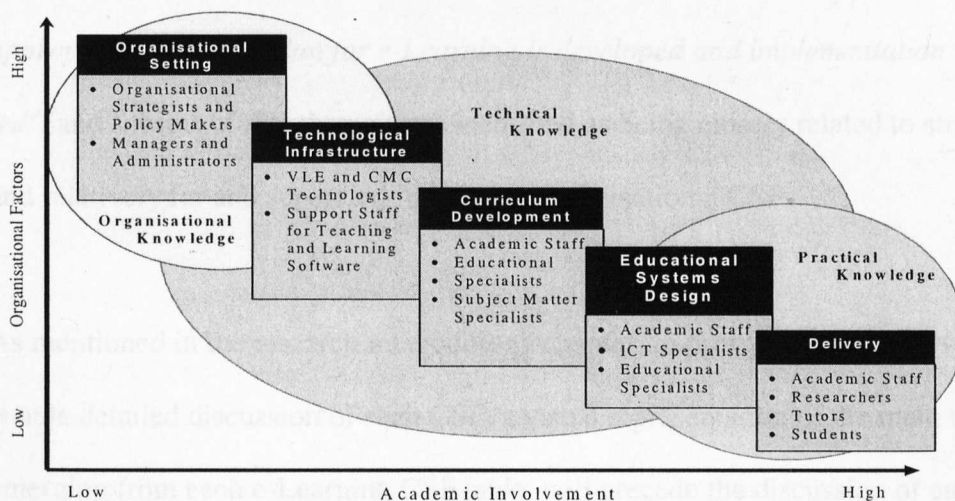


Fig. 13 - e-Learning Framework further developed and indicating typical knowledge required

In the context of this analysis, thematic clustering was carried out isolating similarities and differences of key issues within a particular aspect of e-Learning as identified by participants emerging from their own professional practice. Thus, these sets of CSFs come out of participants' groupings that were originally brought together from across organizational boundaries and which made sense to them as practitioners.



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## 8.1 Presentation of Findings

The analysis of the data revealed a total of 1,124 statements of interviewees' main CSFs. In order to keep track of the data, responses were initially colour coded according to the workshop to which the contribution had been made. The data from all workshops, which had already been grouped into the five framework categories by respondents, were then merged. Using the rules set out in 7.11, the selective coding was implemented and thematic analysis carried out. Gradually, a clear pattern began to emerge, and the various CSF clusters around each of the framework categories which arose through this process were then separated into relevant sets. The main CSFs were then inserted into a table, and associated issues connected with that CSF further divided into sub-sets and rephrased as questions. For instance, in terms of the overall set of 'e-Learning Organisational Issues, one CSF was identified as "*Ensure that an appropriate strategic plan for e-Learning is developed and implementation is properly led*", and subsets of this theme were identified as being closely related to strategic issues and relatively far and separated from other organisational CSFs.

As mentioned in the research methodology chapter, to provide a clear overview and to enable detailed discussion of each CSF, a visual representation of the main themes emerging from each e-Learning CSF table, will precede the discussion of each of the five framework categories. In this diagram, each of the top-level CSFs identified has been numbered to link this to subsequent discussions. These, along with their corresponding 2<sup>nd</sup> level sub-themes, have also been colour coded to differentiate and distinguish them from neighbouring CSFs. Third and fourth level sub-themes are not included in this diagram, but are included in the tabular format which will follow to allow more detailed discussion in each relevant section.

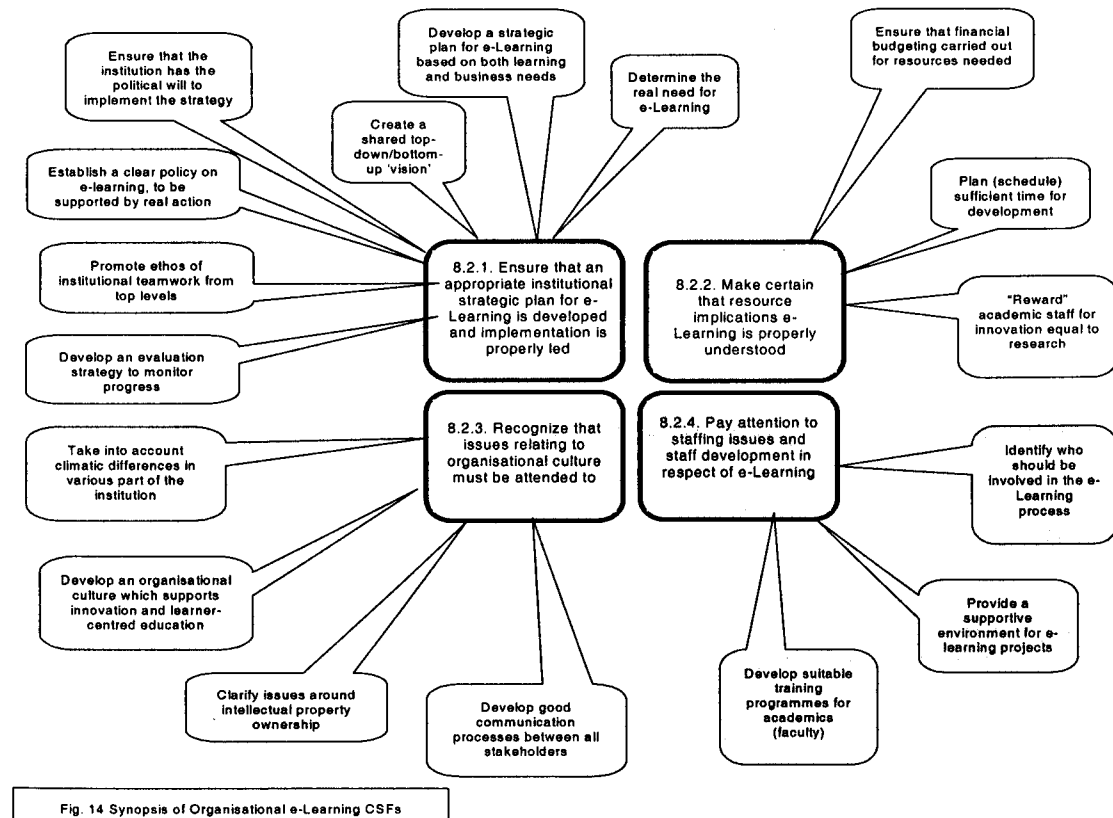
## **8.2 Organisational CSFs for e-Learning**

Under the framework category relating to organisational issues, a total of 245 statements were received from participants. After merging the cluster analysis diagrams for the different workshops, it became apparent that participants had included statements here that could be said to more rightly belong in another category. Therefore, in order to maintain clarity, issues related to technology, design and delivery have been moved to the appropriate group. The detailed description emerging from this research is therefore much more discrete and allows for a more pertinent discussion of relevant issues. This is intended to help researchers understand how organisational issues need to be dealt with to secure e-Learning success.

The analysis of responses, as presented in this section, clearly showed that the organisational CSFs were not neatly bounded by this framework category. Practitioners appeared to have difficulties in separating their views into the strict categories presented to them in the focus group interviews. The interviewees expressed their experiences, difficulties and opinions according to the factors that affect their practice. Using the thematic analysis described before, these have been distilled into the following four CSFs:

- 8.2.1 Ensure that an appropriate institutional strategic plan for e-Learning is developed and implementation is properly led
- 8.2.2 Make certain that resource implications of e-Learning are properly understood
- 8.2.3 Recognize that issues relating to organisational culture must be attended to
- 8.2.4 Pay attention to staffing issues and staff development in respect of e-Learning

As stated in 8.1, the tabular findings for each of these CSFs will be preceded by a visual representation to give a clear image of the key delivery issues and their associated sub-themes. The visual depiction of the main themes emerging from the e-Learning CSFs identified for ‘Organisational Issues’ can be seen in the diagram as shown in Figure 14. Discussion of each CSF will be followed by a table showing greater detail.



## 8.2.1 *Ensure an Appropriate Institutional Strategic Plan*

### 8.2.1.1 *Determine the real need for e-Learning*

Many authors have identified the necessity to carry out a “needs analysis” before embarking on the development of an e-Learning module, course or programme. As students are inseparable from any educational process, it may seem obvious that careful consideration of their learning needs and intended outcomes, as well as managing expectations, would be identified as fundamental to the success of e-Learning.

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### 8.2.1.2 *Develop a strategic plan for e-Learning based on both learning and business needs*

The respondents felt that creating an e-Learning strategy, based on learning and business needs, was crucial to success. Such a strategy often sets out the institutional vision through a mission statement, institutional values, and provides guiding principles.

Whilst it is recognised that rhetoric and practice may not necessarily be aligned, it is helpful to at least try to establish a shared view of established traditions or institutional aspirations. Strategy should not be simply used as a bureaucratic tool for accounting purposes, but should help to formulate a unified endeavour in a given direction that will benefit both the institution and the students it serves.

### 8.2.1.3 *Ensure that the institution has the political will to implement the strategy*

This issue is critical as a strategic plan does not transform itself into action without the will to implement it. Yet, while it is thought that HE institutions should aspire to political openness, in practice this is extremely difficult in such a complex body. There are many competing interest groups and HE has a history of academic autonomy. An additional point made was that HE is “[...] *influenced by government policy (and funding) and this has to be taken into consideration*” (11/ICALT 2002).

### 8.2.1.4 *Create a shared top-down / bottom-up ‘vision’*

The respondents felt that a common management vision should be established. In this regard, it is essential that departments, academics, and researchers align their efforts with organisational mission and vision, as well as with national and organisational strategies and policies, within existing funding and available resources. There was a desire for “real commitment from university – not only financial” (5/AUA 2002).

They also wanted genuine shared leadership of e-Learning initiatives. Finally, a strategy that has not been properly disseminated will be woefully unsuccessful as the different

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members of the institution will not share aims and objectives if they are totally unaware of what these might be.

#### *8.2.1.5 Establish a clear policy on e-Learning, to be supported by real action*

In line with the previous point, respondents felt that an institutional policy statement committing to this form of teaching should be released. It was considered that a mission objective should be set to foster and support online learning. In this regard, it was thought important to align departmental strategies for e-Learning projects with that of the top level strategy. It is therefore unsurprising that interviewees identify “the university’s” leadership, support, willingness to provide funding as well to recognise and reward achievement as critical organisational factors.

#### *8.2.1.6 Promote ethos of institutional teamwork from top levels*

Connected with the issue of real action, respondents thought that promotion from on high of teamwork in institutions was essential. It was felt that appropriate user consultation should be carried out at all stages in order to achieve full involvement, not least of which is that of academic / faculty participation.

#### *8.2.1.7 Develop an evaluation strategy to monitor progress*

If an evaluation strategy is to be useful, it is necessary to ensure that there is a willingness to accept input from all parties. Thus there has to be a mechanism in place to ensure input from all stakeholders.

#### *8.2.1.8 Synopsis of strategic planning issues*

This particular point raises the issue that respondents felt that it was the institution’s responsibility to ensure that an appropriate institutional strategic plan for e-Learning is developed and to make sure that any subsequent implementation is properly led.

Table 4 reveals respondents’ concerns.

<b>Ensure that an appropriate institutional strategic plan for e-Learning is developed and implementation is properly led</b>	
<b>Determine the real need for e-Learning</b>	
<ul style="list-style-type: none"> <li>Carry out an institutional investigation to find out the real need</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>What is the benefit of investing in e-Learning?</li> <li>Has a "learning" plan been considered?</li> </ul>
<b>Develop a strategic plan for e-Learning based on both learning and business needs</b>	
<ul style="list-style-type: none"> <li>Provide strategic direction and leadership</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Can a business case and plan be made?</li> <li>Is financial support available for initiatives?</li> </ul>
<b>Ensure that the institution has the political will to implement the strategy</b>	
<ul style="list-style-type: none"> <li>The institution should aspire to political openness</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Is strategy aligned with governmental politics?</li> </ul>
<b>Create a shared top-down / bottom-up 'vision'</b>	
<ul style="list-style-type: none"> <li>Establish a common management vision</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Is commitment from university real – not just financial?</li> <li>Is leadership genuinely shared?</li> <li>Has the strategy been properly disseminated?</li> </ul>
<b>Establish a clear policy on e-Learning, to be supported by real action</b>	
<ul style="list-style-type: none"> <li>Release institutional policy statement committing to this form of teaching</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Has a mission objective to foster and support online learning been set?</li> <li>Have departmental strategies for e-Learning projects been aligned to top level strategy?</li> </ul>
<b>Promote ethos of institutional teamwork from top levels</b>	
<ul style="list-style-type: none"> <li>Promotion from on high of teamwork in institutions</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Has appropriate user consultation been carried out at all stages?</li> <li>How has involvement been accomplished?</li> <li>Has academic / faculty participation been achieved?</li> </ul>
<b>Develop an evaluation strategy to monitor progress</b>	
<ul style="list-style-type: none"> <li>Ensure there is a willingness to accept input from all parties</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Is there a mechanism in place to ensure input from all stakeholders?</li> </ul>
Table 4. CSFs for Organisational Issues: Institutional Leadership, Strategy and Policy	

## 8.2.2 Resource Implications for e-Learning

### 8.2.2.1 Ensure that financial budgeting is carried out for resources needed

Participants felt it was vital to establish a firm budgetary policy for e-Learning and to have university-wide commitment to it. It was felt that financial resources should be made available for realisation of all stages, i.e.; design, development, implementation and delivery. The finance, it was thought, should not only be available for hardware and

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software, such as PCs for staff and students, and learning technologies, but that financial support should also be made available for academic staff. Furthermore, there should be finance for resources to support and maintain the system.

#### *8.2.2.2 Plan (schedule) sufficient time for development*

There was an emphasis on workload analysis which could work out lecturers' time loading and give workload credit for working on e-Learning courses. It was felt that a move away from expectation of two lectures per week; i.e. one lab and one tutorial, etc. needed to be made. It was also considered vital to ensure that staff were granted sufficient release time, with additional compensation if this was warranted, in order to ensure that effort would not be wasted on ill-considered projects.

#### *8.2.2.3 Reward academic staff for innovation equal to research*

Given the hitherto emphasis on research over and above teaching, participants felt that it was necessary to create rewards and incentives for developing e-Learning. If superior teaching were not valued and rewarded, then there would be little motivation for engaging in such work. Given the competing demands on academics/ faculty, it was thought that work in this area should be thoroughly evaluated. In addition to budget allocation to cover development activities, staff reward systems and compensation should be considered.

#### *8.2.2.4 Synopsis of resource implications*

Practitioners responsible for creating academic and educational settings are necessarily influenced by the availability of resources, strategic planning and subsequent management policy, as well as by the weight of administrative procedures this might entail. This necessarily impacts on realistic pedagogical models and affects the design of e-Learning. Table 5 indicates the resourcing issues identified by respondents.

<b>Make certain that resource implications of e-Learning are properly understood</b>	
<b>Ensure that financial budgeting carried out for resources needed</b>	
<ul style="list-style-type: none"> <li>Establish budgetary policy for e-Learning and university-wide commitment to it</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Are financial resources available for realisation of all stages; design, development, implementation <b>and</b> delivery?</li> <li>- Is there financial support for academic staff?</li> <li>- Is there finance for learning technologies; hardware and software + PCs for staff and students?</li> <li>- Are there resources to support and maintain system?</li> </ul>
<b>Plan (schedule) sufficient time for development</b>	
<ul style="list-style-type: none"> <li>Work out time/workload credit– lecturers loading</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Can a move away from expectation of 2 lectures; i.e. 1 lab, 1 tutorial, etc. / week, be achieved?</li> <li>- Is there sufficient staff release time – additional compensation?</li> </ul>
<b>“Reward” academic staff for innovation equal to research</b>	
<ul style="list-style-type: none"> <li>Create rewards and incentives for developing e-Learning</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is superior teaching valued and rewarded?</li> <li>- Is there any compensation for work and budget to cover development by academics/faculty?</li> <li>- Are there evaluation and reward systems?</li> </ul>

Table 5. CSFs for Organisational Issues: Resourcing

### **8.2.3 Attend to Organisational Culture Issues**

#### **8.2.3.1 Take into account cultural differences in various parts of the institution**

It was noted that there are particular cultures, or “climates” as one participant put it, in various parts of the organisation, and that it was necessary to increase awareness of the differences that might exist between the different stakeholders. Respondents wondered if there was sufficient awareness of existing traditions and the effects that cultural influences have on new developments such as e-Learning. It seems that people feel that it is necessary to reveal the mood within a specific community or within certain student settings. Furthermore, the success of e-Learning is more likely if there a genuine commitment to innovation in learning and to e-Learning in particular.

#### **8.2.3.2 Develop an innovative learner-centred education culture**

Respondents point out that it is necessary to develop an organisational culture which is open to change and favourable to e-Learning. It seems advisable to appoint an



organisational champion who is really committed to this form of learning so that that person can facilitate the development of a common vision, foster a mutual interpretation of the vision and help to lead the change management process in an effective manner. At the same time, it is felt that staff need to have an open view toward learning technologies and accept the need for new form of studies.

“Institution / staff buys into e-Learning policy / approach → successful implementation

i) Strategy – not scattering approach

ii) Open communication – sharing results [hardest to achieve]

iii) Bringing together [sometimes unlikely] personnel to achieve stated outcomes”

(14/AUA 2002).

#### 8.2.3.3 Clarify issues around intellectual property ownership

Given that knowledge is part of an academic’s personal assets and career currency, it seems natural that the issue of intellectual property (IP) should be brought to the fore. Respondents recommend that mutually acceptable rules related to IP should be developed. The question was asked whether IP is actually part of the contract. The question of who owns what, i.e. IP issues, ought to be clarified from day one.

#### 8.2.3.4 Develop good communication processes between all stakeholders

In view of the fact that communication and collaboration have been identified in the literature as being an important part of students’ learning, it is natural that concerns regarding this matter were raised in this context too. As one participant (8/E-Learn 2002) expressed it “*How do you build a community when competition and hierarchy, not sharing etc. are overarching ‘values’ of HE?*” Unsurprisingly, respondents felt that strategies concerning organisational communication and collaboration with respect to e-Learning issues had to be found to deal with this issue. In this regard, it was recommended that there should not only be good communication between practitioners and management but that there should be open communication with all stakeholders (staff, university, students, industry and society at large) as well.

### 8.2.3.5 Synopsis of cultural issues

Respondents felt it important to take cultural differences in various parts of the institution into account and it was deemed vital to develop an innovative learner-centred education culture. It was also evident that there were concerns regarding intellectual property issues and that ownership of copyright needed clarification. If all stakeholders were represented and good communication could be established, then e-Learning initiatives were much more likely to arrive at a successful outcome. Table 6 indicates the detail of findings in this respect.

<b>Recognize that issues relating to organisational culture must be attended to</b>	
<b>Take into account climatic differences in various part of the institution</b>	
<ul style="list-style-type: none"> <li>• Increase awareness of the climate in the organisation</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is there sufficient awareness of tradition and cultural influences?</li> <li>- What is the mood in community / student settings?</li> <li>- Is there a commitment to e-Learning?</li> <li>- How can we persuade teachers to make courseware?</li> <li>- Have issues around teacher's motivation been explored?</li> <li>- Can a serious commitment throughout organization among all stakeholders – admin, mgmt, faculty and students - be achieved?</li> </ul>
<b>Develop an organisational culture which supports innovation and learner-centred education</b>	
<ul style="list-style-type: none"> <li>• Develop an organisational culture which is open to change and favourable to eLearning</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is there an organisational champion committed to this form of learning that can develop a common vision, a mutual interpretation of the vision and lead the change management process effectively?</li> <li>- Do staff have an open view toward learning technologies and accept the need for new forms of studies?</li> </ul>
<b>Clarify issues around intellectual property ownership</b>	
<ul style="list-style-type: none"> <li>• Develop mutually acceptable rules re intellectual property</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is intellectual property part of the contract?</li> <li>- Who owns what? Have IPR issues been clarified from day 1?</li> </ul>
<b>Develop good communication processes between all stakeholders</b>	
<ul style="list-style-type: none"> <li>• Identify ways to deal with issues relating to communication and collaboration</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Good communication between practitioners and management</li> <li>- Open communication with stakeholders (staff, university, students, industry)</li> </ul>

Table 6. CSFs for Organisational Issues: Culture and Mores

### 8.2.4 Pay Attention to e-Learning Staffing Issues

The skills required for successful design, development, implementation and delivery of e-Learning are not trivial, and in fact can be totally off-putting to those who are not technophiles. Therefore, it is unsurprising that the issue of staffing was raised as a CSF.

#### *8.2.4.1 Identify who should be involved in the e-Learning process*

As might be expected when discussing organisational issues, respondents discussed the issue of staffing in this context. It was recommended that a decision should be made with regard to who the key people in the process might be, and thereafter to form apposite teams. The tasks involved in e-Learning vary widely, and some of the roles that were suggested as needing particular consideration were: subject matter experts; learning designers; technology and hardware designers; software engineers; administrative help; and not least, technical support. In addition, it was thought that the expertise of administration in the form of human resources might be fundamental.

#### *8.2.4.2 Provide a supportive environment for e-Learning projects*

An accommodating atmosphere is essential if staff are to put effort into developing innovative e-Learning. Respondents felt that it was important to make appropriate facilities available for e-Learning Initiatives. This is reflected by the following:

“organisational culture determines whether you get money, time, credit, enabling technologies, technical support staff, ability to change delivery modes, etc.”

(6/ICALT 2002)

This requires an ethos of support for the idea of e-Learning. In addition, it was felt that in reality administrators should be supportive rather than suffering under the illusion that developing e-Learning is simply there to save money. If espousal is forthcoming, it should be ensured that resource support in terms of sharing of expertise is set in place.

#### *8.2.4.3 Develop suitable training programmes for academics (faculty)*

As stated before, getting involved in e-Learning initiatives is not for the faint-hearted. It is unrealistic to expect that all academics have the necessary skills ready-made to get fully involved in such ventures. Respondents felt that it was vital for training facilities and resources to be made available for staff wanting to engage with e-Learning projects.

Again, it was highlighted that for e-Learning to really succeed, there needs to be an ethos of support. Up to now, qualifications have not been needed in HE, but in an e-Learning context, it is thought that appropriately qualified personnel need to be available and recognised. If suitably qualified staff are not already in place, it was thought that staff, teacher and tutor training and professional development, appropriately aligned with institutional aims and culture, should be made accessible to all who need this.

#### 8.2.4.4 Synopsis of staffing issues

Respondents indicated that it was necessary to identify who should be involved in the e-Learning process. This would help the process of providing a supportive environment for e-Learning projects. However, a key issue would be to develop suitable training programmes for academics (faculty). Table 7 indicates the detail of these staffing issues.

<b>Pay attention to staffing issues and staff development in respect of e-Learning</b>	
<b>Identify who should be involved in the e-Learning process</b>	
<ul style="list-style-type: none"> <li>Decide who the key people in the process might be and form apposite teams</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Experts?</li> <li>Designers?</li> <li>Hardware designers, engineers, technology?</li> <li>Help of administration and technical support?</li> <li>Administration?</li> <li>Expertise / human resources?</li> </ul>
<b>Provide a supportive environment for e-Learning projects</b>	
<ul style="list-style-type: none"> <li>Make appropriate facilities available for e-Learning Initiatives</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Is there an ethos of support for the idea of e-Learning?</li> <li>Are administrators supportive or do they think eLearning is there to save money?</li> <li>Is resource support in terms of sharing of expertise in place?</li> </ul>
<b>Develop suitable training programmes for academics (faculty)</b>	
<ul style="list-style-type: none"> <li>Devise suitable staff development processes and resources</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Are appropriately qualified personnel available?</li> <li>Is suitable staff and professional development accessible?</li> <li>Has training been appropriately aligned?</li> <li>Have teacher / tutor training programmes been set up?</li> <li>Is there sufficient technical and pedagogic training and support?</li> <li>Is a teachers' qualification system for e-Learning recognised?</li> </ul>

Table 7. CSFs for Organisational Issues: Staffing Matters

### 8.3 Technological CSFs for e-Learning

Under the framework category relating to Technological issues, a total of 241 statements were received from participants. These have been distilled into four CSFs:

- 8.3.1 Ensure that the infrastructure is adequate for supporting learning processes
- 8.3.2 Make certain that suitable learning and teaching software is available
- 8.3.3 Ensure that the learning technology is adequate for learning purposes
- 8.3.4 Ensure technical support issues have been addressed

A visual representation of the main themes emerging from the e-Learning Technological CSF findings can be seen in the diagram shown in Figure 15.

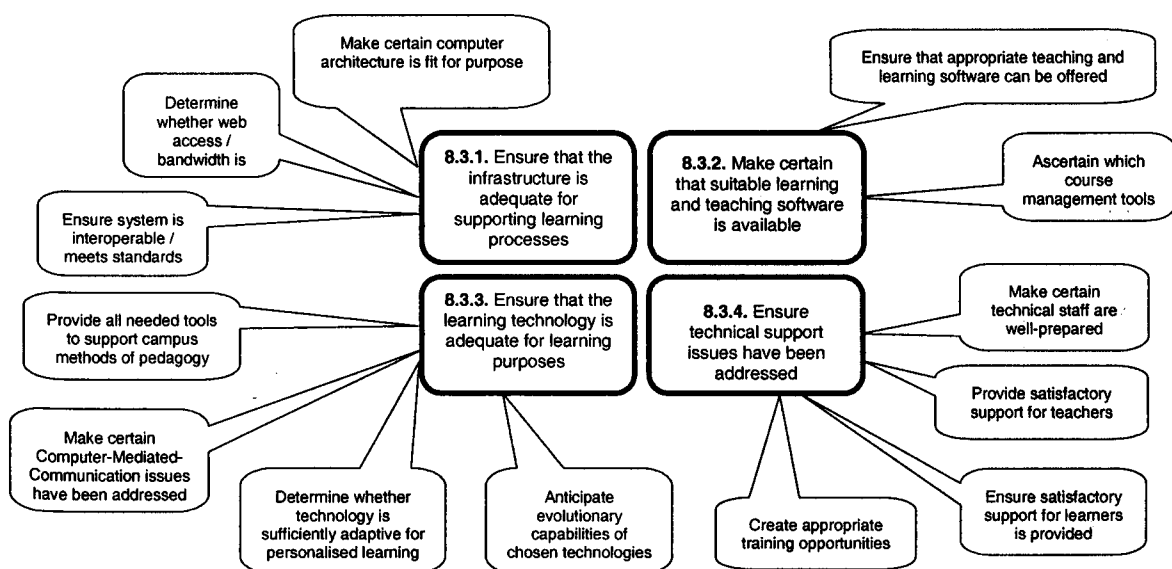


Fig. 15 Synopsis of Technological e-Learning CSFs

This provides a synopsis of the key delivery CSFs and their associated sub-themes. As before, each of the top-level CSFs identified has been numbered to link this to subsequent discussions and have, along with their corresponding 2<sup>nd</sup> level sub-themes, been colour coded to differentiate and distinguish them from neighbouring CSFs.

### ***8.3.1 Issues associated with Technological Infrastructure***

The technological infrastructure for learning is clearly essential, as emphasised by one respondent (14/ICCE, 2002) as follows:

“[...] because it is the way for dissemination, delivery (of) the content”.

#### ***8.3.1.1 Make certain computer architecture is fit for purpose***

Particular issues that were raised with regard to ensuring that the institutional computer architecture is fit for purpose related to the availability of corporate “neutral” and robust LMS (VLE). Respondents suggested that a commonality of learning platforms was needed and that servers need to be adequate for the purpose of serving e-Learning needs. The question was raised as to whether a suitable hardware, software, and “humanware” mix could be found as this would have a significant impact on the success or otherwise of e-Learning.

#### ***8.3.1.2 Ensure adequate equipment available for learners***

Since this research is addressing fundamental e-Learning issues, respondents drew attention to the fact the institutional provision needs to match the technology available to students. Given that an institution has a particular student body in mind, institutional technology should meet that of the lowest common denominator within the intended audience. The issue of scalability needs to be addressed and it should be determined whether the system can be scaled up to meet demand. Naturally, in an era of malicious threats to systems, security issues are essential in using data for normal students and respondents felt that an authorising system would be necessary. It was felt that careful attention should be paid to choosing appropriate technologies which are readily available, reliable, and scaleable. Therefore, it is not surprising that interviewees identified CSFs closely related to creating suitable technological infrastructures that

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provide robust security, data protection, and intellectual property protection as well as adequate data transmission and communication.

#### *8.3.1.3 Determine whether web access / bandwidth is adequate*

Assuming that future e-Learning systems will be web-enabled, participants wanted to make the point that Internet and networked technology could either enhance or impinge adversely on the learning environment intended to be created. It was noted that different infrastructure scenarios (bandwidth, browsers, operating systems) need to be properly supported. With the first point above in mind, if Internet access is vital, then Internet connectivity is a foremost requirement and it needs to be checked that this technology is also available to students. As mentioned in 5.2.1, despite its wide acceptance in most developed countries today, access to broadband is by no means universal. With regard to web design, it is recommended to follow best practice advice regarding access, integration, usability, and flexibility, as described in 3.2. If multimedia is to be used by novice staff, then training, for example in the use of HTML (hypertext markup language), needs to be available. It seems that bandwidth has been a real concern, and may still be so in some parts of the world. If a common bandwidth or platform is required, technologists have to ensure that lack of available bandwidth to access the information is not a hindrance. As a final check, respondents drew attention to the need to ensure computer technology issues around network, bandwidth and access had been addressed.

#### *8.3.1.4 Ensure system is interoperable / meets standards*

Whilst it is recognised that not all staff want to “share” learning objects, nevertheless the issue of reusability was raised as a concern. It was suggested that learning systems need to be integrated with other systems, e.g. recording, monitoring, appraisal. Thus, the system needs to be based on compatible technologies. At the same time, the question of

platform / hardware independence was raised and respondents felt that it might be prudent to consider using “open source” technology. Open source technologies are however subject to much controversy with computer scientists and managers at two extreme ends of the discussions.

In addition, issues of standardization versus flexibility need to be balanced. In this regard, it needs to be checked whether e-Learning activities are compatible with standardization efforts. The question of the standards themselves was also raised and there must be an awareness of appropriate and agreed upon world-wide standards (e.g. IMS, SCORM as discussed in 3.1.3.1) and if these are being used to support any learning style. Additionally, since learners are the intended beneficiaries of such systems, it is essential to have these users involved in implementation development of learning technology standards. Finally, these are obvious CSFs that would always be associated with a learning approach that is centred in ICT. It is also fair to expect that these CSFs be addressed by the organization hosting the e-Learning. Furthermore and also to be expected, interviewees also expressed the need for reliable technology, adoption of interoperability standards, appropriate selection processes of both web and generic software applications, consideration of bandwidth and other access issues for both staff and students.

#### *8.3.1.5 Synopsis of infrastructure issues*

HE educational institutions have faced severe challenges posed by the rapid evolution of learning technologies. As learning technologies form the backbone for e-Learning, universities have had to decide which systems, resources and infrastructures to support this type of educational approach are both adequate and available to learners.

Bandwidth and interoperability were also highlighted as important concerns to address.

Table 8 details the issues raised by respondents.



<b>Ensure that the infrastructure is adequate for supporting learning processes</b>	
<b>Make certain computer architecture is fit for purpose</b>	
<ul style="list-style-type: none"> <li>Corporate “neutral” and robust LMS (VLE)</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is there a commonality of learning platforms?</li> <li>- Are servers adequate for purpose?</li> <li>- Can a suitable hardware – software – humanware mix be found?</li> </ul>
<ul style="list-style-type: none"> <li>Ensure adequate equipment available for learners</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Does the institutional provision match students' technology?</li> <li>- Should institution meet lowest common denominator?</li> </ul>
<ul style="list-style-type: none"> <li>Address issues of scalability</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Can the system be scaled up to meet demand?</li> </ul>
<ul style="list-style-type: none"> <li>Security essential in using data for normal students</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Authorising system</li> </ul>
<ul style="list-style-type: none"> <li>Choose appropriate technologies:., readily available, reliable, scaleable</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Make sure system is robust</li> <li>- Has the infrastructure fully tested with software and web operation?</li> <li>- Is the performance of the system good enough?</li> <li>- Has effectiveness of system been ensured?</li> </ul>
<b>Determine whether web access / bandwidth is adequate</b>	
<ul style="list-style-type: none"> <li>Web-enabled</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Will Internet and networked technology enhance or impinge on the learning environment intended to be created?</li> <li>- Can different infrastructure scenarios (bandwidth, browsers, operating systems) be properly supported?</li> </ul>
<ul style="list-style-type: none"> <li>Assured Internet connectivity</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is Internet access required and is this technology available to students?</li> </ul>
<ul style="list-style-type: none"> <li>Ensure best practice for web design</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- If multimedia (HTML) is to be used, is training available?</li> </ul>
<ul style="list-style-type: none"> <li>Ensure bandwidth is not a hindrance</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Is a common bandwidth or platform required?</li> <li>- Have computer technology issues around network, bandwidth and access been addressed?</li> <li>- Have suitable bandwidths to access the information been selected?</li> </ul>
<b>Ensure system is interoperable / meets standards</b>	
<ul style="list-style-type: none"> <li>Attend to reusability issues</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Can learning systems be integrated with other systems, e.g. recording, monitoring, appraisal</li> </ul>
<ul style="list-style-type: none"> <li>Base system on ubiquitous technologies</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Can platform / hardware independence be achieved?</li> <li>- Should “open” technology be used?</li> </ul>
<ul style="list-style-type: none"> <li>Balance issues of standardization vs. flexibility</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>- Are activities compatible with standardization efforts?</li> <li>- What are appropriate world-wide standards?</li> <li>- Are standards being used to support any learning style?</li> <li>- Have users been involved in implementation development of learning technology standards?</li> </ul>

Table 8. CSFs for e-Learning Technologies: Infrastructure

### ***8.3.2 Verify Availability of Suitable e-Learning Systems***

#### *8.3.2.1 Ensure that appropriate teaching and learning software can be offered*

As a starting point, it is essential that software designs that effectively support students are chosen in order to really meet pedagogic needs. Respondents felt that the complexity of navigation should be reduced as hitherto, a number of environments have been created where there is a real risk of becoming “lost in hyperspace”. In the interests of avoiding wasteful expenditure, it was considered that the selected software should have longevity in order to ensure sustainability of e-Learning solutions. To that end, it should be ensured that appropriate technologies that meet these criteria are available. A key determinant was whether fast, simple and reliable software could be provided and one respondent even proposed that e-Learning software should be based on easy (office applications) authoring tools.

#### *8.3.2.2 Ascertain which course management tools are needed*

Based on predetermined needs, it can be decided which applications, programmes and software are needed. Depending on the demographics of the student cohort, it may be determined that different software is required for support, such as online support where connectivity can be assured or in the form of CDs where this is not the case. It was felt that the technology should be customizable, although it was recognised that there may be a trade off between technology/service and amount of work involved.

#### *8.3.2.3 Synopsis of e-Learning system availability*

The focus of this section is clearly on the selection of appropriate teaching and learning systems which have the capability of supporting students’ needs. To meet this CSF, it is essential that the software really meets pedagogic needs, but respondents wondered whether suitable technologies were readily available. Two main e-Learning system

components were identified and, as indicated in Table 9, it was noted that suitable teaching and learning software had to be readily available and apt course management tools had to be provided.

<b><i>Make certain that suitable learning and teaching software is available</i></b>	
<b><i>Ensure that appropriate teaching and learning software can be offered</i></b>	
<ul style="list-style-type: none"> <li>Choose software design that supports students</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Will the software really meet pedagogic needs?</i></li> <li><i>Can the complexity of navigation be minimised?</i></li> </ul>
<ul style="list-style-type: none"> <li>Determine whether fast, simple and reliable software can be provided</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Are appropriate technologies available?</i></li> <li><i>Will software be based on easy (office applications) authoring tools?</i></li> <li><i>Will the software have a long life?</i></li> </ul>
<b><i>Ascertain which course management tools are needed</i></b>	
<ul style="list-style-type: none"> <li>Determine which applications, programmes and software are needed</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>What software be required for support: online / CDs?</i></li> <li><i>Can the technology be customized?</i></li> <li><i>Is there a trade off between technology/service and amount of work?</i></li> </ul>

Table 9 CSFs for e-Learning Technologies: Software

### ***8.3.3 Ensure Technological Appropriateness***

Interestingly, interviewees seem to highlight the importance of distinguishing between e-Learning, as a learning process, and the technology that underpins the learning. This is important when deciding whether technology is appropriate for a particular purpose. This is illustrated by a comment (19/ICALT 2002) to the effect that “[...] a concerted effort must be made now, to ensure the technology is ready for learners”.

#### ***8.3.3.1 Provide all needed tools to support campus methods of pedagogy***

Respondents stressed that the technology actually needs to enable learning. They asserted that the threshold should be low enough to ensure that the question of a potential digital divide is considered. Whilst it was thought significant that technology could be blended to achieve strategic leverage, there was an emphasis on the fact that technologies should support genuine e-Learning rather than provide simple procedural training methods.

### *8.3.3.2 Make certain CMC issues have been addressed*

The use of CMC applications in order to implement constructivist and other collaborative teaching and learning strategies is high on the agenda. Respondents felt that telecoms and computer technology should be properly integrated and that the communication infrastructure needed to be within acceptable limits. It should be established whether CMC would be useful for specific learning settings. There was a recognition of the different communication modes offered by CMC and it was suggested that it had to be ascertained if synchronous chat or asynchronous CMC forums are required. It was also suggested that it should be verified that both staff and students have good communication (networks) and whether all make widespread use of ICT, even including e-mail within this context.

### *8.3.3.3 Determine whether technology is sufficiently adaptive for personalised learning*

Respondents felt that it was essential to make appropriate use of media and its technology to enable learning. In this regard, they were concerned that it should encourage interactivity and fit students' learning styles. They suggested that if students need to learn at their own pace and have limited web access, then on some occasions it may be that lower level technologies, such as CD ROM, might be more appropriate.

The main concern was that it should help improve student outcomes by improving learning opportunities by diversifying from lectures.

### *8.3.3.4 Anticipate evolutionary capabilities of chosen technologies*

There was an appreciation of the speed of technological evolution, and respondents suggested that an eye should be kept on changing technologies. With this in mind, it has to be ascertained that existing technologies will have a sufficiently long life-span. The main issue of concern was whether such new technologies were actually useful, giving

the use of PDAs as an example, i.e. that these could be “[...] either good or bad, but perhaps a necessity” (21/ICCE 2002).

### 8.3.3.5 Synopsis of Technological Appropriateness

The responses of the participants in this framework category seem to also show a certain degree of mature thinking in the e-Learning community. They are fully aware that the success of e-Learning cannot be attributed solely to the acquisition of leading edge technologies, but is far more dependent on what is done with these ICTs in terms of both design and delivery. Table 10 indicates respondents’ specific concerns.

<b>Ensure that the learning technology is adequate for learning purposes</b>	
<b>Provide all needed tools to support campus methods of pedagogy</b>	
<ul style="list-style-type: none"> <li>Establish whether technology appropriate for particular purposes</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Does the technology actually enable learning?</li> <li>Is threshold low enough? (e.g. For DL, Africa has low bandwidth)</li> <li>Can technology be blended to achieve strategic leverage?</li> <li>Do technologies support eLearning rather than training?</li> </ul>
<b>Make certain Computer-Mediated-Communication issues have been addressed</b>	
<ul style="list-style-type: none"> <li>Check that telecoms and computer technology integrated</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Is communication infrastructure up to the job?</li> <li>Is CMC useful for specific learning settings?</li> <li>Are asynchronous CMC forums required?</li> <li>Have staff and students got good communication (networks)?</li> <li>Do all make widespread use of ICT? (Could start with e-mail!)</li> </ul>
<b>Determine whether technology is sufficiently adaptive for personalised learning</b>	
<ul style="list-style-type: none"> <li>Appropriate use of media and its technology to enable learning</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Can it fit students’ learning styles?</li> <li>Does it encourage interactivity?</li> <li>If students need to learn on own, is CD ROM more appropriate?</li> <li>Will it help improve student outcomes?</li> <li>Can it be used for lecture diversity?</li> </ul>
<b>Anticipate evolutionary capabilities of chosen technologies</b>	
<ul style="list-style-type: none"> <li>Keep an eye on changing technologies</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Will existing technologies have a long enough life-span?</li> <li>Are new technologies actually useful? (PDA’s good – bad - a necessity)</li> </ul>

Table 10. CSFs for e-Learning Technologies: Appropriateness

### ***8.3.4 Address Technical Support Issues***

#### *8.3.4.1 Make certain technical staff are well-prepared*

Since technology is known to go wrong from time to time, academic staff and students depend on their services to keep the e-Learning setting functioning as it should.

Therefore, technical staff play a vital role and need proper preparation. Whilst this may not be a widespread problem, one respondent suggested that it should be ensured that technical support staff are supportive rather than resistant to e-Learning. This is clearly linked to the next point to be discussed.

#### *8.3.4.2 Provide satisfactory support for teachers*

Academic staff / teachers do require IT support from time to time, and this should be the responsibility of technical staff. In this respect, it is essential that the lecturers' needs are adequately supported. When new technologies for faculty are being offered, this is particularly relevant for busy academics who may have many other responsibilities and motivations besides teaching.

#### *8.3.4.3 Ensure satisfactory support for learners is provided*

The needs of the student body were also acknowledged, and here respondents stressed that IT support for students should be the responsibility of technical staff. It was felt that adequate support for students' data access and storage should be provided. Nevertheless, a key question raised was whether support for use of new technologies by students could be ensured.

#### *8.3.4.4 Create appropriate training opportunities*

As a final point, appropriate technical support in using the ICT infrastructure, as well as good maintenance of this infrastructure, were identified. Staff training was recognised as a key area for investment to ensure that teachers are properly familiarised with technology.

### 8.3.4.5 Synopsis of technical support issues

The new opportunities provided for access to information and communication by the convergence ICTs, together with emergent pedagogical thinking, have enabled HE institutions to design and deliver new e-Learning programmes, courses and modules. As identified by the interviewees, CSFs here imply expert support for the deliverers and the learners, appropriate training of staff, careful follow-up of feedback from both tutor and learner evaluation processes. Table 11 shows these aspects in more detail.

<i>Ensure that technical support issues have been addressed</i>	
<i>Make certain technical staff are well-prepared</i>	
<ul style="list-style-type: none"> <li>• Ensure technical support staff are pro rather than anti</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Do support staff regard this as a primary role?</li> <li>- Are technical staff willing to provide support to less technically able academic staff?</li> </ul>
<i>Provide satisfactory support for teachers</i>	
<ul style="list-style-type: none"> <li>• IT support for teachers should be responsibility of technical staff</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Are lecturers' needs being adequately supported?</li> <li>- Is support the use of new technologies for faculty being offered?</li> </ul>
<i>Ensure satisfactory support for learners is provided</i>	
<ul style="list-style-type: none"> <li>• IT support for students should be responsibility of technical staff</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Is adequate support for students' access and storage being provided?</li> <li>- How is support use of new technologies for students being ensured?</li> </ul>
<i>Create appropriate training opportunities</i>	
<ul style="list-style-type: none"> <li>• Invest in staff training</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Are teachers being familiarised with technology?</li> </ul>

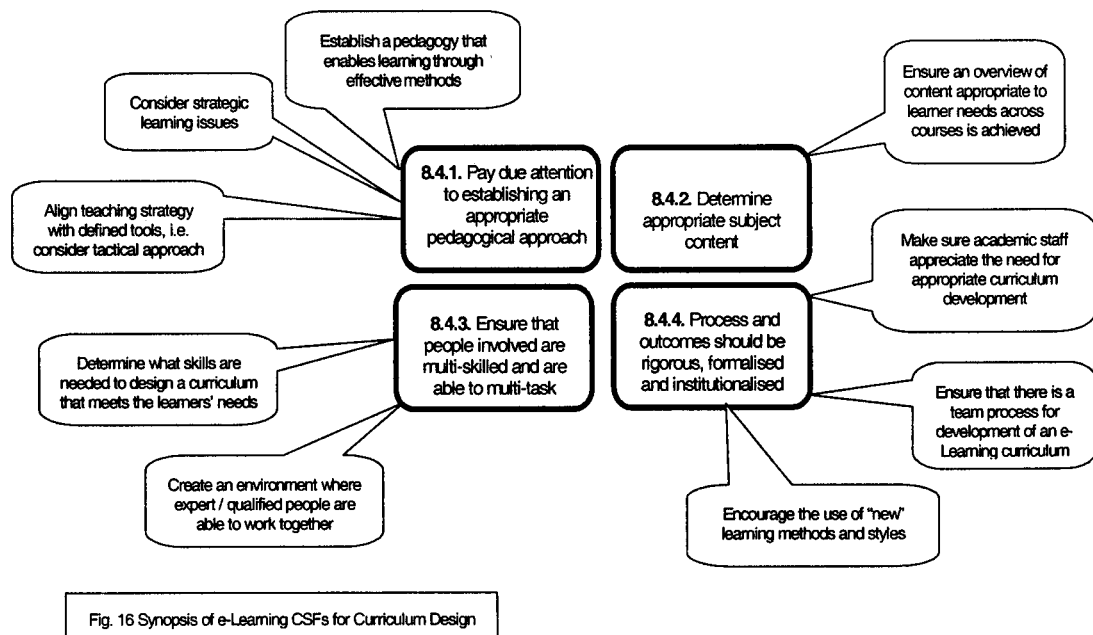
Table 11. CSFs for e-Learning Technologies: Support

## 8.4 CSFs for Curriculum Design and Development

Under the framework category relating to curriculum design, a total of 209 statements were received from participants. These have been distilled into the following CSFs:

- 8.4.1 Pay due attention to establishing an appropriate pedagogical approach
- 8.4.2 Consider appropriate subject content
- 8.4.3 Strategic learning issues must be considered
- 8.4.4 People involved should be multi-skilled and be able to multi-task

A visual representation of the main themes emerging from the e-Learning Curriculum Design CSF ontology can be seen in the diagram shown in Figure 16.



This figure provides a synopsis of the key delivery CSFs and their associated sub-themes. Again, each top-level CSF identified has been numbered and, along with its corresponding 2<sup>nd</sup> level sub-themes, colour coded to link these to subsequent discussions.

### ***8.4.1 Establish an Appropriate Pedagogical Approach***

#### *8.4.1.1 Consider strategic learning issues*

Pedagogical methods need to be tailored so that they are appropriate to the subject matter and target audience. With suitable learning outcomes decided, appropriate module / course prerequisites / modes of assessment can be considered and evaluative processes can be linked to pedagogical processes. Participants stressed the need to design curricula, bearing in mind clear and explicit learning outcomes at the outset, and there need to be well thought through assessment strategies. Added to this is a requirement for student feedback opportunities and support for progression both while the courses are being provided and after completion. The use of appropriate e-Learning



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technology should be integrated with conventional learning and teaching. This was clearly noted by one of the participants as follows:

“In particular, for me, when the subject domain is delimited and structured, and the teaching strategy is set up, everything else become(s) more clear...”

(08/ICALT 2002)

#### *8.4.1.2 Establish a pedagogy that enables learning through effective methods*

Respondents identified the selection of a good student-focussed pedagogical model as one of the most crucial success factors. It was noted that it is desirable that the chosen teaching approach suits all learning styles of intended learners, which requires clarity about who the curriculum is to be aimed at.

This notion suggests a level of personalization reached by a real understanding of the intended audience through an adequate learning needs analysis. The curriculum developers clearly need to have an overall vision of topics in order to be able to develop individualised paths within the curriculum. Associated with this point, learning needs to be contextualized within the cultural background that characterizes the culture, country or region in which the learning is taking place. In order to ensure student inclusion, this contextualisation within the learning process needs to be subject to thorough evaluation.

“CSFs depend on strategy/objectives/learning needs – not the same for every institution.”

(15/E-LEARN 2002)

The curriculum developers therefore need to have a clear vision of topics in order to be able to develop an individualised curriculum. Such a personalised curriculum would allow tutoring, mentoring and learning materials to be adapted to different levels of knowledge, learning needs and learning styles.

#### 8.4.1.3 *Align teaching strategy with defined tools, i.e. consider tactical approach*

Respondents also highlighted the need to consider new learning and teaching methods appropriate to the e-Learning environments and the media being used. According to participants, e-Learning methods should include active learning approaches, based on learning-by-doing and personalization of content and learning paths. This involves identifying suitable content, structure, and activities through appropriate design and planning. Curriculum developers need to have an awareness of how e-Learning affects traditional audiences and attend to motivational aspects that affect e-Learning. Emergent issues can be revealed by making sure that there are ample opportunities for student feedback. Where technologically disadvantaged students might be enrolled, participants cautioned that the curriculum must be designed having the minimum common denominator in mind when e-Learning technology is in use.

“Accessibility to students, either remotely located or lifestyle constraints (e.g. work, family) [is important].”

(03/E-Learn 2002)

#### 8.4.1.4 *Synopsis of issues relating to adopting appropriate pedagogical approaches*

Respondents clearly feel that e-Learning curriculum design and development needs to be underpinned by a considered and appropriate pedagogical design. For e-Learning to be successful, it is essential to have learning strategically planned and aligned with suitable pedagogical models, centred and focused on the learner, as shown in detail in Table 12.

<i>Pay due attention to establishing an appropriate pedagogical approach</i>	
<i>Consider strategic learning issues</i>	
<ul style="list-style-type: none"> <li>Tailor methods so that they are still appropriate to the subject matter and target audience</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Have learning outcomes been considered to decide appropriate module / course prerequisites / modes of assessment?</i></li> <li>- <i>Can evaluative processes be linked to pedagogical processes?</i></li> <li>- <i>Is the use of technology appropriate and should e-Learning be integrated with conventional learning and teaching?</i></li> </ul>

<i>Pay due attention to establishing an appropriate pedagogical approach</i>	
<i>Establish a pedagogy that enables learning through effective methods</i>	
<ul style="list-style-type: none"> <li>Ensure that the chosen teaching approach will suit all learning styles of intended learners</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Do curriculum developers have a clear vision of topics to be able to develop an individualised curriculum?</li> <li>- Has an adequate needs analysis been carried out to ascertain learners' needs and is it clear who the curriculum is to be aimed at?</li> <li>- Can the curriculum be adapted to learners (based on previous knowledge and will the pedagogy be student-focussed)?</li> <li>- Do pedagogical models need to be country (culture) specific?</li> </ul>
<i>Align teaching strategy with defined tools, i.e. consider tactical approach</i>	
<ul style="list-style-type: none"> <li>Identify suitable content, structure, activities, design and planning</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Are curriculum developers aware of how e-Learning affects traditional audiences?</li> <li>- Have motivational aspects of e-Learning been attended to?</li> <li>- Can opportunities for student feedback be created?</li> <li>- Will all intended students have access to technology to be used?</li> </ul>

Table 12. CSFs for e-Learning Curriculum Design: Establish an appropriate pedagogical approach

## **8.4.2 Determine Appropriate Subject Content**

### *8.4.2.1 Ensure content appropriate to learner needs across courses is selected*

Respondents identified a number of sub-themes related to content as an e-Learning Curriculum Design CSF. They advised that it is important to make sure that appropriately structured courses should contain appropriate content derived from good sources. In this sense, such content needs to be not only recent (up-to-date), but also updatable. Core content can be supplemented by good auxiliary materials derived from quality sources (textbooks, papers, links, etc.). However, content must be validated and updated by experts in the subject matter. The content should be suitable and support engaging activities that link different aspects of the subject matter and the course. This is achieved by the ability by curriculum designers to have an overview of content across modules and the course as a whole.

### *8.4.2.2 Give Intellectual Property and copyright issues due attention*

Furthermore, and revealing seasoned practitioner caution, participants recommended paying particular attention to intellectual rights and copyright issues, when linking or

making use of external material. In particular, authors, managers and other stakeholders should make sure that control of content is given due consideration.

#### 8.4.2.3 *Synopsis of issues relating to subject content*

The importance of content as a CSF did not come as a surprise. This is probably the most predictable of results, and one of the topics in the field with a great deal of coverage in the literature (Bielawski and Metcalf, 2003; Roman and Colle, 2003).

However, attention was drawn to intellectual property and copyright as issues still to be resolved. This is outlined further in Table 13.

<i>Determine appropriate subject content</i>	
<i>Ensure an overview of content appropriate to learner needs across courses is achieved</i>	
<ul style="list-style-type: none"> <li>• Make sure that appropriate content is from good sources, and is recent (up-to-date) and updatable</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- <i>Can high-quality course content - linked to marketability – be prepared?</i></li> <li>- <i>Is material suitable for topic available?</i></li> <li>- <i>Have good sources of material (textbooks/papers/links) been identified?</i></li> <li>- <i>Can effective involvement and engagement of content provider/s be assured?</i></li> </ul>
<i>Give Intellectual Property and copyright issues due attention</i>	
<ul style="list-style-type: none"> <li>• Make sure control of content is given due consideration</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- <i>Who will have rights to amend or update?</i></li> </ul>

Table 13. CSFs for e-Learning Curriculum Design: Content Issues

### 8.4.3 *Formalise a Rigorous Institutional Process*

#### 8.4.3.1 *Make sure academic staff appreciate the need for appropriate curriculum development*

It was felt that subject relevance, specificity and coverage strategy must be considered.

There needs to be a clean, clear and appropriate focus on the subject matter.

Participants were clearly mindful of academic expertise, but felt that the curriculum should be developed with the mission of the university in mind. It was felt that an awareness of “Learning Styles” would be helpful in order to provide individualised paths for learning. There was an acknowledgement that students’ would be aiming

toward a career after graduation, and therefore that the needs of industry have to be considered to some extent. Finally, to allow students to tailor their knowledge acquisition, there have to be opportunities for being able to choose his/her courses, taking some restrictions into account.

#### *8.4.3.2 Ensure that there is a team process for development of an e-Learning curriculum*

Respondents wanted to make the point that curriculum development should be carried out in a holistic way by bringing relevant people together. This raises the question of who precisely should be involved in the curriculum development team. To this end, a number of suggestions were made that relevant members of such a team would comprise task groups of academics, educational specialists, teachers, librarians, developers, and technology (IT) staff. One respondent went as far as suggesting that in this model, international curriculum development teams might be appropriate as e-Learning courses may have internationally located audiences. The use of collaborative teaching should be considered, and it was suggested that a spirit of co-evolution through collaboration could be fostered to add value to the curriculum.

#### *8.4.3.3 Encourage the use of “new” learning methods and styles*

In order to achieve the adoption of new learning methods and styles, it seems that this can be achieved by providing comprehensive / facilitating leadership. An essential component of encouraging staff to rethink their approach to curriculum development is that of communication. Therefore, communication issues and processes must be properly addressed. Finally, there is a perception of a gap between IT and educational experts creating dialogue and collaboration problems. However, if e-Learning is to succeed, these groups must be able to work together toward a common goal.

#### 8.4.3.4 Synopsis of rigorous institutional process issues

The process of curriculum design and development was one of the foremost concerns of the workshop participants. There were indications that practitioners and researchers alike would like to see a more formalized process. However, this should be set within institutional and learning contexts, and lead to clear learning outcomes. The process should be influenced by both societal and academic forces and tailored to learners' needs and interests. Finally, it was proposed that ISD needs to conform with organizational "statutes and ordinances". That is, ISD needs to carefully take into consideration organizational constraints and facilities, as well as technological infrastructures and their inherent limitations. Table 14 explains this in more detail.

<i>Process and outcomes should be rigorous, formalised and institutionalised</i>	
<i>Make sure academic staff appreciate the need for appropriate curriculum development</i>	
<ul style="list-style-type: none"> <li>Subject relevance, specificity and coverage strategy must be considered: need a clean, clear and appropriate focus on the subject matter</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Can the curriculum be developed with mission of the university in mind?</li> <li>- Are curriculum designers aware of "Learning Styles"?</li> <li>- Can the needs of industry be met?</li> <li>- Will students be able to choose his/her courses, taking into account some restrictions?</li> </ul>
<i>Ensure that there is a team process for development of an e-Learning curriculum</i>	
<ul style="list-style-type: none"> <li>Make certain that curriculum development is carried out in a holistic way by bringing relevant people together</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Who should be involved in the curriculum development team: Task groups of academics, educational specialists, teachers, librarians, developers, technology (IT) staff?</li> <li>- Would international curriculum development teams be appropriate?</li> <li>- Has collaborative teaching been considered?</li> <li>- Can a spirit of co-evolution through collaboration be fostered?</li> </ul>
<i>Encourage the use of "new" learning methods and styles</i>	
<ul style="list-style-type: none"> <li>Provide comprehensive / facilitating leadership</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Are communication issues and processes being attended to?</li> <li>- Can IT and educational experts work together toward common goal?</li> </ul>

Table 14. CSFs for e-Learning Curriculum Design: Process Issues

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### ***8.4.4 Attend to People Selection and Development Skills***

#### *8.4.4.1 Determine skills required to design a curriculum that meets learners' needs*

Selecting the right team containing the right people with the necessary skills was identified by the participants as vital to the success of the curriculum design and development process. Thus, respondents felt it essential that staff (academics and developers) must be both qualified and experienced so that all involved understand requirements and planning procedures. With this in place, potential needs for rework and redevelopment of courses will result in more efficient processes of iterative design.

#### *8.4.4.2 Create an environment where expert / qualified people are able to work together*

There was a broad consensus that a team approach to the curriculum design and development process is needed, bringing academics, technologists, subject matter experts together, with student representation and even alumni involvement. As one of the participants noted, "e-Learning is the willingness to change yourself, by sharing experiences with your learning partners, at all levels" (17/ICALT 2002). This quote perfectly summarizes the findings of this research. The process should therefore have a holistic and co-evolutionary nature that results from efficient teamwork, good communication and inter-professional collaboration. Additionally, if this is to lead to successful e-Learning courses, good project management and planning are required to integrate these complex teams.

#### *8.4.4.3 Synopsis of issues relating to staff selection and skills development*

The importance of the skills in a multi-disciplinary team confirms that CSFs identified in the process category above are linked to the quality, qualifications and experience of the team members involved. Furthermore, important personal and intra-personal skills and attributes were identified as the ability to multi-task, to acquire new skills, and to understand the networked environment that characterizes e-Learning, as well as the

more traditional communication, negotiation and leadership skills. Table 15 illustrates this further.

<i>Ensure that people involved are multi-skilled and are able to multi-task</i>	
<i>Determine what skills are needed to design a curriculum that meets the learners' needs</i>	
<ul style="list-style-type: none"> <li>Staff (academics and developers) must be qualified and experienced</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Do all involved understand requirements and planning?</li> <li>- Is everyone aware of the need to rework and redevelop courses (iterative design)?</li> </ul>
<i>Create an environment where expert / qualified people are able to work together</i>	
<ul style="list-style-type: none"> <li>Involve people with right background: academic, educational technology, industry</li> </ul>	<i>Examples of issues for consideration:</i> <ul style="list-style-type: none"> <li>- Do subject specialists take priority over educational technology skills?</li> <li>- Can alumni be involved?</li> <li>- Should commercial – v – in-house design be considered?</li> </ul>

Table 15. CSFs for e-Learning Curriculum Design: People and Skills Issues

### 8.5 CSFs for Instructional Systems Design

Under the framework category relating to curriculum design, a total of 178 statements were received from participants. These have been distilled into the following CSFs:

- 8.5.1 Ascertain staff suitability and ensure effective collaboration of all involved
- 8.5.2 Ascertain suitability of pedagogical approach
- 8.5.3 Attend to process issues
- 8.5.4 Address the challenge of designing for learning

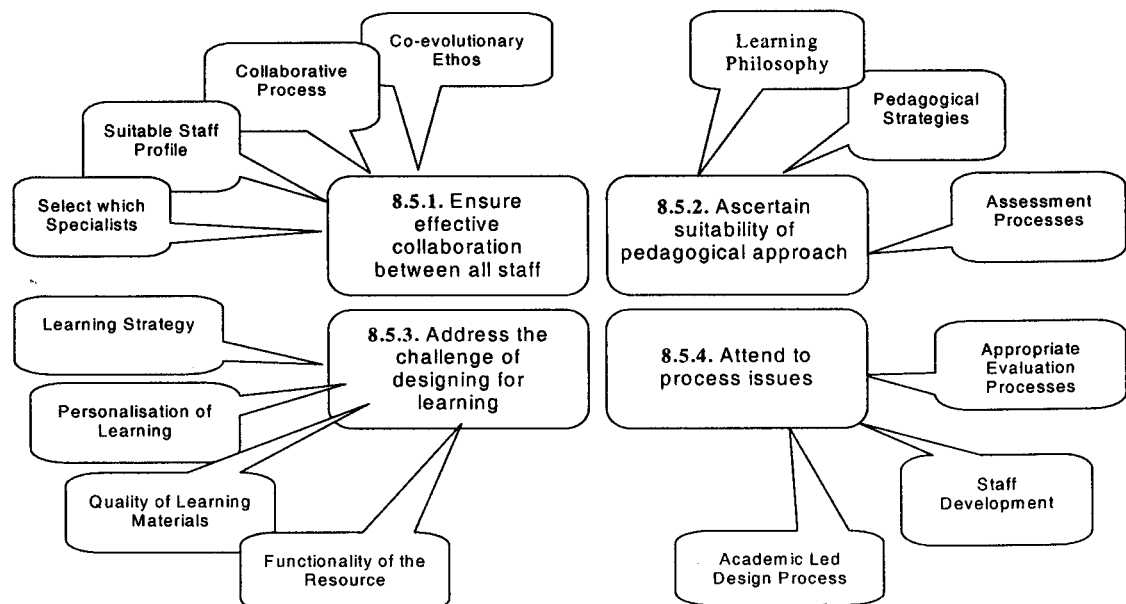


Fig. 17 Synopsis of e-Learning CSFs for ISD



A visual representation of the main themes emerging from the e-Learning ISD CSF ontology can be seen in the diagram above in Figure 17. Once again, this provides a synopsis of the numbered and colour-coded ISD and associated sub-themed CSFs.

### **8.5.1 Ascertain Staff Suitability and Collaboration**

#### *8.5.1.1 Establish which specialist staff need to be involved in the ISD process*

In this particular discussion, it was felt that the initial activity should be to decide which experts need to have a role in the process of ISD. Since the aim of ISD is to produce educational environments, respondents believe that educationalists, subject matter experts and technologists must interact and understand each other, in an integrated and systematic manner, making use of appropriate frameworks. Hence, ISD must integrate the contributions of *educationalists* who will be primarily responsible for the curriculum design, learning activity specification and learning material creation, *subject matter experts* who are responsible for the content materials, and the *technologists* who will be responsible for the learning environment design, development and implementation.

#### *8.5.1.2 Determine profile of staff involvement*

Once the design team has been identified, the next task is to ensure everyone involved has the necessary skills and knowledge. To ensure motivation, it was suggested that there needs to be a system of recognition and reward. It was considered that it would be helpful to foster a culture of collaborative work, as the team cannot function properly without this. However, one respondent wanted to explicitly note that there needs to be respect for educational specialists rather than an overemphasis on technology.

#### *8.5.1.3 Make certain of effective collaborative processes involving all specialists*

Continuing the theme of collaboration, it was suggested that the ISD process should be based on cross-functional teams. Even where experts are not directly involved in the

design of the learning setting, it was considered that all appropriate specialists need to be consulted in order for the very complex process of e-Learning delivery to be successful. These may include subject domain experts, educational specialists, academic staff, faculty, teachers, librarians, IT developers, instructional designer, coach, and former students.

#### *8.5.1.4 Create a co-evolutionary ethos*

As stated before, ISD methodologies and frameworks must, in a first stage, establish the educational requirements for the particular subject matter and then, in a second stage, develop the environment where learning is to occur. The collaboration, team work and complementarity of skills and specific sets of knowledge become therefore crucial for the success of e-Learning. All staff need to be encouraged to share and collaborate in good practice and in particular, to develop a common understanding between educational experts and developers, leading to the development of a shared process and understanding. The sustainability of such integrated cross-functional teams will therefore depend on mutual respect, good communication channels and the creation of common understandings and language. The result of these interdisciplinary team efforts will hopefully be a co-evolution of theories, models, strategies and even frameworks.

#### *8.5.1.5 Synopsis of staff suitability and collaboration issues*

A number of respondent statements were related to staffing, key of which were to establish which specialist staff need to be involved in the ISD process, to determine suitability of staff involved, to make certain ISD is an effective collaborative process involving all specialists and to create a co-evolutionary ethos.

<b><i>Ascertain staff suitability and ensure effective collaboration of all involved</i></b>	
<b><i>Establish which specialist staff need to be involved in the ISD process</i></b>	
<ul style="list-style-type: none"> <li>Decide which experts in particular need to have a role</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Who should be involved: academics, educational specialists, educational technology/ instructional design specialists, technical staff/ ICT (Information Communication Technology) specialists?</i></li> </ul>
<b><i>Determine profile of staff involvement</i></b>	
<ul style="list-style-type: none"> <li>Ensure everyone involved has the necessary skills and knowledge</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Is there a system of recognition/reward to ensure motivation?</i></li> <li><i>Does a culture of collaborative work exist?</i></li> <li><i>Is there respect for educational specialists?</i></li> </ul>
<b><i>Make certain that it is an effective collaborative process involving all specialists</i></b>	
<ul style="list-style-type: none"> <li>Base the ISD process on cross-functional teams</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Have all appropriate specialists been consulted: i.e. domain experts, educational specialists, academic staff, faculty, teachers, librarians, IT developers, instructional designer, coach, and former students?</i></li> </ul>
<b><i>Create a co-evolutionary ethos</i></b>	
<ul style="list-style-type: none"> <li>Encouraged staff to share and collaborate in good practice</li> </ul>	<b><i>Examples of issues for consideration:</i></b> <ul style="list-style-type: none"> <li><i>Is there a common understanding between educational experts and developers?</i></li> <li><i>Can this further develop a shared process and understanding: integrating team effort?</i></li> </ul>

Table 16. CSFs for ISD: Staffing Issues

## ***8.5.2 ISD-Related Pedagogical Issues***

### ***8.5.2.1 Consider the various pedagogical strategies (active learning, student learning, metaphors)***

The transformation of the curriculum design into an e-Learning course requires a clear awareness of the profile of learners and their pedagogical needs. The whole team therefore need to have knowledge of lifelong learning and student-centred strategies. In the design of the learning setting, it was felt that it would be necessary to identify missing knowledge and skills and attend to addressing this gap. Thinking about the student cohort, it would be appropriate to decide if it is necessary to adopt a blended learning approach, i.e. part online and part f2f. Consideration has to be given to whether e-Learning should consist of stand-alone units, i.e. as an extension to existing work. Particular attention needs to be paid to the type of tasks that learners will be asked to do and for technology to work, attention should be paid to making sure that the pedagogy is correct e.g. e-books used differently to DVD or CMC. Furthermore, participants believe

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that “pedagogy should drive technical use” (13/ICALT 2002) in ISD. Thus, ISD must not be “technologically driven” (20/E-Learn 2002). That is, ISD should be driven by curriculum design and clear learning outcomes, and not as very often proposed in the past by technology-centred fads. This implies that learning processes must be appropriate for student needs and teaching should not be based on web sources because this is the easy route.

#### *8.5.2.2 Base the pedagogical model on academics’ philosophy of learning*

One of the issues identified was that a pedagogical model based on an explicit and sound philosophy of learning should be selected. Participants placed an emphasis on rooting the e-Learning activities on constructivist principles. If learning is based on a constructivist philosophy, then it was felt that learning could more readily be developed for deep understanding rather than simple and shallow recall without real insight. Yet there was an awareness of the impact of the organisational culture and it was suggested that this pedagogy needs to fit in with current statues and institutional ordinances.

#### *8.5.2.3 Address testing and assessment processes*

Although academics might sometimes hope that learners might seek knowledge for the sake of knowledge itself, it is clear that assessment is a motivational driver in HE. Therefore, participants recommended that a suitable testing and assessment framework, including clear learning outcomes, should be devised. Details that need attention are issues such as how assessment will be arranged. This might be in formative incremental blocks or portfolios, or summative through end of phase/year examinations, etc. It is important that this is decided before designing the learning setting. It was suggested that assessment should be based on the application of knowledge rather than on simple recall tests. The question of how student feedback could be provided is crucial as this plays an important developmental role in the learning process for the next phase of the

learner's progression. It was recognised that institutional timetabling issues played a part and it was recommended that realistic assessment deadlines should be set, with enough time for exercises to be completed.

#### 8.5.2.4 Synopsis of ISD-related pedagogical issues

There were three broad themes that emerged around pedagogical issues; to consider the various pedagogical strategies, to base the pedagogical model on faculty's philosophy of learning and to address testing and assessment processes.

<b>Ascertain suitability of pedagogical approach</b>	
<i>Consider the various pedagogical strategies (active learning, student learning, metaphors)</i>	
<ul style="list-style-type: none"> <li>Establish a clear awareness of the profile of learners and their pedagogical needs</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Is it founded on knowledge of continuous learning?</i></li> <li><i>Is this based on knowledge of student-centred strategies?</i></li> <li><i>Has learning been developed for deep understanding?</i></li> <li><i>Has missing knowledge and skills been attended to?</i></li> </ul>
<ul style="list-style-type: none"> <li>Decide if it is appropriate to adopt a blended learning approach</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Should e-Learning consist of stand-alone units, i.e. as an extension to existing work?</i></li> <li><i>What sort of tasks should be incorporated?</i></li> </ul>
<ul style="list-style-type: none"> <li>Ensure that pedagogy drives technical use</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Have approaches that are not technologically driven been adopted?</i></li> <li><i>Is pedagogy correct for technology to work, e.g. e-books used differently to DVD or CMC?</i></li> <li><i>Are learning processes suitable and not just teaching what is on the web?</i></li> </ul>
<i>Base the pedagogical model on faculty's philosophy of learning</i>	
<ul style="list-style-type: none"> <li>Select an appropriate pedagogical model with a strong philosophy of learning</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Is this rooted in constructivist principles?</i></li> <li><i>Does this pedagogy fit in with current statutes and institutional ordinances?</i></li> </ul>
<i>Address testing and assessment processes</i>	
<ul style="list-style-type: none"> <li>Devise a suitable testing and assessment framework</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Are there clear learning outcomes?</i></li> <li><i>Will assessment be in incremental blocks: end of phase/year etc.?</i></li> <li><i>Can it be ensured that assessment is based on the application of knowledge rather than on simple recall tests?</i></li> <li><i>How will feedback be provided?</i></li> <li><i>What is the way to give feedback?</i></li> </ul>
<ul style="list-style-type: none"> <li>Set realistic assessment deadlines</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li><i>Has enough time for exercises been established?</i></li> <li><i>Has institutional timetable been taken into account when devising exercises for students?</i></li> </ul>

Table 17. CSFs for ISD: Pedagogy

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### ***8.5.3 Attend to ISD-Related Process Issues***

#### *8.5.3.1 Ascertain that the design process will be academic led*

With respect to the design process, participants stated that the process must not be technologically driven and that an “armoury of techniques” (14/ICCE 2002) is needed. This armoury should include both technological and educational components. These need to be integrated by ISD methodologies that enable the dialogue between the different groups. A methodology involving a collection of procedures, techniques, tools, and documentation aids that help developers in their efforts to implement a new learning environment is needed. It was recommended that there is a “[...] common understanding among the developers, educators and end-users, as a good process for them to co-operate” (11/ICALT 2002). The technology needs to be turned from constraint into opportunity and should not be technology driven. Nevertheless, it was suggested that the full range of techniques should be contemplated. In addition, it was felt that this should be academic led, with administrative input rather than the other way round.

#### *8.5.3.2 Ensure appropriate change management procedures are in place*

Academic acceptance has been recognized as one of the fundamental CSFs for successful e-Learning. Participants proposed that this acceptance is dependent on guaranteeing good communication between educationalists and technologists, creating formalized processes for collaboration, cooperation and evaluation and connecting best practices both within the institution and from other institutions’ experiences. This will enable co-ownership of design solutions and delivery strategies, the emergence of e-Learning champions and therefore allow for better rates of acceptance within the institution. However, learning environments implemented in traditional HE settings usually require processes of change management. These processes, although not

necessarily always within the remit of instructional design processes, need nonetheless to be considered both at implementation and delivery stages. It was considered that academic acceptance might be ensured if appropriate change management procedures are in place. Yet, academic staff do need reassurance that e-Learning actually adds value to the traditional lecture and that this kind of approach can be reasonably open-ended. Academics might be more accepting if reassurance can be given that such changes will bring new learning opportunities. Nevertheless, domain experts and developers and education experts need help to talk a common language - this will improve if good communication lines can be established. It was suggested that all aspects of the process be formalised and connected to best practices.

#### *8.5.3.3 Pay enough attention to suitable staff development, particularly re authoring techniques*

The transition from a traditional face-to-face learning process to one based on technology enhanced environments, poses serious challenges and cognitive conflicts on both academic staff and students. Consequently, participants have focused heavily on the need for training and support in the use of the e-Learning environments and corresponding affordances. It was deemed vital to pay sufficient attention to suitable staff development, particularly with regard to authoring techniques.

On the other hand, it was considered that academic staff (often referred to by US colleagues as faculty) and teachers need to be encouraged to participate. However, if e-Learning is to succeed, staff; academic, teachers, designers, need to be properly prepared “in all parts of the process” (07/ICALT 2002). It is by no means certain that all staff have a relevant understanding of the virtual environment. Therefore, it was noted that if teachers are required to create online material, good preparation, training and support must be provided.

Therefore, due consideration must be given as to how to best provide this assistance. It might be necessary to review training provision for academics and all other staff using technology and ICT to ensure that this is adequate and appropriate. In this respect, it needs to be ascertained if online help in the form of e-Manuals is sufficient and whether suitable backup support systems are in place.

#### *8.5.3.4 Decide on an appropriate evaluation process*

Evaluation was seen as a crucial component in ISD. Participants proposed that this should be a process of “continuous improvement” (12/ICCE 2002) that should consider both pedagogical and technical aspects of the design. Respondents also proposed that appropriate evaluation of all ISD processes had to be implemented. Formative evaluation processes in the form of piloting and testing need to be set up to ensure that the course setting will actually function as desired. In addition, suitable pedagogical evaluation processes have to be selected in order to ensure that a process of constant improvement can be carried out. If it is decided that a course should be evaluated for continuous improvement, the use of student feedback should be included in order to foster continual change and improvement.

#### *8.5.3.5 Synopsis of ISD process issues*

Following the argument proposed for pedagogical CSFs, the design of online learning environments usually involves a complex technical component and requires a systematic design and development methodology to translate those pedagogical models into the reality of practice. CSFs associated with this process were divided into four categories: the design process itself, academic acceptance, staff development and evaluation.



<b>Attend to process issues</b>	
<b>Ascertain that the design process will be academic led, with admin input rather than the other way round</b>	
<ul style="list-style-type: none"> <li>Identify an appropriate instructional design process</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Can the technology be leveraged to turn constraint into opportunity?</li> <li>Will the process be supported rather than constrained by the tools, i.e. no technology driven?</li> <li>Has the full armoury of techniques been contemplated, e.g. the possibility of integrating AI technology?</li> </ul>
<b>Ensure appropriate change management procedures are in place</b>	
<ul style="list-style-type: none"> <li>Reassure academic staff that eLearning adds value to the traditional lecture</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Assure the academic staff that e-Learning can be reasonably open-ended;</li> <li>Will the change bring new possibilities?</li> </ul>
<ul style="list-style-type: none"> <li>Help academic staff – ICT – specialists – educational specialists to talk a common language</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Have good communication lines been established between domain experts and developers and education experts?</li> </ul>
<ul style="list-style-type: none"> <li>Will all aspects of the process be formalised?</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Can this be connected to best practices?</li> </ul>
<b>Pay enough attention to suitable staff development, particularly regarding authoring techniques</b>	
<ul style="list-style-type: none"> <li>Include and enable academic staff (faculty)</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Can teachers be encouraged to participate?</li> <li>Are staff; academic, teachers, designers, properly prepared?</li> <li>Do all staff have a relevant understanding of the virtual environment?</li> </ul>
<ul style="list-style-type: none"> <li>If teachers are required to create the material, provide good support</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Has consideration been given as to how to best provide assistance?</li> <li>Is the training of academics and all other staff in technology and ICT adequate and appropriate?</li> <li>Is online help in the form of eManuals sufficient?</li> <li>What backup support systems are in place?</li> </ul>
<b>Decide on an appropriate evaluation process</b>	
<ul style="list-style-type: none"> <li>Put in place formative evaluation processes</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Has evaluation in the form of piloting and testing been set up? [i.e. media first: 1st evaluation with small group; 2nd feedback for real learning]</li> </ul>
<ul style="list-style-type: none"> <li>Establish suitable evaluation processes</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>What pedagogical evaluation processes have been decided upon?</li> <li>How will evaluation of design for constant improvement be carried out?</li> <li>Should the course be evaluated for continuous improvement?</li> <li>Will the use of student feedback be adopted to change and improve?</li> </ul>

Table 18. CSFs for ISD: Process Issues

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## ***8.5.4 ISD-Design Related Issues***

### *8.5.4.1 Decide appropriate strategies to ensure appropriate learning can take place*

Owing to the importance placed on ISD, participants felt that the design strategy should be based on research evidence of what works. It was pointed out that it required “purposeful use” rather than being adopted just for sake of fashion. Nevertheless, should e-Learning be adopted, it was considered that ISD should include new technologies and better methods, because old ones may not work as well. At an early stage, it is necessary to decide which instruction and delivery model should be chosen – possibilities include fully web-based (web-delivered); partially online (web-enhanced/blended); not online (CD / f2f) delivery models – for use at home, on campus, or somewhere else. In this sense, it is useful to consider the context of use in order to decide what is appropriate. Not only is it deemed necessary to consider where the learning might be carried out, but it is also important to ensure that the learning content be designed to suit as many learning styles as possible. Participants recognised the need for ISD processes to be pertinent to the subject domain and suggested that a suitable “ISD” process be identified. Finally, it was suggested that academics in the relevant content area need to have appropriate qualifications and experience for all this to work.

### *8.5.4.2 Think carefully about the possibilities for personalisation of learning*

Personalisation was high on the participants’ agenda and it was suggested that the design should be learner-centred if at all possible, with diverse learning paths for different students to be made available. This is related to the issue of student learning styles and it was felt that the design learning approach should incorporate this possibility. An emphasis was put on considering users’ desires, recommending that assorted layouts for different learners be developed. It was also considered that sufficient interactivity should be built in so that students would be able to “discover” by

themselves. Thus, with the possibilities afforded by technology in mind, individual interaction needs to be put in the forefront. The learning process needs to allow more dynamic intervention from students, with less passive observation:

“e-Learning demands a lot of attention being given to creating interaction and virtual classrooms, discussions, etc.”

(03/E-Learn 2002)

Not only should interaction between the student and the course content be considered, but interaction between “student-teacher” and “student-student” should be built in. In order to engage the students’ attention, aspects of student motivation need to be carefully considered. This might be accomplished by devising different ways for individuals to learn the same content / learning material. Participants wondered therefore if it might be possible to provide a “rich learning environment” (REAL) that would make this possible. In order to achieve this type of REAL, due consideration needs to be given to how structured the learning environment will be. If a highly structured environment is required, then it is essential that a decision is made as to the methodology required to achieve this end and this may either be a single method or make use of a “mixed methods” approach.

#### *8.5.4.3 Decide what level of quality of materials is required so that no lowering of learning standards occurs*

In order to fully engage students, it was considered necessary to offer good media presentation and to consider human computer interaction (HCI) issues. This involved converting the subject matter into electronic material, taking into account the functionality that the technology provides. If hyperlinks to outside resources are needed, then it is essential to ensure that these work and are regularly maintained. Moreover, the technology needs to include tools that will enable the learner to express

his/her ideas (as with concept maps). Finally, in this context, readability (in the form of font, spacing, margins, etc.) must be taken into consideration.

#### 8.5.4.4 Consider the functionality of the resource

This point is closely linked to the section above and participants advised that close attention should be paid to technical issues. These considerations include: user-friendliness; accessibility; adaptability; consistence; simplicity; ease-of-use; and robustness. The design of the learning setting needs to take into account how the curriculum designer feels that the material needs to be presented. If it is to engage the students' attention, the presentation will not only need to be informative, but it should also make the learning fun.

#### 8.5.4.5 Synopsis of ISD-design related issues

Despite the fact that the term "Instructional Systems Design" is a hotly contested one, participants nevertheless considered that it was necessary to ensure "good instructional design adapted to particular students and friendly and easy-access interfaces, because these things can improve the motivation to the students to learn, and also if the students have teaching support" (02/ICALT 2002). In this context, a successful curriculum design is wholly dependent on a good instructional design. Table 19 elaborates.

<i>Address the challenge of designing for learning</i>	
<i>Decide on an appropriate strategy to ensure appropriate learning can take place</i>	
<ul style="list-style-type: none"> <li>Base the ISD strategy on research evidence of what works</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Is it purposeful use rather than just for sake of keeping up with trends?</i></li> </ul>
<ul style="list-style-type: none"> <li>Decide which instruction and delivery model should be chosen</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Should delivery model be fully web-based (web-delivered); partially online (web-enhanced/blended); not online CD / f2f)?</i></li> <li>- <i>Should the ISD include newer and better methods and models for new technologies (old ones may not work)?</i></li> <li>- <i>What is context of use / what is appropriate?</i></li> <li>- <i>Will it be used in various situations (home, campus, other)?</i></li> <li>- <i>Can the design of learning content be as close as possible for "all" learning styles?</i></li> </ul>

<b>Address the challenge of designing for learning</b>	
<ul style="list-style-type: none"> <li>Establish ISD process pertinent to the subject domain</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Have suitable "ISD" processes been identified?</li> <li>Do academics in content area have the appropriate qualifications and experience?</li> </ul>
<b>Think carefully about the possibilities for personalisation of learning</b>	
<ul style="list-style-type: none"> <li>The design should be learner-centred if at all possible</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Are there different paths to learning for students?</li> <li>Does the approach incorporate student learning style?</li> <li>Have users' desires been considered?</li> <li>Will it be possible to develop different layouts for different learners?</li> </ul>
<ul style="list-style-type: none"> <li>Sufficient interactivity should be built in</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Are the students able to 'discover' by themselves?</li> <li>Has the individual interaction been put in the forefront line?</li> <li>Is interaction between student-teacher / student-student being built in?</li> <li>Can the learning process allow more dynamic involvement from students, less passive action?</li> <li>Have students' motivations been well thought-out?</li> </ul>
<ul style="list-style-type: none"> <li>Devise different ways to learn the same content / learning material</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Is it possible to provide a "rich learning environment"?</li> <li>What structure will the learning environment take?</li> <li>Highly structured?</li> <li>What methodology is required?</li> <li>Single method or mixed methods?</li> </ul>
<b>Decide what level of quality of materials is required so that no lowering of standards occurs</b>	
<ul style="list-style-type: none"> <li>Offer good media presentation (HCI)</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Is it possible to convert the subject matter into electronic material, taking into account the functionality the technology provides?</li> <li>Are hyperlinks to outside resources needed?</li> <li>Will the technology include tools which enable the learner to express his/her ideas (like concept maps)?</li> <li>Has readability been taken into consideration; font, spacing, margins?</li> </ul>
<b>Consider the functionality of the resource</b>	
<ul style="list-style-type: none"> <li>Pay attention to technical issues</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Will it be user-friendly?</li> <li>Will it be accessible?</li> <li>Will it be adaptable?</li> <li>Will it be consistent?</li> <li>Will it be simple and easy-to-use?</li> <li>Will it be robust?</li> </ul>
<ul style="list-style-type: none"> <li>Take into account how the material needs to be presented</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>Will the presentation be informative?</li> <li>Will it make learning fun?</li> </ul>

Table 19. CSF Ontology for ISD: Designing for Learning

## 8.6 Critical Success Factors for Delivery of E-Learning

Under the framework category relating to curriculum design, a total of 204 statements were received from participants. These have been distilled into the following CSFs:

- 8.6.1 Determine Staff and Students’ Attributes, Experience and Availability
- 8.6.2 Implement Relevant Delivery Model
- 8.6.3 Address Training Requirements
- 8.6.4 Provide Inspirational Leadership

A visual representation of the main themes emerging from the e-Learning Delivery CSF ontology can be seen in the diagram shown in Figure 18 below. This provides a synopsis of the key delivery CSFs and their associated sub-themes.

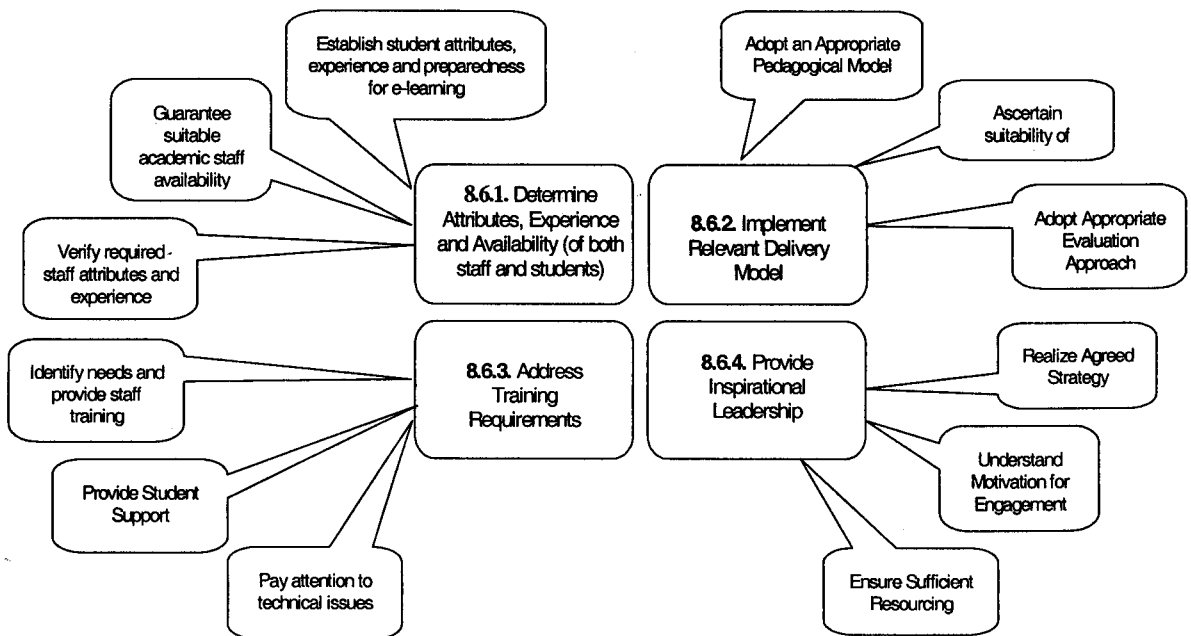


Fig. 18 Synopsis of e-Learning CSFs for e-Learning Delivery

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## ***8.6.1 Determine Staff / Students' Attributes, Experience and Availability***

### *8.6.1.1 Verify Required Staff Attributes and Experience*

Respondents were clearly aware of the need to check tutor experience before asking them to become involved in the delivery of e-Learning. In this context, the preparation of personnel involved as tutors is crucial. It would also be advisable to consult tutors, who have other perspectives and experience, about suitable CMC moderation of online groups, etc. Furthermore, tutors need to not only to be responsive and have excellent facilitation skills, but must also have sufficient ICT expertise and confidence to be unflustered by technical hitches. However, it is necessary not only to ascertain tutors' attributes and experience, but those of students too, as discussed in 8.5.1.3.

### *8.6.1.2 Guarantee Suitable Academic Staff Availability*

The changing nature of teaching and learning begs the question as to whether tutors are properly prepared for future roles as: coaches; tutors; mentors; content producers; facilitators; researchers, etc. Beyond the need for skills, because of the flexible nature of e-Learning, it is also necessary to ensure the availability of tutors / instructors. Mentors and tutors need to be available for online chats at different times to f2f courses, and it may be necessary to allocate local mentors for (distance) international students in incompatible time zones.

### *8.6.1.3 Establish Student Attributes, Experience and Preparedness for e-Learning*

Workshop participants were not only concerned with tutor skills. It was suggested that it might be necessary to verify students' computer literacy. In addition, there may be a need to ascertain that students have or can develop sufficient independent learning abilities and the motivation to stay with an e-Learning programme which may at times be more difficult than its f2f counterpart. Thus, there was an emphasis on the

sufficiency of student skills and levels of computer literacy. A link was also made to the suitability of students' learning styles and their ability to learn independently in a self-motivated fashion, as refined by e-Learning.

#### 8.6.1.4 *Synopsis of issues pertaining to staff and students' attributes, experience and availability*

As discussed in the literature, tutoring in e-Learning environments has been widely considered as a crucial factor in the success of computer-mediated collaborative learning activities. Thus, staffing issues has been selected as the first of the four CSFs within the e-Learning Delivery category.

<b>Determine Attributes, Experience and Availability (of both staff and students)</b>	
<b>Verify Required Staff Attributes and Experience</b>	
<ul style="list-style-type: none"> <li>Check tutor experience of eLearning delivery</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- Are personnel prepared?</li> <li>- Do tutors have facilitation skills?</li> <li>- Are e-tutors congenial</li> <li>- Do tutors have sufficient technical expertise and ICT confidence?</li> <li>- Have tutors been consulted about suitable design and development?</li> </ul>
<b>Guarantee Suitable Academic Staff Availability</b>	
<ul style="list-style-type: none"> <li>Ensure availability of tutors / instructors</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- What delivery roles are required?</li> <li>- Are teachers prepared for future roles; coaches, tutors, mentors, content producer, facilitator, researcher etc.?</li> <li>- Are mentors available for online chats, etc. and local mentors available for (distance) international students?</li> </ul>
<b>Establish Student Attributes, Experience and Preparedness for e-Learning</b>	
<ul style="list-style-type: none"> <li>Verify students' computer literacy; independent learning abilities; motivation</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- Are student skills sufficient?</li> <li>- Are they computer literate</li> <li>- Have they suitable learning styles?</li> <li>- Are they independent learners?</li> <li>- Are they self-motivated?</li> </ul>

Table 20. CSFs for e-Learning Delivery: Staffing Issues



## ***8.6.2 Implement Relevant Delivery Model***

### *8.6.2.1 Adopt an Appropriate Pedagogical Model*

It was deemed necessary to consider incorporating a variety of learning and teaching methods such as learner-centred approaches. In common with statements made in the sections dealing with curriculum design and instructional systems design, here participants emphasised the need to provide sufficient opportunities for interaction, collaboration, and sharing of results. Given the emphasis on collaboration in previous discussions, there was concern that it should be possible to facilitate the community of learners in group meetings. The thought was expressed that students' skills could also be brought to bear and that they could also act as tutors. Student convenience also has to be considered and it was thought that on-campus students should also be able to participate if they so desired. In the delivery process, it was deemed essential that students are accorded the respect they deserve. If learning is to be delivered through a technological medium, participants stressed that it needed to enhance performance and that the value that ICT affords must be determined. Once the question of fit has been determined, the needs of students must be investigated and accommodated.

### *8.6.2.2 Ascertain suitability of modes*

The issue of whether the delivery will be fully online or blended, i.e. e-Learning offered alongside traditional learning, must have been fully and well thought-out prior to student enrolment. If it is to be blended, the question of how much should be online, f2f or on CD must have been considered. The extent to which communication should be synchronous or asynchronous / discussion forums will fundamentally affect the delivery style. There were sentiments expressed that a good balance of f2f and virtual environments may be desirable. Related to this, the suitability of the mode for home / school / on global basis must have been resolved. It was considered that the provision

of regular f2f provision should be made where desirable and possible. Where the decision had been taken for international courses to have a blended element, it is necessary to appoint local f2f tutors, with all the skills required to dovetail this learning with students' online experiences. Finally, in order to ensure the students' learning was timely, it was expressed that the content should be regularly updated.

#### *8.6.2.3 Adopt Appropriate Evaluation Approach*

Both evaluation (of the overall course programme) and assessment (of student achievement) is a crucial issue and must be decided upon relevant pedagogical grounds. In common with all formal learning, student achievement needs to be judged in relation to previously determined strategic goals. However, the quality of delivery itself needs to be determined and there was an expression that the process should be subject to an iterative evaluation in order to achieve continuous improvement. As one might expect, there are a number of different forms of evaluation, and it is necessary to decide which of these are appropriate at which point. If both pre-tests or post-tests are to be used, how these are implemented will have an impact on the results. One suggestion was that synchronous interaction should be used in order to receive and offer immediate feedback. Such feedback can be drawn on to solve problems. Finally, students need to be given an opportunity to ask questions about the system and to have a means to complain if needs be. Thus, genuine levels of satisfaction can be assessed.

#### *8.6.2.4 Synopsis of issues relating to the implementation of relevant delivery models*

Despite the literature on adult learning, which includes HE, referring to the term andragogy, it seemed that 'pedagogy' was the more familiar term. Thus, participants discussed the need for a pedagogical model that would emerge from academic staff. Participants stressed that e-Learning must involve the creation of interactive online environments, suitably reviewed by appropriate evaluation. Table 21 shows more detail.

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<b>Implement Relevant Delivery Model</b>	
<b>Adopt an Appropriate Pedagogical Model</b>	
<ul style="list-style-type: none"> <li>• Pedagogical model should emerge from faculty</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Has a variety of learning and teaching methods been used, e.g. learner-centred?</i></li> <li>- <i>Are there sufficient opportunities for interaction, collaboration, sharing results?</i></li> <li>- <i>Can group meetings be facilitated (community of learners)?</i></li> <li>- <i>Can students act as tutors?</i></li> <li>- <i>Has student convenience been considered? (Can students be on-campus if desired?)</i></li> <li>- <i>Have students been accorded the respect they deserve?</i></li> <li>- <i>Will it enhance performance?</i></li> <li>- <i>Has the value that ICT affords study been determined?</i></li> <li>- <i>Has the question of fit been determined and students at risk identified?</i></li> </ul>
<b>Ascertain suitability of modes</b>	
<ul style="list-style-type: none"> <li>• Create an interactive online environment</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Will e-Learning be offered alongside traditional learning methodologies?</i></li> <li>- <i>Has the question of online vs. blended been fully considered - how much should be online / f2f / CD?</i></li> <li>- <i>To what extent should synchronous or asynchronous communication / discussion forums be used?</i></li> <li>- <i>Is there a good balance of f2f and virtual environments?</i></li> <li>- <i>Is mode suitable for home / school / on global basis?</i></li> <li>- <i>Will regular face to face be provided where desirable and possible?</i></li> <li>- <i>Should there be local f2f tutors where courses are offered internationally?</i></li> <li>- <i>Will content be updated in timely way?</i></li> </ul>
<b>Adopt Appropriate Evaluation Approach</b>	
<ul style="list-style-type: none"> <li>• Decide on relevant pedagogical evaluation and assessment</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Can achievement be judged in relation to previously determined strategic goals?</i></li> <li>- <i>Can iterative evaluation on processes for continuous improvement be implemented?</i></li> <li>- <i>How will quality of delivery be determined?</i></li> <li>- <i>What forms of evaluation are apt?</i></li> <li>- <i>Will pre-post tests be used?</i></li> <li>- <i>Can synchronous interaction be used to offer immediate feedback?</i></li> <li>- <i>Can feedback be drawn on to solve problems?</i></li> <li>- <i>Will levels of satisfaction be assessed, i.e. will students be given a means to ask about the system and complain?</i></li> </ul>

Table 21. CSFs for e-Learning Delivery Models

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### ***8.6.3 Address Training Requirements***

#### *8.6.3.1 Identify needs and provide staff training*

Given the emphasis on the amount of new knowledge and skills that e-Learning tutors have to bring to bear, it could be anticipated that participants would emphasise the provision of essential training for all levels of staff. In this respect, adequate training / education of lecturers teaching courses needs to be assured and staff development / user training and ongoing support must be put in place for stakeholders. The training offered to tutors must cover the various roles such as becoming mentors, conference moderators, online teachers and facilitators. Not only are these skills essential, but technical and administrative support must also be put in place for lecturers. Academic staff and tutors should have the opportunity to be trained in the use of technology if they do not have the wherewithal to pick up these skills on their own. One participant wondered whether courses such as the European Computer Driving Licence (ECDL) should be in place for all to provide a basic level of technological training. Others recommended that short appropriate e-Learning courses should be offered. Finally, and still related to staff training, a supportive “just-in-time” help environment should be available to assist staff in a timely manner when needed.

#### *8.6.3.2 Provide Student Support*

On the other side of the coin, student support is also vital. It was suggested that technological, pedagogical, and personal learner support should also be made available to students. All staff (academics educational specialists, IT support, researchers) and students should be involved in this activity. Students’ user needs and/or individual learner requirements must be fully understood in order to assure appropriate student training can be provided. It was suggested that user technical support mechanisms

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(e.g. helpdesk, FAQs) should be set up. Yet the focus was not solely directed on the support of technical needs, and attention was drawn to the requirement to think about intangible needs (social, personal support, etc.). On a wider level, campus services need to be considered, and timely support for enrolment provided.

### 8.6.3.3 *Pay attention to technical issues*

With e-Learning inextricably linked to technology, one of the most obvious necessities is to provide an appropriate infrastructure and communication system which is both robust and reliable. Not only does the technology need to work, but it also needs to be effective and sustainable. Participants felt that IT systems need to be sufficient, seamless, transparent and ordered so that IT does not interfere with the learning. One person (16/ICCE) recommended the acronym “RAS”: Reliable, Available, Serviceable. With an ever-increasing demand for speedy services, the institution and technical staff need to ensure that the distribution systems are fast enough. To make sure that everything works properly, it was advised that a process of developmental testing should be put in place. For learner success, it was recommended that access to appropriate PC technology with suitable e-Learning software and communication tools be provided. On-campus, sufficient labs and computers with up-to-date features, (such as good Internet connections), printers must be provided and for off-site students, access to necessary technology must be made. Common [and standard] ways for delivering the content (e.g. web-based) should be exploited and the use of project-based design and development tools was recommended. Referring back to the personalisation theme, respondents again suggested that adaptability (tailor to learner’s aptitude), customisability and usability of e-Learning systems should be taken into account. Furthermore, with an emphasis on accessibility, it was noted that all design, development and tutoring staff must be made aware of the necessity to provide

accessible e-Learning. To this end, users need to be consulted to ensure usability, ease of use, and attractive interfaces are offered to encourage student use. Systems must be adaptable to needs of learners if users are to be provided with the learning they need and want.

#### 8.6.3.4 Synopsis of training and support issues

According to participants, the need for new tutoring and learning skills in e-Learning environments requires the provision of appropriate programmes of continuing professional development for staff and e-skills for students. This must be accompanied by suitable technical support. This is represented by responses in Table 22.

<b>Address Training Requirements</b>	
<b>Identify Needs and provide staff training</b>	
<ul style="list-style-type: none"> <li>• Provide essential training for all levels of staff</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- Can adequate training/education of lecturers teaching courses be assured?</li> <li>- Is staff development / user training and ongoing support in place for stakeholders?</li> <li>- Is training offered for tutors to become mentors, conference moderators, online teachers and facilitators?</li> <li>- Is technical and administrative support for lecturers in place?</li> <li>- Can academic staff and tutors be trained in using the technology?</li> <li>- Are courses such as ECDL (European Computer Driving Licence) in place for basic level of technological training?</li> <li>- Are other short appropriate e-Learning courses offered?</li> <li>- Is there a supportive environment (help when needed)?</li> </ul>
<b>Provide Student Support</b>	
<ul style="list-style-type: none"> <li>• Make sure technological, pedagogical, and personal learner support is available</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- Are all staff (academics educational specialists, IT support, researchers and students) involved?</li> <li>- Have students' user needs and/or individual learner requirements been understood?</li> <li>- What student training needs to be provided?</li> <li>- Have user technical support mechanisms (e.g. helpdesk, FAQs) been set up?</li> <li>- Has attention been paid to the intangibles (social, support, etc.)?</li> <li>- What campus services are available?</li> <li>- Is there timely support for enrolment?</li> </ul>

<b>Address Training Requirements</b>	
<b>Pay attention to Technical Issues</b>	
<ul style="list-style-type: none"> <li>• Provide appropriate Infrastructure</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Is infrastructure robust and reliable?</i></li> <li>- <i>Are communication systems effective and sustainable?</i></li> <li>- <i>Are IT systems sufficient, seamless, transparent and ordered</i></li> <li>- <i>Are systems RAS: Reliable, Available / Serviceable</i></li> <li>- <i>Are distribution systems fast enough?</i></li> <li>- <i>Is there a process of developmental testing in place?</i></li> </ul>
<ul style="list-style-type: none"> <li>• Ensure access to appropriate PC technology with suitable e-Learning software and communication tools</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>In on-campus, have sufficient labs and computers with up-to-date features, (like good Internet connections), printers been provided?</i></li> <li>- <i>If off-site, do all students have access to necessary technology?</i></li> <li>- <i>Are common [and standard] ways for delivering the content (e.g. web-based) in use?</i></li> <li>- <i>Are design and development tools project-based?</i></li> </ul>
<ul style="list-style-type: none"> <li>• Ensure adaptability (tailor to learner's aptitude), customisability and usability of e-Learning systems</li> </ul>	<p><i>Examples of issues for consideration:</i></p> <ul style="list-style-type: none"> <li>- <i>Are all design, development and tutoring staff aware of the necessity to provide accessible e-Learning?</i></li> <li>- <i>Have users have been consulted to ensure usability, ease of use?</i></li> <li>- <i>Have attractive interfaces been offered to encourage student use?</i></li> <li>- <i>Are systems adaptable to needs of learners?</i></li> <li>- <i>Are users getting what they want?</i></li> </ul>

Table 22. CSFs for e-Learning Delivery: Training Issues

## **8.6.4 Provide Inspirational Leadership**

### **8.6.4.1 Realize Agreed Strategy**

Referring back to the issue of transforming the way teaching and learning is carried out, discussed in the organisational issues section, it was suggested that staff should be involved in change processes. However, there was a caveat here too that issues of ownership and IP need to be clarified. Furthermore, it was noted that issues of culture / class / gender can be problematic and also need to be resolved. In this part of the findings, there was a focus on the changing role of educational professionals. It was accepted that e-Learning opens up options for students, but at the same time may well be threatening to tutors and it was thought that in these circumstances, a slow and deliberate transition could be put in place. If e-Learning is to succeed, it was suggested that it is highly desirable to encourage a culture of open and evolving commitment.

#### *8.6.4.2 Understand Motivation for Engagement*

Motivational factors of the educational staff are fundamental, and it was recommended that institutional leaders offer recognition for staff commitment. Thus, genuine ways to acknowledge dedication of teaching staff need to be found. On the other hand, the motivations of VLE providers and developers need to be considered as well since these may not be the same as for delivery staff. Therefore, incentives for the application of an e-Learning framework may be appropriate. The motivation of learners also has to be appreciated. As discussed within the context of curriculum and instructional design, it needs to be verified whether students are sufficiently independent and motivated to able to undertake computer-based learning. Therefore, where e-Learning is deemed desirable, targets and customers must be well-defined. Thus, motivational factors of learners, i.e. rewards for learners, need to be established because if students see the benefits, then there is a higher possibility of success. Student users must want it if they are to use it. From a leadership point of view, an understanding of what is deemed acceptable and usable is vital. Academics need to be sure that e-Learning will work, and to know how teaching staff (if different from academic staff) are going to use it.

#### *8.6.4.3 Ensure Sufficient Resourcing*

There was a suggestion that the demand for e-Learning as a method of learning needs to be created or at least measured. The teaching staff (tutors) have to be persuaded of the need for convergence and flexibility to enhance students learning experiences and a move away from normal tutor/student expectation (2 lectures, 1 lab, 1 tutorial, etc. per week) has to be encouraged. If this is to be achieved, then sufficient funding must be guaranteed. This raises issues of affordability and viability. In this respect, time resourcing, e.g. more time to teach online, must also be taken into account.



#### 8.6.4.4 Synopsis of leadership concerns

There are matters that have to be dealt with at a higher level, and therefore the issue of institutional leadership was discussed in a number of ways. It was considered vital to follow through agreed strategy and bring strategic plans to fruition. Table 23 elaborates.

<b>Provide Inspirational Leadership</b>	
<b>Realize Agreed Strategy</b>	
<ul style="list-style-type: none"> <li>Involve staff in change processes</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Have issues of ownership and IP been clarified?</li> <li>Have issues of culture / class / gender been resolved?</li> </ul>
<ul style="list-style-type: none"> <li>Focus on to changing role of educational professionals</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Opens up options for students but may be threatening to tutors - could a slow and transition be put in place?</li> <li>Is it possible to encourage a culture of open and evolving commitment?</li> </ul>
<b>Understand Motivation for Engagement</b>	
<ul style="list-style-type: none"> <li>Offer recognition for staff commitment</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Have motivational factors of the educational staff been determined?</li> <li>Is there a way to acknowledge dedication of teaching staff?</li> <li>Is motivation of VLE providers and developers same as delivery staff?</li> <li>Are there incentives for the application of an e-Learning framework?</li> </ul>
<ul style="list-style-type: none"> <li>Appreciate motivation of learners</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Has it been determined whether students are sufficiently independent and motivated to able to undertake computer-based learning?</li> <li>Where e-Learning is deemed desirable, are targets and customers well-defined?</li> <li>What are motivational factors of learners i.e. rewards for learners?</li> <li>Can students see the benefits?</li> <li>Do student users want it and will they use it?</li> </ul>
<ul style="list-style-type: none"> <li>Understand what is deemed acceptable and usable</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Can academic staff be convinced that e-Learning will work, i.e. do they have a wish to use and develop new tools?</li> <li>How are teaching staff going to use it?</li> </ul>
<b>Ensure Sufficient Resourcing</b>	
<ul style="list-style-type: none"> <li>Create (or at least measure) the demand for eLearning as a method of learning</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Can teaching staff be persuaded of the need for convergence and flexibility to enhance students learning experiences?</li> <li>Can a move away from expectation of 2 lectures, 1 lab, 1 tutorial, etc. per week be encouraged?</li> </ul>
<ul style="list-style-type: none"> <li>Guarantee sufficient funding</li> </ul>	<b>Examples of issues for consideration:</b> <ul style="list-style-type: none"> <li>Have issues of affordability and viability been determined?</li> <li>Can time resourcing, i.e. to teach online, be taken into account?</li> </ul>
Table 23. CSFs for e-Learning Delivery: Leadership Issues	

All findings will now be presented in an emergent ontology (Figures 19-23).

### 8.7 Emergent Ontologies

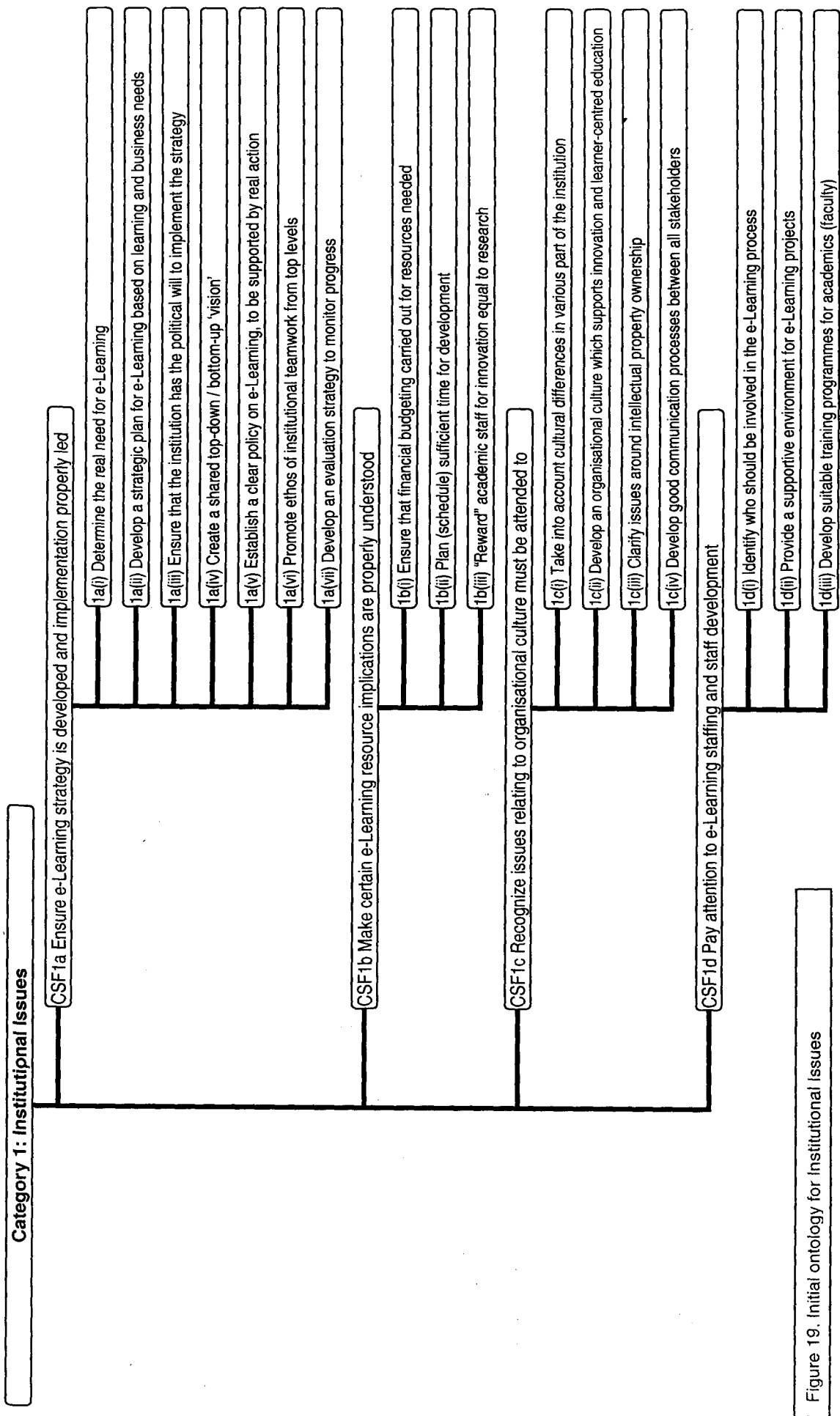


Figure 19. Initial ontology for institutional issues

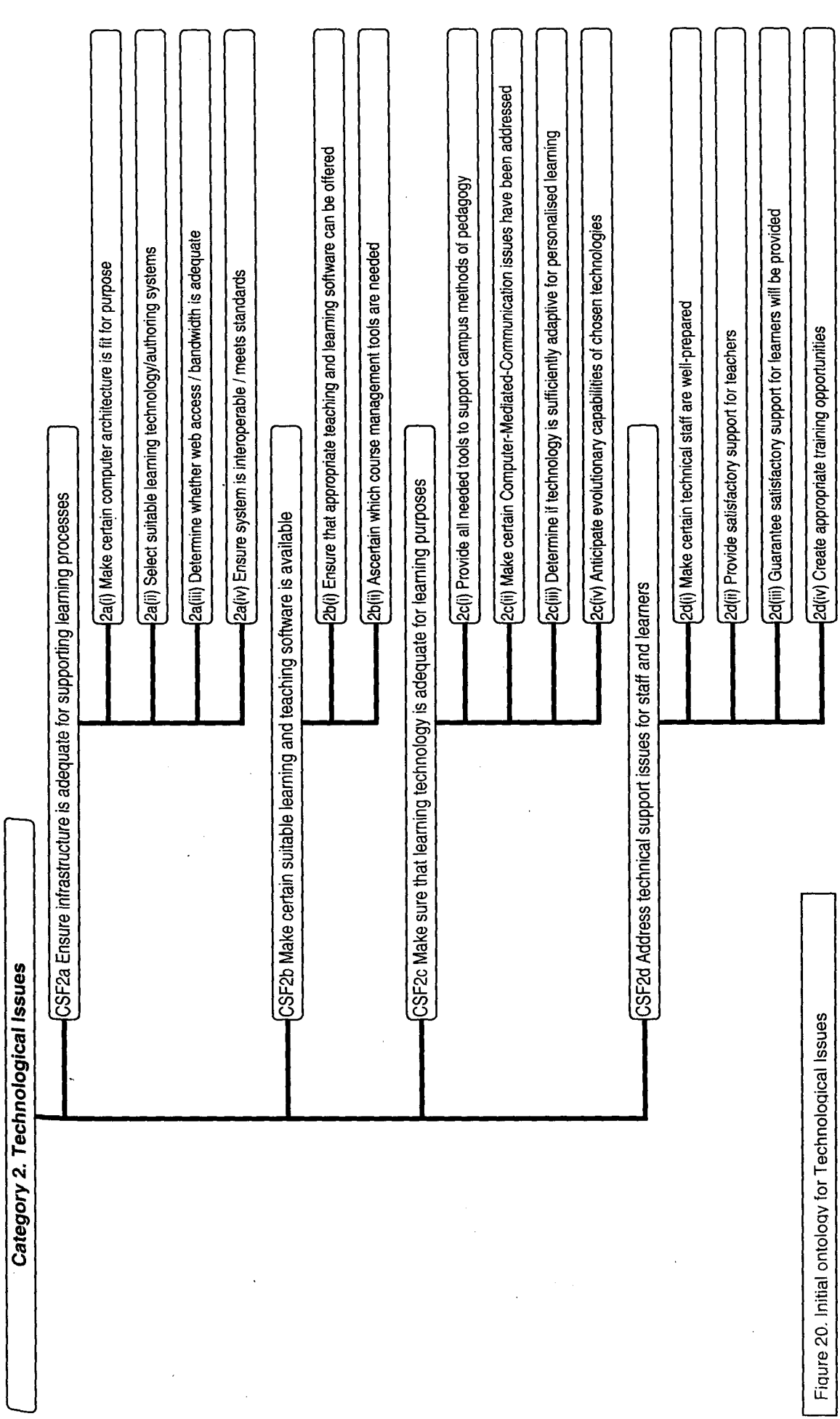


Figure 20. Initial ontology for Technological Issues

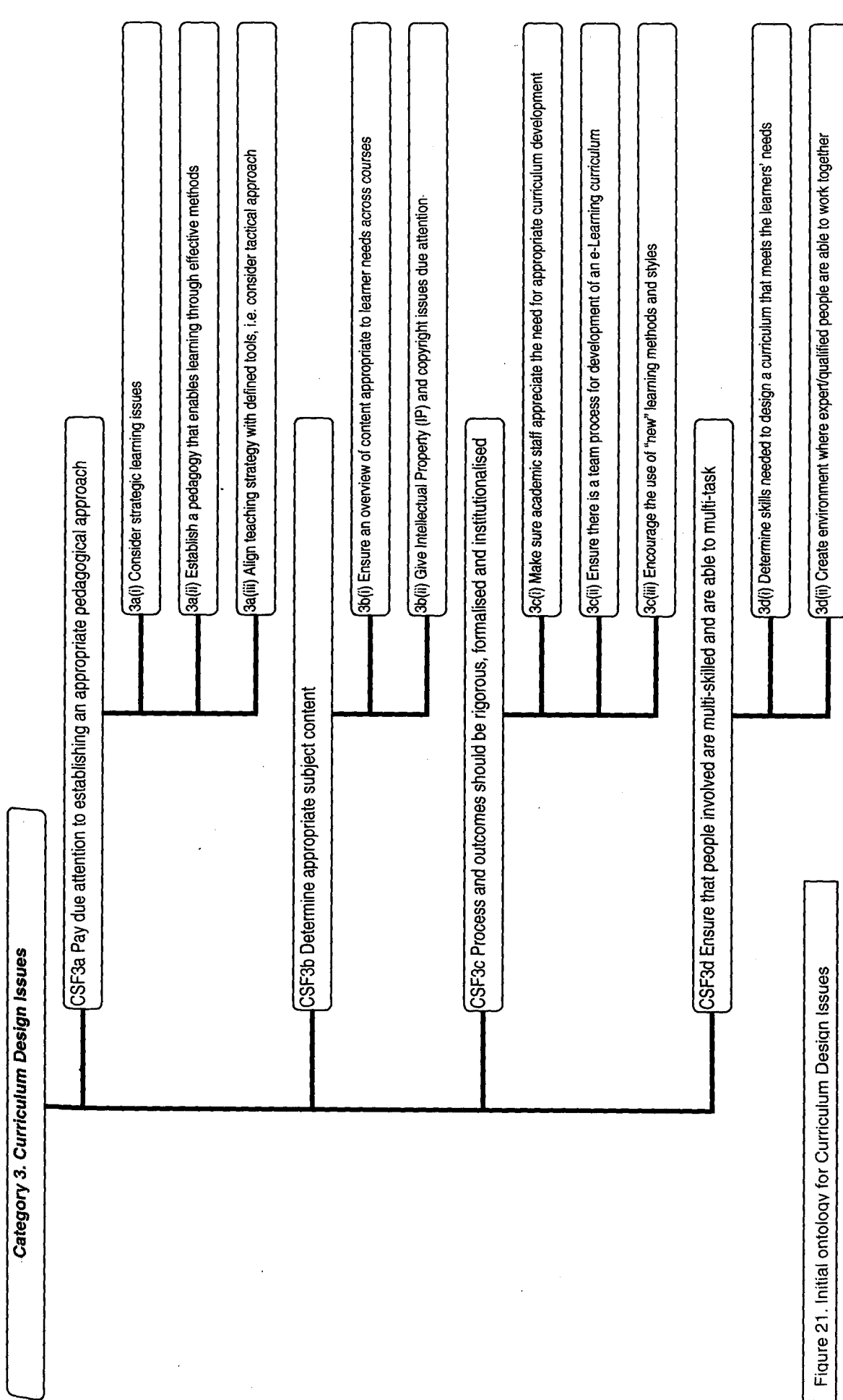


Figure 21. Initial ontology for Curriculum Design Issues

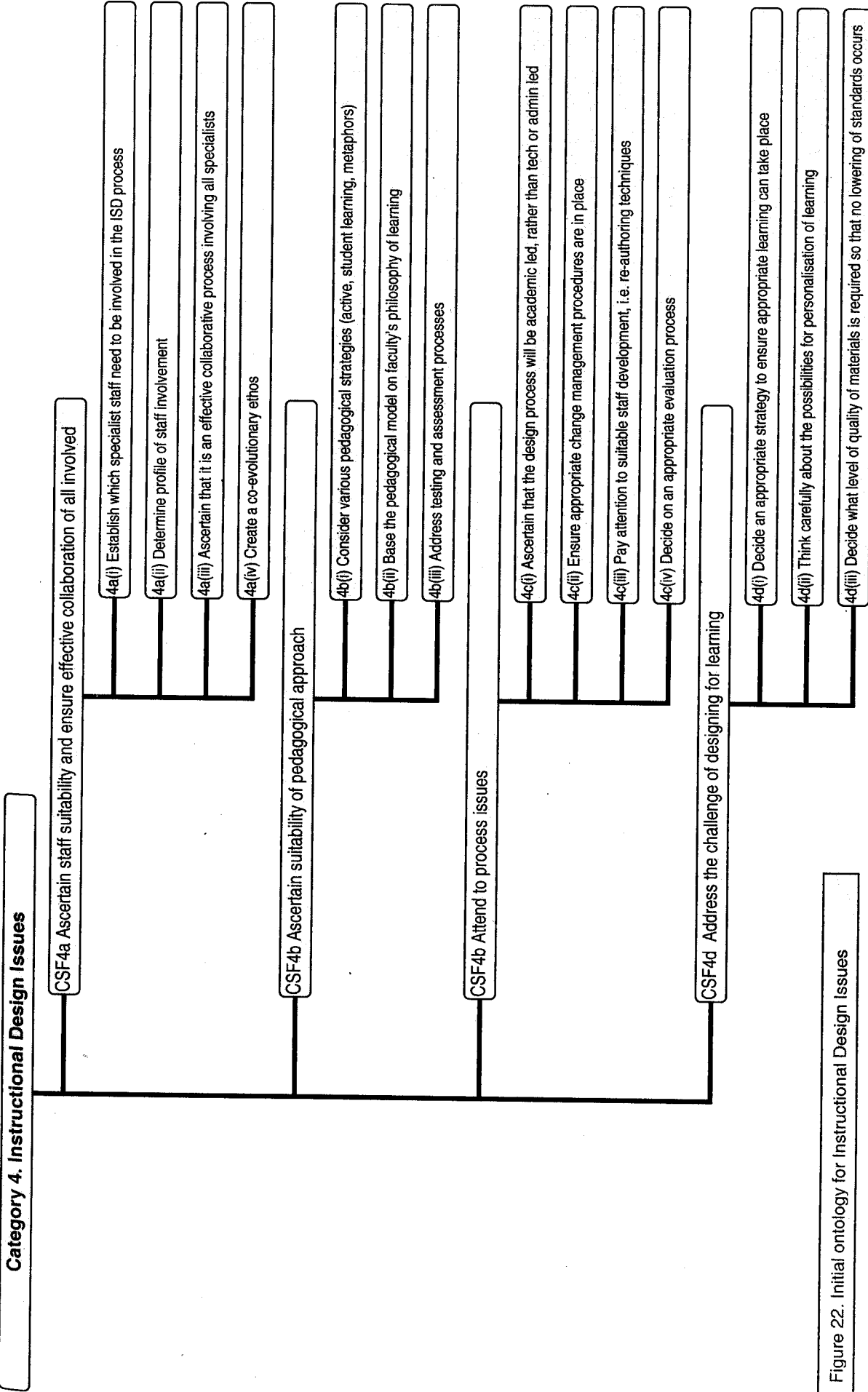


Figure 22. Initial ontology for Instructional Design Issues

Category 5. e-Learning Delivery Issues

CSF5a Determine attributes, experience and availability (both staff and students)

5a(i) Verify required staff attributes and experience

5a(ii) Guarantee suitable academic staff availability

5a(iii) Establish student attributes, experience and preparedness for e-Learning

CSF5b Implement Relevant Delivery Model

5b(i) Adopt an appropriate pedagogical model

5b(ii) Ascertain suitability of modes

5b(iii) Adopt appropriate evaluation approach

CSF5c Address Training Requirements

5c(i) Identify needs and provide staff training

5c(ii) Provide Student Support

5c(iii) Pay attention to Technical Issues

CSF5d Provide Inspirational Leadership

5d(i) Realize Agreed Strategy

5d(ii) Understand Motivation for Engagement

Figure 23. Ontology for e-Learning Delivery Issues

## **8.7 Conclusions**

The presentation of these research findings is comprehensive and thoroughly detailed. The CSFs, as identified by participants in this research, were initially analysed through thematic analysis and then represented in visual cluster diagrams. These were, however, for ease of presentation, discussed separately within distinct framework categories shown in tabular format. However, in order to be able to see links and connections, it was decided that the overall findings should be presented in an emerging ontology. Each CSF and associated sub-CSFs has been given a definitive code so that direct comparisons between all main CSFs and their associated sub-issues in the various framework categories can be made. Yet this is only a first step in the creation of the final and holistic e-Learning CSF ontology, which constitutes the substantial proposition of this thesis. In the next chapter, the findings presented in this emerging ontology will be presented in an integrated visual cluster diagram and then discussed and contrasted with literature relating to each CSF.

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## 9 Discussion and Integration of Research Findings

At the outset of this research, it was suggested that e-Learning would play an increasingly significant role within the educational sector in the future. If this was indeed proved to be the case, then it would be both necessary and helpful to ask what underlying CSFs would support the design, development, implementation and management of e-Learning in HE institutions.

It was intended that this research should offer a theoretical framework upon which e-Learning could be based. This framework would then be put to practitioners in order to discover what CSFs they would assign to the various aspects of e-Learning. In this chapter, the findings of the research will be examined in relation to the original aims and objectives as set out in Chapter One and compared to emerging e-Learning literature.

### 9.1 Initial e-Learning Ontology: Integrative Discussion

The discussion in this section will take an overview of each of the CSFs identified in the emergent ontology of the five different framework categories presented at the end of the last chapter.

To help with this process, in Figure 24 all e-Learning CSFs and associated sub-issues have been presented in a new visual diagram using the codes assigned in Figures 19-23. Different colours have been used to represent the individual e-Learning Framework categories while the alpha-numeric codes correspond to the main CSFs and associated sub-issues.



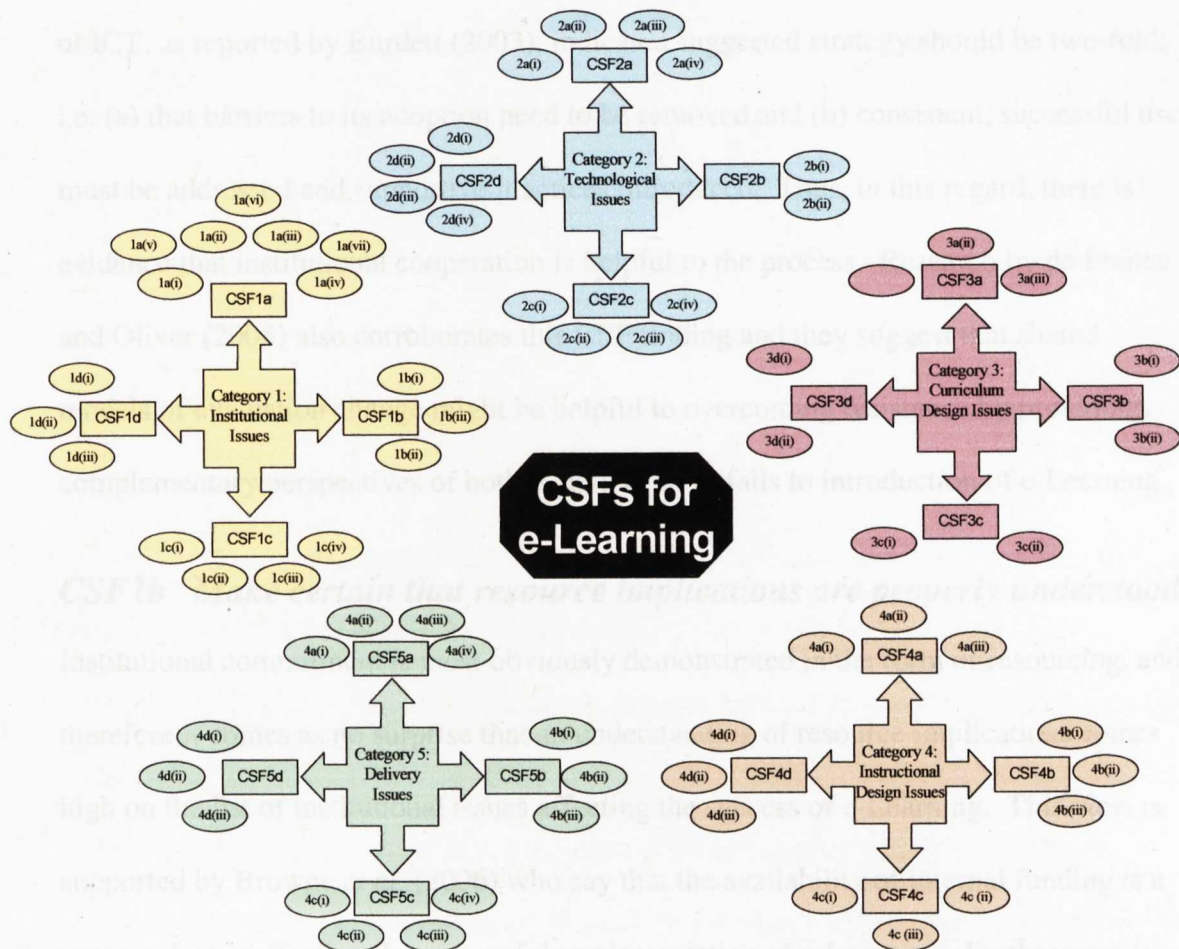


Figure 24. All five CSF framework categories colour coded

These CSFs will now be discussed and contrasted with more recent literature to determine the significance of these CSFs and sub-issues from this holistic perspective.

### ***CSF1a Ensure appropriate institutional strategic planning and e-Learning implementation is properly led***

The findings revealed that the development and implementation of a strategic plan, based on learning and business needs, was crucial to success of e-Learning.

Respondents considered that this can only be achieved if the institution goes beyond rhetoric and demonstrates its political will to implement the strategy.

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Research and findings that investigated early and late academic adopters' innovative use of ICT, as reported by Burdett (2003), indicated suggested strategy should be two-fold; i.e. (a) that barriers to its adoption need to be removed and (b) consistent, successful use must be addressed and supportive practices introduced. Thus, in this regard, there is evidence that institutional cooperation is helpful to the process. Research by de Freitas and Oliver (2005) also corroborates this CSF finding and they suggest that shared models of evaluation change might be helpful to overcoming resistance by providing complementary perspectives of both benefits and pitfalls to introduction of e-Learning.

***CSF1b Make certain that resource implications are properly understood***

Institutional commitment is most obviously demonstrated in the form of resourcing, and therefore it comes as no surprise that an understanding of resource implications comes high on the list of institutional issues affecting the success of e-Learning. This view is supported by Browne *et al.* (2006) who say that the availability of internal funding is a primary factor affecting the successful implementation of e-Learning. Furthermore, Philip and Voerman (2005), in their report of an enterprise-wide implementation programme, reveal that whilst casual or junior staff are often the most enthusiastic, willing to take risks and be innovative with technology to support learning, these same people are least likely to be given opportunities to attend training or to spend time on development. A lack of resources also results in a limited amount of time available to contribute to a community of practice or mentor other staff, which is a vital activity that helps sustain innovation on a wider scale (Philip and Voerman, 2005). The number of students and volume of learner activity affects the cost of effective e-Learning systems over the length of the program, and needs careful thought (Rovai, 2003) Thus, it can be seen that even where there is interest and enthusiasm for making innovative use of e-Learning, appropriate institutional resources must be provided to make this a success.

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***CSF1c Recognize organisational culture issues must be attended to***

As reported in 8.1.3, respondents asked if there was enough understanding of existing traditions and how cultural influences can affect e-Learning. This view is supported by Newton (2004) who asserts that the introduction of e-Learning is a central challenge to some of the assumptions on which “traditional” higher education has operated (Newton, 2004). Traditionally, teacher-centred, unmediated classroom education has been the principal form of learning within universities (Piccoli, Ahmad and Ives, 2000), and the academic career structure has been based firmly around research outputs. However, despite the initiation of quality assurance and quality enhancement mechanisms, Newton (2004) argues that this is still the predominant culture in UK higher education institutions. The importance of addressing cultural issues is further emphasised through an investigation into the demise of the ill-fated UK eUniversity (UkeU) by Conole *et al.*, (2006). It was concluded that while the need to bring together people from diverse backgrounds had been acknowledged, in practice no effective steps had been taken to try to smooth the way for cross-sector and cross-cultural relationships formed on the basis of mutual understanding and respect (Conole *et al.*, 2006).

***CSF1d Pay attention to staffing issues and staff development***

Successful e-Learning programmes are said to require the input of cross-disciplinary team members. This concurs with the views of respondents in this research who, as stated in 8.1.4, argued that the success of e-Learning depended on the identification of key team members. Conole *et al.*, (2006) emphasised the necessity for academic course developers to interact with administrative and management departments to a far greater extent than the average academic putting together a traditional f2f course, and they stress that further research is urgently required into the nature of these relationships, i.e. what makes them successful and the roles and interactions of those involved.

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Furthermore, participants felt the provision of a supportive environment and training was critical to the success of e-Learning. This finding was also discussed as an issue in the literature review in 2.2.2, where it was highlighted that until relatively recently there has not been a requirement for formal academic teaching and learning training (Ramsden and Martin, 1996). Newton (2004) claims beyond the provision of adequate training opportunities, staff need to be given sufficient time to engage with these developmental activities. Issues of training and development could be said to be inextricably bound up in the need for institutions to overtly recognise the importance of this activity and a consequent requirement to offer practical support to staff who wish to engage in it (Newton, 2004).

### ***CSF2a Ensure infrastructure can adequately support learning processes***

The infrastructure issues as identified by respondents relate to the necessity for computer architecture to be fit for purpose. Clegg *et al.* (2003) point out that the success of innovations depends as much on reliable resources and technological advice about functionality as it does on individual creativity. Moreover, there is a risk that unless solutions are inherently incorporated into the institutional infrastructure and adequately supported, technology can fail at crucial times (Clegg *et al.*, 2003).

Respondents also noted that learners must have access to suitable equipment, and although discrepancies between learners' access to equipment have reduced over time, there are still marked differences. This view is supported by Kirkwood and Price (2005) who note that while male students are likely to report using their "own equipment", females often confirm the use of "a family resource". Thus, if HEIs are concerned about avoiding the creation of a "digital divide", not only in terms of availability to equipment but also in the quality and level of learners' access, institutions will need to consider how differential access to computer resources may disadvantage

the very students that it might be seeking to attract. In addition, although broadband is more widely available these days, as mentioned in 5.2.1, insufficient bandwidth may still be problematic for some learners (Rovai, 2003). Likewise, although some progress has been made toward resolving interoperability issues, challenges in the form of authority and version control, trust and provenance, inconsistency and incompleteness still need to be addressed (Kalfoglou *et al.*, 2005).

### ***CSF2b Make sure suitable learning and teaching software is available***

Respondents felt that appropriate teaching and learning software had to be found and that a lack of suitable software could prove detrimental. However, since conducting the data collection for this research, a number of new social software tools have been developed and new learning and teaching software and technological environments that can handle and/or resolve the important 'social' aspects of student-teacher interaction(s) are becoming more readily available (Abrahart *et al.*, 2005). With respect to these emerging opportunities, Anderson (2005) is convinced that tools afforded by the emerging educational semantic web will result in significant improvements for education, particularly distance learning.

With respect to the development of other software intended to enable practitioners to effortlessly draw on a wider-ranging set of models or perspectives, Conole *et al.* (2004) have investigated toolkits that assist with selection of media and resources for learning and teaching as well as with evaluation and information handling. This research indicates that such toolkits are particularly useful where a range of approaches could be used and where there is no single right answer to the problem (Conole *et al.*, 2004).

***CSF2c Ensure that the technology is adequate for learning purposes***

Not surprisingly, respondents wanted to draw attention to the fact that the technology needs to be fit for the purpose of supporting learning and teaching. This issue is also highlighted by Rovai (2003), who advocates some of the same issues identified by participants in this research, namely whether the e-Learning system is adequate for the programme, whether course materials can be easily produced using this technology, and to what extent does the e-Learning system meets programme requirements.

***CSF2d Ensure technical support issues have been addressed***

Although respondents felt that technical support was a key issue that needed to be addressed, Mumtaz (2000) argued that a positive attitude to IT from senior staff, beliefs about the way the subject should be taught, and skills associated managing learning activities are more influential in teachers' use of computers than support issues. Phillips (2005) also found that technological issues were not the major impact and discovered that wider educational and institutional issues had greater influence on appropriate use of educational technology. Nevertheless, computer-handling skills must be mastered, and Fitzgibbon and Jones (2004) suggest that technical support is still needed during the initial stages of staff becoming familiar with online teaching.

***CSFa3 Pay attention to establishing an appropriate pedagogical approach***

In the view of respondents, an appropriate pedagogical approach requires curriculum designers to focus on identifying strategic learning issues, deciding on effective pedagogical methods, and aligning teaching strategy with available tools. Guidance issued by the QAA (2006) still lays emphasis on a linear curriculum design process that consists of inputs (in the form of a HE syllabus), process (learning activities that will be undertaken) and specifically defined outputs (learning achieved and demonstrated).

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This approach is not without its critics, and as argued by Cooper *et al.* (2004), the QAA goal could be said to increase the degree of order, reductionism, predictability and determinism. It should be noted that if learning in HEIs is trying to address an increasing emphasis on inter and intra-professionalism, then the learning design will need to be rich and is therefore likely to be fairly complex (Grabinger and Dunlap, 1995; Hughes and Hewson, 1998; Nunes and Morón-García, 2002; Carr *et al.*, 1998; Kommers, 1997). In reality, there is no such thing as a perfect policy or learning strategy; and repeated adaptation and exploration is needed to achieve satisfying outcomes (Cooper *et al.*, 2004). However, this does not clarify whether such outcomes are to satisfy students, tutors, the institution or society (particularly in the form of employers). Cooper *et al.* (2004) go on to say that the goal “[...] is not to find *the* best learning strategy, but to evolve systems longitudinally that continually search, explore, and test out those strategies”. This can be said to be equally applicable in f2f or online learning settings.

### ***CSF3b Consider appropriate subject content***

Although content was a predictable issue, there was not undue attention to this and respondents only mentioned two themes. The first of these was that content should be appropriate. According to Kalantzis and Cope (2004), learning is founded on three things: the learning ways, the learning content and the learning community. However, with regard to the content issue, Kalantzis and Cope (2004) suggest that learners will pose questions such as:

“Do I already know enough about an area of content to want to know more?  
(Or, do I already know so much about something that I naturally want to know more? Has my appetite been sufficiently whetted by what little I already know to want to know more?)”

(Kalantzis and Cope, 2004)

Yet it seems that e-Learning is still not being utilised to its full potential. An institutional study by Smith and Brown (2005) revealed that the predominant use of the online system was transactional; access to course content (lecture notes, PowerPoint slides, library database access), information about courses and for electronic access to the administrative procedures of the universities. There are indications that those responsible for courses even now refuse to accept the need for changes to the curriculum. Conversely, the use of more collaborative and communicative processes was much less prevalent (Smith and Brown, 2005) verifying concerns about emphasis on content. Talking about dental education in particular, Manogue and Brown (2007) argue that such resistance may lead to merely tinkering with the curriculum by adding a few cosmetic changes or may even mean an outright withdrawal to the old curriculum, instead of totally rethinking its structure, management and content suitable for the 21st Century. This view was corroborated by Manogue and Brown (2007) who argue that an effectively designed curriculum that lives up to the challenge of meeting learners' needs requires intellectual input and the creation of a collaborative learning culture.

The second e-Learning content issue identified by participants is that of IPR and copyright, a major point of law that can have serious impact on academic staff and the courses that HEIs offer. Writing from a US perspective, Levy (2003) also highlighted IPR and copyright as a key issue within university settings:

“Fair use allows copyrighted materials to be used without express permission of the copyright holder in an educational setting, provided that the use does not impair the marketability of the work, that only a portion of the original work is used and it is not a critical portion, that credit is given to the author, and, in the case of a performance, it is part of a systematic instructional activity related to the teaching content, and it is transmitted for reception in a classroom.”

(Levy, 2003)



This sounds quite reasonable until the issue is explored in further depth. Academics have been under the impression that they own the notes they hand out to students, even if this right was not legally established. Thus, they have been under the impression that they could give away their lecture notes without restraint or, when moving from one institution to another, they have assumed that they can take their lecture notes with them. However the law on this differs in different parts of the world, e.g. in the US a part-time instructor can use the same lecture notes at two different institutions, a full-time instructor may not (Levy, 2003). This issue is further complicated when considering the creation of e-Learning content. With profitable online courses, HEIs may wish to claim copyright so as to retain the content if an academic leaves their employ. This is a serious knowledge management issue for academics who create online resources as they may be prevented from taking their course notes with them when they move to another institution. Therefore, authors are seriously advised to negotiate the right to this material at the outset of development.

### ***CSF3c Process and outcomes should be rigorous, formalised and institutionalised***

Respondents felt that it would be beneficial to the curriculum design process if there were formalised processes appropriate to the institutional setting. They felt that staff must appreciate the need for developing an appropriate curriculum, echoing a point made earlier by Manogue and Brown (2007), that this should be a team process and that those involved should consider the use of “new” learning methods and styles to meet the changing needs of students and society. Therefore, curriculum development teams need to devise ways to contextualize the curriculum within intuitional and societal settings, while creating activities capable of motivating students and help them to acquire both knowledge and skills that may help them during their studies in HE and beyond.

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***CSF3d People involved should be multi-skilled and able to multi-task***

Following the reasoning presented in the previous section, respondents argued that teams had to be comprised of multi-skilled and motivated individuals. Indeed, many courses now require input from several quarters, and modules are more commonly being co-operatively designed as a team project between academics, practitioners and educators, with varying degrees of success. For example, Oberski *et al.* (2004) note that although they developed the curriculum for a module as a team with extensive discussions about the content, insufficient attention was paid to the process of delivery and the requirement of individual facilitators. In this case, when it came to the point of delivery, students complained that tutors were too prescriptive, a problem which could have been avoided by better clarification of the facilitation role (Oberski *et al.*, 2004). Thus, curriculum design not only requires efficient content structuring, but also new pedagogical models and corresponding learning and teaching approaches.

***CSF4a Ensure staff suitability and effective collaboration***

The process for creating e-Learning environments involves an intricate collaboration between educationalists, subject matter experts and instructional design technologists. Educationalists and subject matter experts are primarily concerned with curriculum design issues, whilst instructional designers are often more involved with the transition of the curriculum into a technical environment. Given the multi-professional nature of the process, the ability to facilitate collaboration between colleagues is essential. Since these groups come from different perspectives, they often speak different “*languages*” and do not readily understand the problems of the other (Lebow, 1993). Yet when adopting ICT technology, pedagogical thinking cannot be ignored; nor can accessibility and usability issues be neglected. Hence, respondents emphasised an efficient project approach that integrates and supports the dialogue between these different groups.

***CSF4b Ascertain suitability of pedagogical approach***

Respondents' emphasis on the importance of ISD rests in assuring that the whole learning environment is implemented using the same pedagogical approach and is compatible with module, programmes and institutional expected learning outcomes. Accordingly, it is suggested that effective instructional design and development is only possible if it emerges from deliberate application of a particular theory of learning (Bednar *et al.* (1992). It is also proposed that more consistency in quality and conformance with basic instructional design guidelines would reduce negative responses (McGovern and Gray, 2005). Greater attention to this point would ensure that pedagogical approaches and ICT conceptual models selected are compatible and all coherently use the same learning philosophy within a particular module.

***CSF4c Attend to process issues***

The ISD methodological approach is of paramount importance in learning environment design and development, since it ensures integration of all stakeholders involved in the process: educationalists, content matter specialists, designers and programmers, graphical designers and audio-visual production teams, and even students themselves. Whilst acknowledging the essential contribution of all team members, respondents stressed that the development should be led by academic staff and that appropriate attention should be paid to change management processes. This emphasis on process is also acknowledged by Sloep *et al.* (2005) although the perspective here is technically biased. Most ISD models depict a linear design process, yet it should be stressed that ISD methodologies cannot be regarded as mere recipes since philosophical foundations and conceptual models determine much of the final structure of the development methodology and even the architecture of the application itself. Wilson (2006) seems to be in agreement, calling for a more flexible stance toward instructional strategies,

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artefact design, emergent activity and learning outcomes. Naturally, suitable evaluation strategies are required to monitor the degree of success of these activities.

#### ***CSF4d Address the challenge of designing for learning***

Appropriate instructional systems design for learning was considered a particular challenge by respondents. It was felt that suitable strategies had to be adopted in order to ensure appropriate learning can take place. There was agreement that e-Learning offered possibilities for personalisation of learning and that these need to seriously be considered. It was felt that suitable criteria should be set for the quality of materials, so that no lowering of standards occurs. Thus, the functionality of the resource should be given due attention. The aim of ISD methodologies is to build learning environments that are robust, reliable, efficient, portable, modifiable and maintainable (Hickman *et al.*, 1989:34-35). This is a more traditional view of CSFs in ISD and participants have identified functionality, such as usability, accessibility and presentation as key issues. Yet, depending on students' circumstances, the "digital divide" may still be an issue. Miner and Missen (2005) warn that most African universities are many years away from reliable, robust ICT capacity and adequate internet connectivity. Hence it is essential for curriculum developers and instructional systems designers to understand the complexity implicated in bridging this gap.

#### ***CSF5a Determine Staff and Students' Attributes, Experience and Availability***

Although many skills needed for such tutoring activities are similar to f2f delivery, in the reality of practice, e-tutoring also differs in a number of ways (McPherson and Nunes, 2004c; Gerrard, 2002). In the delivery context, the literature makes use of various terms when referring to the role of the "teacher" within online contexts; *coach* (Murphy *et al.*, 1998), *leader* (Hotte and Pierre, 2002), *tutor* (Gerrard, 2002), *moderator*

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(Kerr, 1986; Feenberg, 1986; Salmon, 2000:ix; Fang, 2001), *e-facilitator* (Collison *et al.* 2000; Marjanovic, 1999; Berge, 1992), *motivator*, *mentor*, *mediator* and even *production coordinator* (English and Yazdani, 1999). The acquisition of some of the skills required to fulfil these roles may need considerable development and likewise, students may not be prepared for e-Learning (McPherson and Nunes, 2004c). This aligns with respondents' views that specific attributes and experience of staff and students alike were critical to e-Learning success.

### ***CSF5b Implement Relevant Delivery Model***

Systems and environments to support e-Learning require detailed specification of learning needs, materials, activities and delivery methods and needs. The complexity of integration of the different ICT components according to these learning needs requires a sound pedagogical model (Nunes and McPherson, 2007). These early models then influence and determine delivery models and tutoring activities and respondents identified selection and application of suitable pedagogical models as a core CSF. Participants proposed that it is then important to adopt suitable and compatible modes of communication and tutoring. In line with this, the participants emphasised the need for compatible and appropriate evaluation and assessment approaches.

### ***CSF5c Address Training Requirements***

Respondents clearly identify the necessity for systematic identification of training needs through programmes of staff review and development and see this as a crucial CSF. Additionally, the use of new technological tools and artefacts for teaching and learning require both technical support and pedagogical support by central support units. Respondents identify the quality of support and experience of those providing assistance as a crucial success factor. According to Tinker (2001), the first time an online course

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is taught, it is common for tutors to spend 40% to 50% more preparation time than their equivalent f2f colleagues. Also in this case, respondents seem to be quite aware of this problem and the need to ensure that suitable staff should be available and given time to develop their experience and skills in this type of tutoring. However, as discussed in CSF5c, it is not enough that tutors are prepared for online learning, the learners also need preparation (McPherson and Nunes, 2004c). Due to the hype associated with online learning, learners often feel compelled to engage with these new environments, without being properly equipped with the basic skills required to be successful (Nunes *et al.*, 2000a). These skills are not only required to succeed in the online learning environment to which learners are exposed, but are also an essential part of all aspects of daily networked activity. Respondents, clearly aware of this, identified the necessity to establish student attributes, experience and preparedness for e-Learning, and if necessary take mitigation actions to train and prepare cohorts for e-Learning.

### ***CSF5d Provide Inspirational Leadership***

Over the last two decades, political and social changes have had a profound effect on teaching and learning within HE institutions and respondents considered that the role of academic leadership is to balance these demands and guide institutions through development of sound strategic change. All formal e-Learning programmes exist within an organisational context, such as universities, corporations or virtual learning institutes, and it is clear that leadership has the power to facilitate, influence or even impede the development of e-Learning (McPherson, 2003b). This issue is still extant; with “Governance, Organization, and Leadership” being listed among the top ten strategic challenges being faced in a recent Educause survey (Dewey *et al.*, 2006). Respondents claimed that if top-down strategies are devised to implement e-Learning strategies, then it is the duty of leadership to ensure that appropriate levels of staffing and support are in

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place. For example, e-Learning courses can be much more time-consuming than their f2f counterparts, both in terms of preparation and delivery (Bernath and Rubin, 2001:221; Barker, 2002; Buy, 2001; Strauss, 2001). Without these, the sustainability of e-Learning cannot be guaranteed. Along this line of reasoning, responses from participants confirmed recent claims by Jameson *et al.* (2006), that there is a need for agreed strategies that result from the dialogue between top-down e-Learning strategies and bottom-up innovation and creativity. What is more, respondents suggested that for e-Learning delivery to succeed, confirming proposals by authors such as Vaaland, (2004) and Jameson *et al.* (2006), staff and student motivational issues must be tackled by leadership through fostering interdisciplinary collaboration, good communication, trust and creativity. The importance of leadership as a CSF is highlighted by the formation of a specific Centre for Leadership and e-Learning (CEL) in the UK, with a remit to improve leadership understanding and skills to utilise the transformative potential of e-Learning and further reinforced by the following quote:

“Nothing really happens unless if you have leadership. You can have as many champions as you like, you can have as much online information as you like, you can have brilliant pieces of learning technology ... but it begins and ends with leadership.”

Diana Laurillard, Head of ELearning Strategy, DfES (CEL, 2005).

To illustrate the currency of this as a CSF, it is interesting to note that a conference “The Future of Higher Education: ICT Leadership and Innovation” was held June 2007 in London to bring together Higher Education leaders and policy makers to hear direct the latest strategies from the UK Government and Higher Education Funding Council for England (HEFCE) to drive the ICT and e-Learning agenda forward. This high profile event was sponsored by the UK Department for Education and Skills, Universities UK, Leadership Foundation for Higher Education, and the Higher Education Academy, confirming the respondents’ prediction of leadership as a key issue to be addressed.

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## 9.2 Synthesis of Results

Taking a closer look at the overall research findings, presented in the emergent ontology (8.7: Figures 19-23) and visually in Figure 24, further examination indicates that the CSFs derived from the five original e-Learning framework categories during the different workshops are not as neatly bounded as might be hoped. For example, in the case of asking respondents to focus on CSFs relating to one framework category, it seemed that participants occasionally referred to other issues in other categories, particularly in the CSFs relating to design and delivery issues.

Having analysed the CSFs and the emergent literature, where it is felt that a CSF or sub-issue might have been misplaced or better aligned elsewhere, an alternative framework colour has been used to show where these might be better placed in another category. This is intended to reveal where issues may be better placed within another category. As stated earlier, the letters, numbers and colour coding in Fig.24 correspond to the CSF Framework categories, CSFs and sub-issues. Where there is a cross-cutting theme, a new category has been suggested.



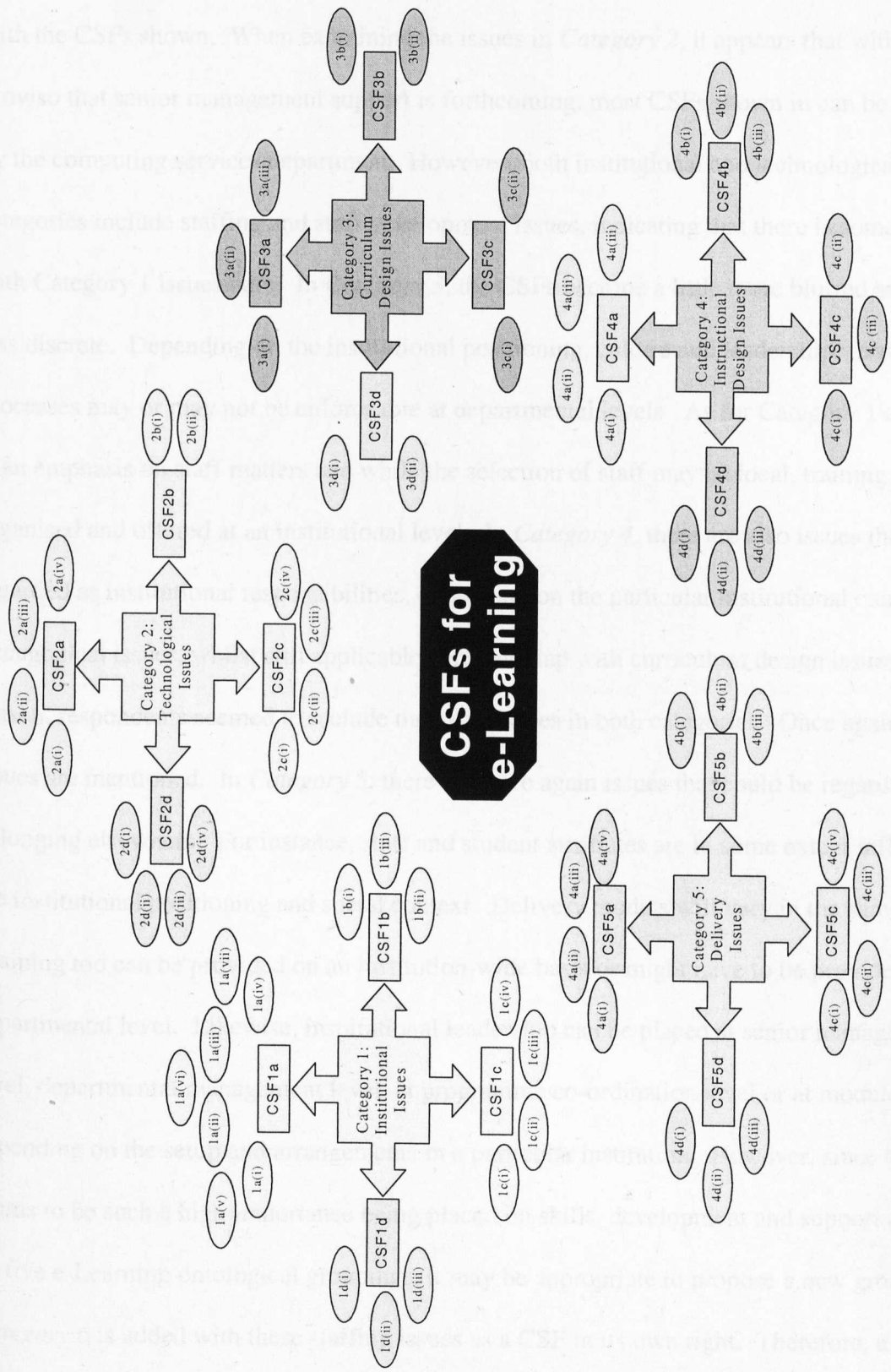


Figure 25. Alternative colour coded CSF framework categories indicating potentially misplaced issues or sub-issues

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Most of the issues in *Category 1* seem to fall firmly within the context of institutional level control. The views of other researchers, as gleaned from the literature, also appear to concur with the CSFs shown. When examining the issues in *Category 2*, it appears that with the proviso that senior management support is forthcoming, most CSFs shown in can be dealt with by the computing services department. However, both institutional and technological categories include staffing and staff development issues, indicating that there is some overlap with *Category 1* issues here. In *Category 3*, the CSFs become a little more blurred and a little less discrete. Depending on the institutional positioning, culture and leadership, formalised processes may or may not be enforceable at departmental levels. As for *Category 1* and *2*, there is an emphasis on staff matters and while the selection of staff may be local, training may be organised and offered at an institutional level. In *Category 4*, there are also issues that could be regarded as institutional responsibilities, depending on the particular institutional context. Pedagogical issues, whilst still applicable here, overlap with curriculum design issues. For that reason, respondents seemed to include the same issues in both categories. Once again, staffing issues are mentioned. In *Category 5*, there are once again issues that could be regarded as belonging elsewhere. For instance, staff and student attributes are to some extent influenced by the institutional positioning and social context. Delivery models will vary in the same way. Training too can be provided on an institution-wide basis or might have to be provided at departmental level. Likewise, inspirational leadership can be placed at senior management level, departmental management level, at programme co-ordination level or at module level, depending on the setup and arrangements in a particular institution. However, since there seems to be such a high importance being placed on skills, development and support of staff in all five e-Learning ontological groupings, it may be appropriate to propose a new group. Thus, *Category 6* is added with these staffing issues as a CSF in its own right. Therefore, a final ontology is proposed in Figures 26-31.

### Category 1: Institutional Issues

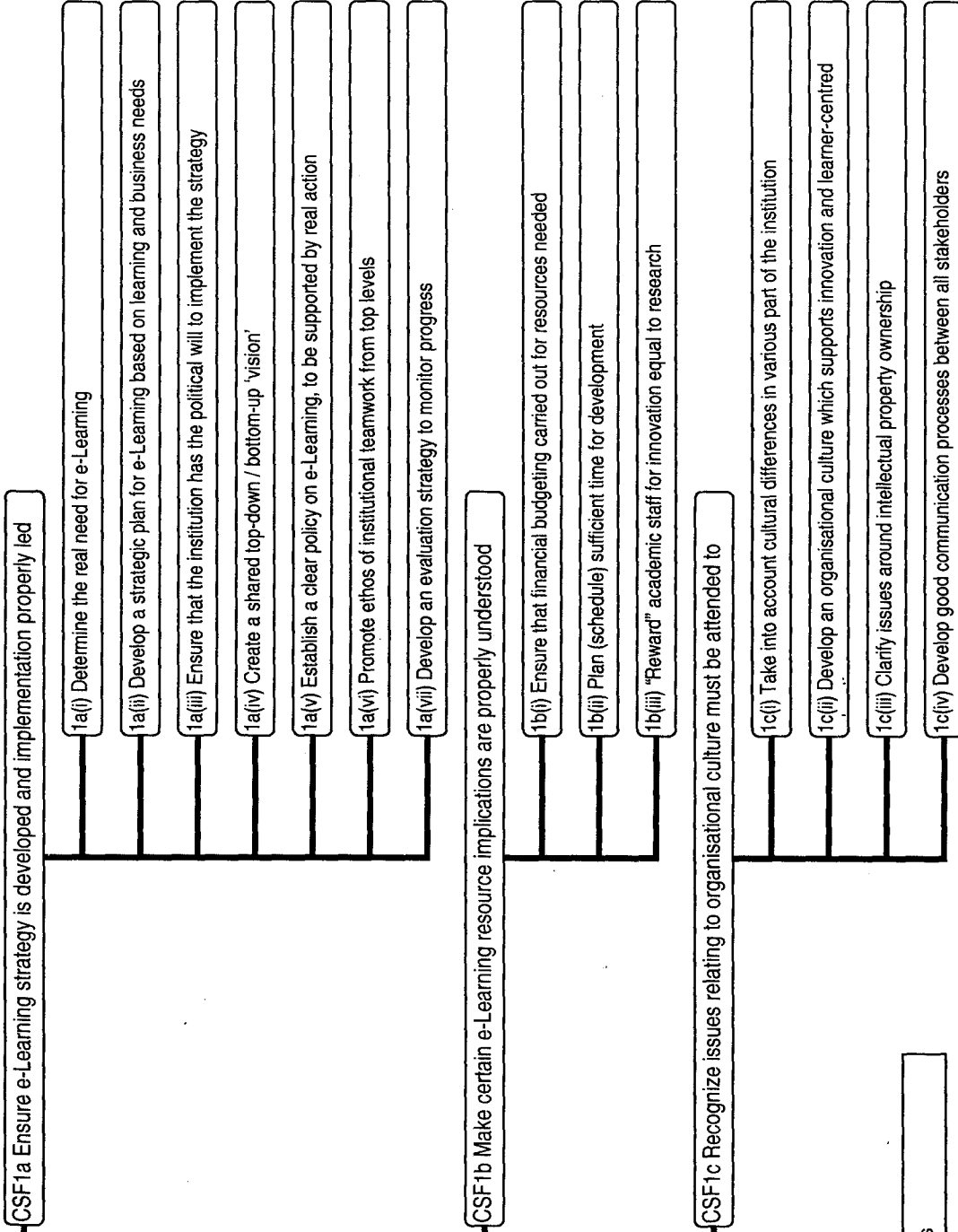


Figure 26. Initial ontology for Institutional Issues

### Category 2. Technological Issues

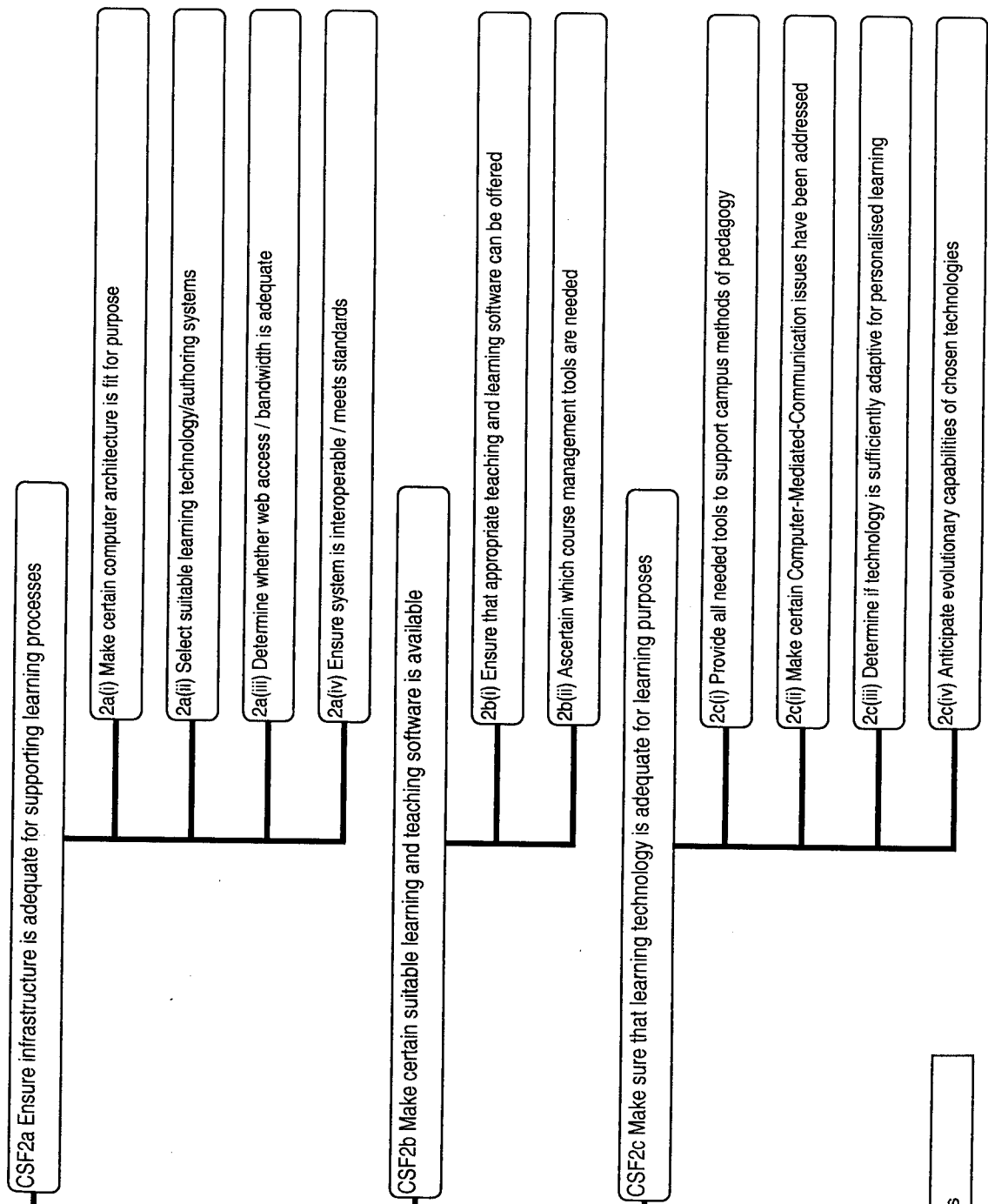


Figure 27. Initial ontology for Technological Issues

**Category 3. Curriculum Design Issues**

CSF3a Pay due attention to establishing an appropriate pedagogical approach

3a(i) Consider strategic learning issues

3a(ii) Establish a pedagogy that enables learning through effective methods

3a(iii) Align teaching strategy with defined tools, i.e. consider tactical approach

3a(iv) Ascertain suitability of modes of delivery

CSF3b Determine appropriate subject content

3b(i) Ensure an overview of content appropriate to learner needs across courses

3b(ii) Give Intellectual Property (IP) and copyright issues due attention

CSF3c Process and outcomes should be rigorous, formalised and institutionalised

3c(i) Make sure academic staff appreciate the need for appropriate curriculum development

3c(ii) Ensure there is a team process for development of an e-Learning curriculum

3c(iii) Encourage the use of "new" learning methods and styles

Figure 28. Initial ontology for Curriculum Design Issues

### Category 4. Instructional Design Issues

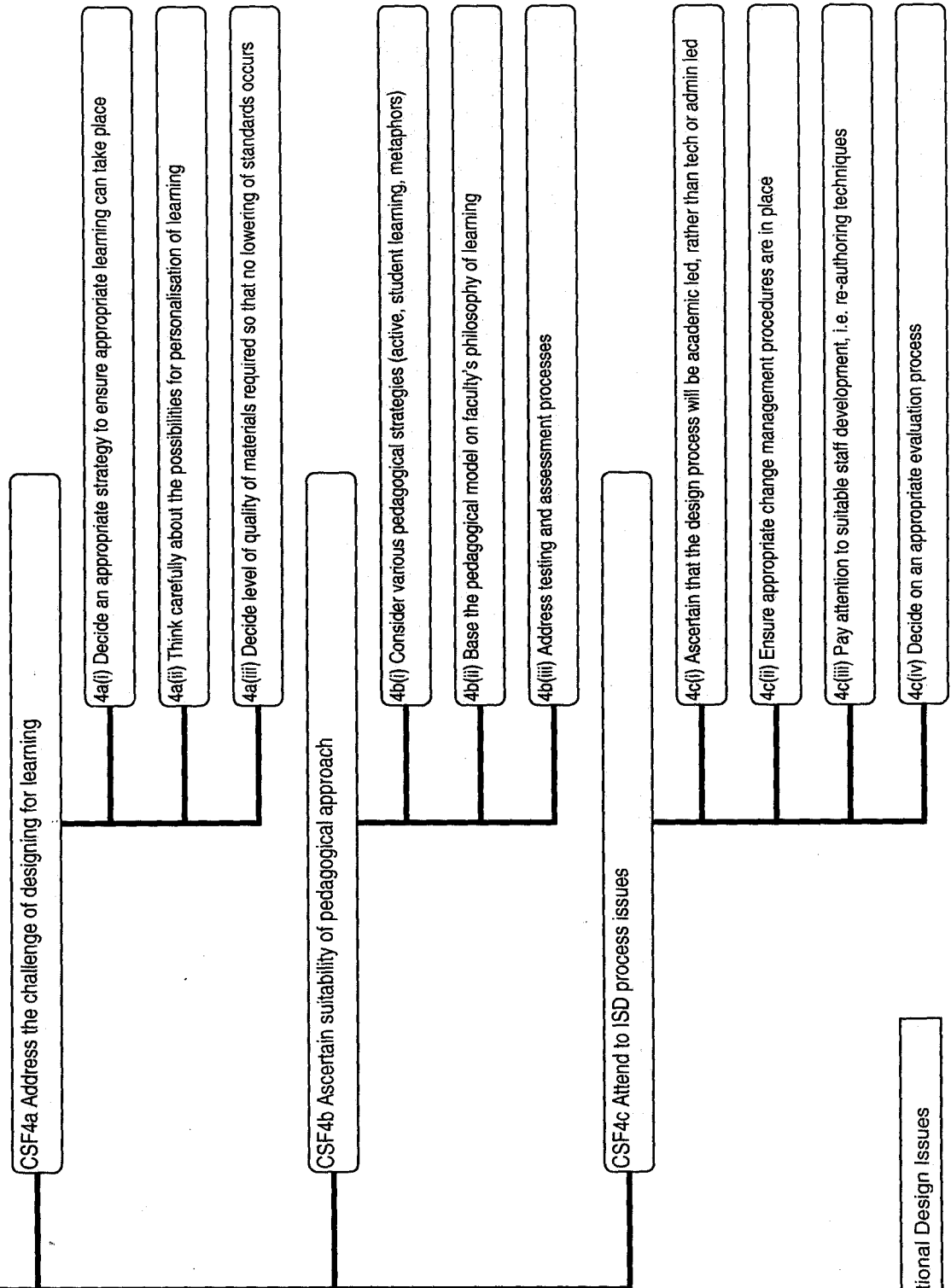


Figure 29. Initial ontology for Instructional Design Issues

Category 5. e-Learning Delivery Issues

CSF5a Determine student attributes and experience

5a(i) Verify required student attributes and experience

5a(ii) Establish student attributes, experience and preparedness for e-Learning

5a(iii) Ascertain suitability of modes of delivery

CSF5b Implement Relevant Delivery Model

5b(i) Adopt an appropriate pedagogical model

5b(ii) Implement suitable delivery model

5b(iii) Adopt appropriate evaluation approach

CSF5c Provide Inspirational Leadership

5c(i) Realize Agreed Strategy

5c(ii) Understand Motivation for Engagement

5c(iii) Ensure sufficient resourcing to provide student support

Figure 30. Ontology for e-Learning Delivery Issues

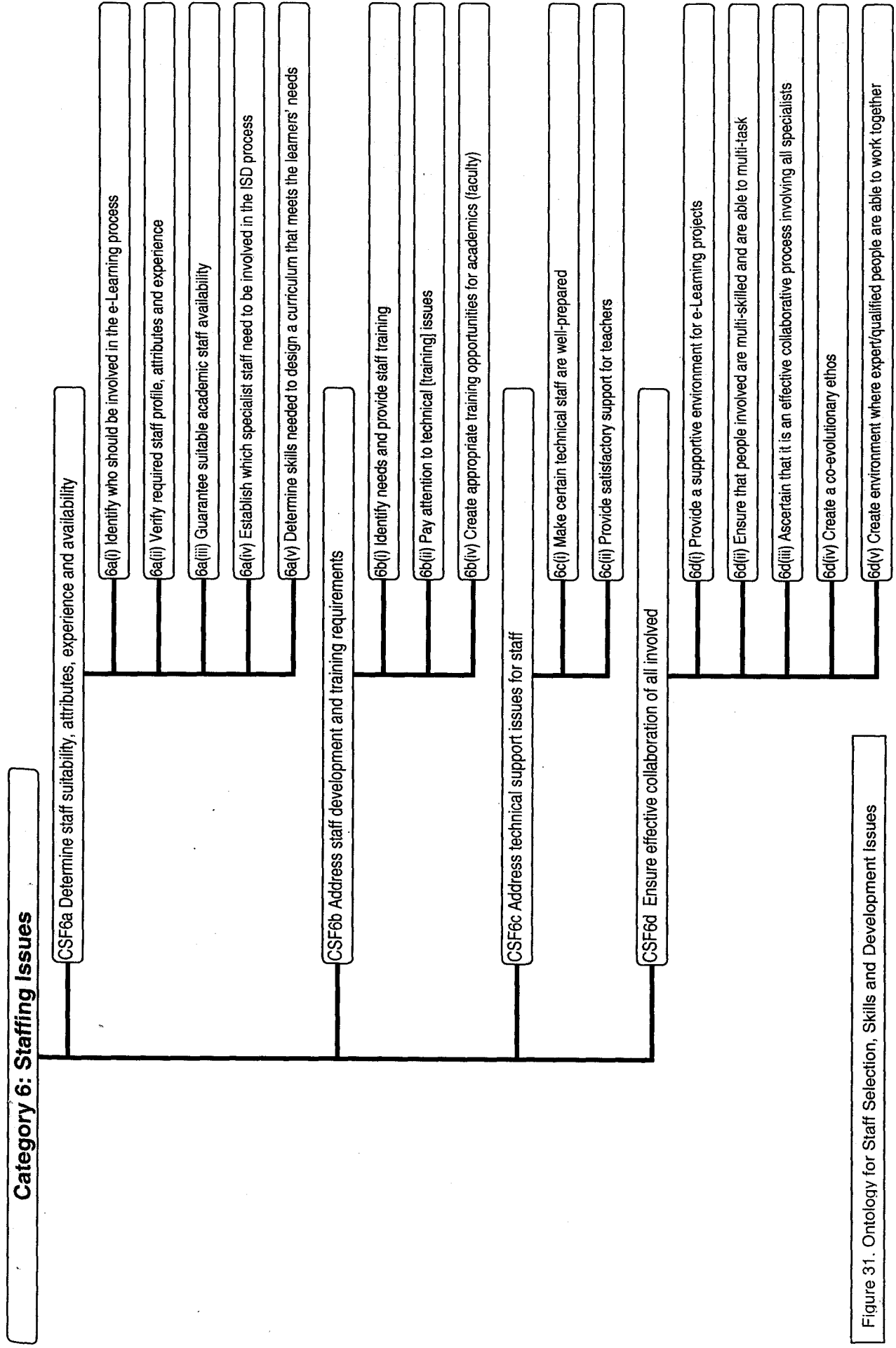


Figure 31. Ontology for Staff Selection, Skills and Development Issues



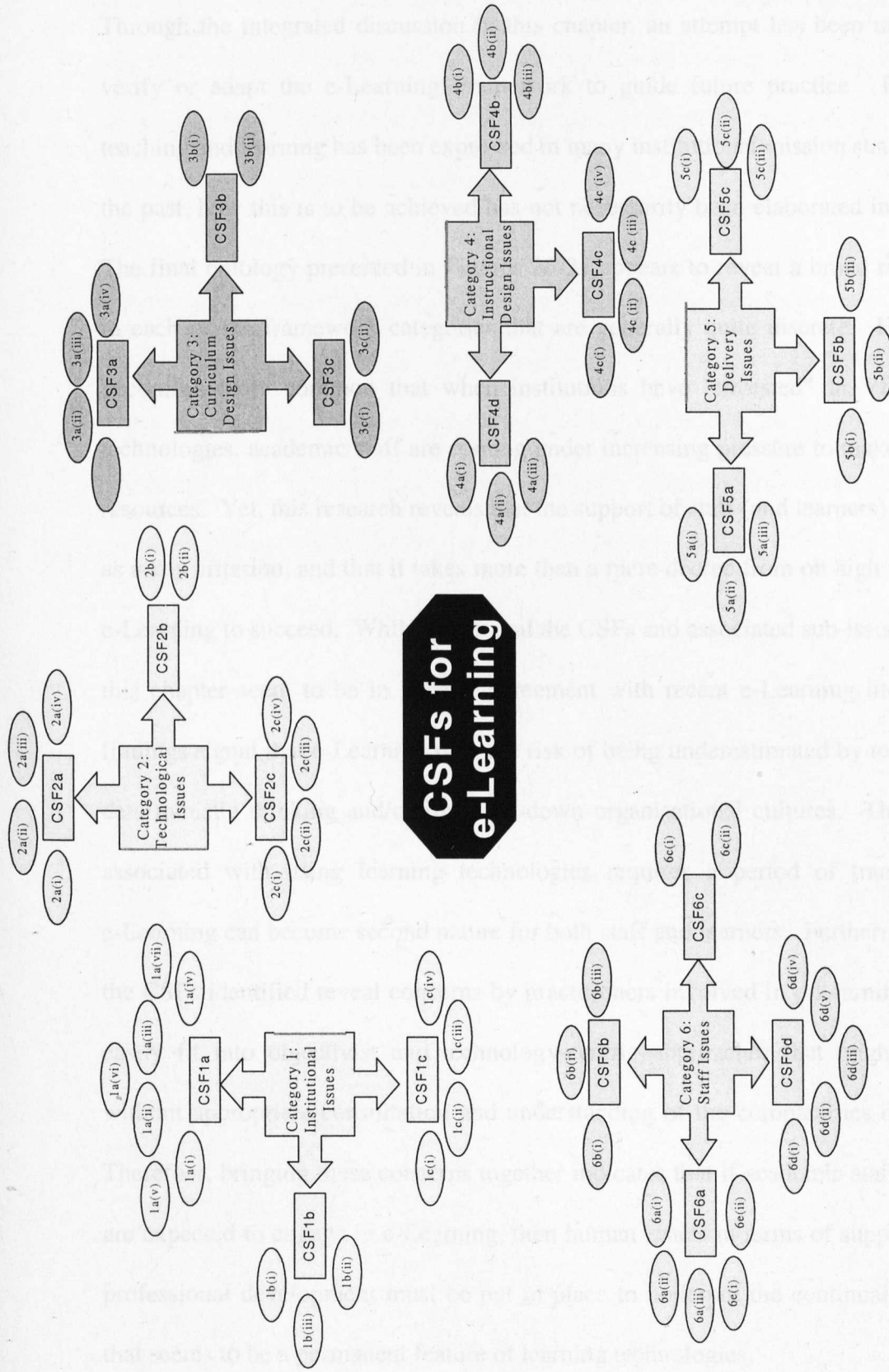


Figure 32. Alternative CSF framework categories including new colour coded category and realigned issues or sub-issues

### 9.3 Concluding Discussions

Through the integrated discussion in this chapter, an attempt has been made to either verify or adapt the e-Learning Framework to guide future practice. Excellence in teaching and learning has been expressed in many institutional mission statements but in the past, how this is to be achieved has not necessarily been elaborated in much detail. The final ontology presented in Figures 26-31 appears to reveal a broad range of CSFs in each of the framework categories that are generally quite discrete. However, it is becoming more common that when institutions have “invested” in VLE and MLE technologies, academic staff are coming under increasing pressure to make use of these resources. Yet, this research reveals that the support of staff (and learners) is considered as a key criterion, and that it takes more than a mere decree from on high for a move to e-Learning to succeed. Whilst in general the CSFs and associated sub-issues revealed in this chapter seem to be in general agreement with recent e-Learning literature, these findings signal that e-Learning runs the risk of being underestimated by technologically deterministic thinking and/or rigid top-down organisational cultures. The complexity associated with using learning technologies requires a period of transition before e-Learning can become second nature for both staff and learners. Furthermore, some of the CSFs identified reveal concerns by practitioners involved in e-Learning that do not easily fit into objectivist and technology-centric approaches that might be adopted without appropriate consultation and understanding of the complexities of e-Learning. Therefore, bringing these concerns together indicates that if academic staff and learners are expected to engage in e-Learning, then human issues in terms of support, skills and professional development must be put in place to underpin the continual development that seems to be a permanent feature of learning technologies.

One of the interesting points that emerged is the absence of Computer Automated Assessment (CAA) in the responses discussed in 8.4.2.3. It is possible that this could be accounted for by the reticence of HEIs to adopt technologies that may not fit in with cultural assessment norms, or the fear that these technologies may not prove as reliable as traditional examination processes.

To sum up the discussions here, it still seems to be helpful to break the CSFs into the categories offered by the e-Learning framework shown in Fig.13, but this is with the caveat that one-size does not fit all, and CSFs are not likely to be universal in the format suggested here. Nevertheless, this provides a very good starting position for thinking about what specific CSFs might exist in individual institutions.

## 10 Conclusions and Future Research

This section provides an opportunity to look at outcomes of this particular research and the role of theory in making sense of the knowledge thus gained. Theory is in reality there to make sense of tacit knowledge and the process of carrying out this research has presented a unique opportunity to explore and to contextualise a perceived rift between theory, practice and policy as seen by e-Learning experts. At the start, it was judged necessary to question the values that underpin existing theory before this chasm could be bridged and it is for this reason that the choice of critical research was made.

### 10.1 Usefulness of the e-Learning Framework

At this point, it is considered that it might be interesting to compare the findings of this research with contemporary research discussions of e-Learning within HE. Khan (2006) has produced the closest holistic alternative e-Learning framework (Fig.25) to that presented in this thesis. Although differing in certain aspects, it certainly appears to have a number of facets in common with the e-Learning framework presented in Chapter One and is therefore worthy of comparison.

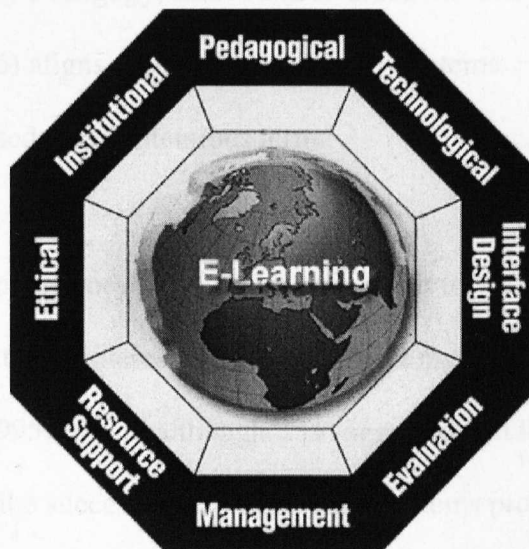


Fig.33 Alternative E-Learning Framework (Khan, 2006)

In the research described in this thesis, it has been argued that institutional and management issues are interrelated and that funding and resourcing are either provided or withheld at this level. It is interesting to note that in Khan's (2006) framework, at least three points could be regarded as institutional concerns, thus reinforcing the notion of this as a key area of concern for E-Learning. The technological point is obvious and concurs with this research.

On the other hand, it is interesting to note that in the literature, Clarke (2002) appears to place an overemphasis on choosing the technology and then "selling" this to course teams and this stance is severely criticised by Romiszowski (2004) when discussing this issue in his paper on the "E-Learning Baby". Khan (2006) also places a stress on points that have been raised in this research which have been broadly discussed under the heading of 'curriculum design', namely Pedagogy, Ethics and Evaluation. The Interface Design described by Khan (2006) aligns with the Instructional Systems Design category, which as already discussed, is a contentious term.

However, it is worthy of note that in Khan's framework, there is no explicit top-level mention of delivery issues. In this context, it is interesting to note project management research findings (The Standish Group, 1995), where although it is suggested that there are a number of factors that contribute to the success of an information systems project, the authors emphasise that are three major factors that will affect the success of a project, i.e.: user involvement, executive management support, and a clear statement of requirements. Although the design, development, implementation and delivery of e-Learning could be described as a particular type of information system, it does nevertheless have many features in common with more generic information systems.

It is felt that the findings in this research both highlight and reinforce the importance of what can be described as “people issues”, and it is felt that this is the CSF that should be given the highest priority of all in authentic e-Learning scenarios. Since in this research, the issue of staffing emerged as a cross-cutting issue across all areas described in this thesis’ framework, it would seem that this is the area that requires most attention of all. Research needs to identify not only what barriers prevent staff from embracing e-Learning, but to investigate how resistance can be overcome.

In reality, it is the interaction between all the stakeholders that seems to be the make or break of an e-Learning initiative and it is necessary to get beyond the “silo mentality” where there is limited communication between the various parties involved in creating e-Learning resources and environments. If this collaborative approach is carefully considered, the venture is more likely to gain acceptance. Yet, there must be a degree of autonomy and flexibility granted to individual players too if e-Learning is to succeed.

## **10.2 Usefulness of Critical Research as a Methodological Approach**

As stated in 7.2.2, Critical Research theory and practice is based on an attempt to interpret and understand human activity within social contexts. It is proposed here that critical research may enable the researcher to challenge potentially repressive theoretical stances held at institutional and ideological levels and such questioning of long-held beliefs may be useful where overriding principles present obstructions to successful e-Learning infusion. It has to be remembered that the heart of e-Learning is not technology, but a complex array of human interaction.

It may be easy to impose solutions that fit neither institutional provision nor the needs of those being served by the institution. Walsham (2005) recommended that critical research should be open and use theory to explore perceptions and the contexts within which they are embedded. It is in this latter context of “openness” that the research in this study was carried out.

Looking further toward the use of focus groups as a data collection method, Lunt and Livingstone (1996) suggested that conversation, public discussion and gossip are normal processes by which ideas are negotiated in daily life, and therefore can be understood as a means by which we can access those relatively inaccessible communicative contexts during which meaning is socially constructed. It was felt that in this study, this public discussion held significant advantages over other collection methods, such as that of survey methods, where data amassed may be potentially quite bland. Whilst it is acknowledged that the use of focus groups to collect the data can be described as purposive, and that this may not represent the same degree of accuracy as might have been achieved with more quantitative methods, it is felt that a more comprehensive view has been reached. Since workshop participants in this research seemed to be sincerely motivated to explore the issues, the moderation of the groups did not present any huge difficulties either, and neither did any substantive problems with dominant voices occur. The environmental concerns were addressed by carrying out the workshops away from institutional stresses and strains, in a relatively comfortable and stress-free atmosphere. Thus, it is suggested that any disadvantages that might be inherent in this approach are more than compensated for by the access gained to such a wide spread of e-Learning experts from all parts of the world.

Thus, critical research as adopted in this study was an attempt to overcome potential social inequalities occurring as a result of embedded institutional structures and entrenched socially constructed beliefs. It is felt that this afforded more liberating solutions than may be gained by other research methods. This approach has revealed insights and observations of practitioners and researchers alike, shared through the process of the critical research approach and focus groups as a data collection method.

### ***10.2.1 Applicability of Design***

The design for this research followed a rational approach of identifying an overriding research question, which was further enriched and refined by conducting a thorough literature review. This process allowed the formulation of a theoretical methodological framework for attempting to understand and establish CSFs for e-Learning. The data were collected after holding focus groups with e-Learning experts during a series of international workshops. The thematic data analysis then revealed patterns and groups of factors that respondents considered critical to the process of e-Learning within the overall e-Learning Framework. The presentation of these findings in an ontology is intended to further extend the theory about what is most important for e-Learning success. It is felt that this process worked very well indeed and it is considered that the same design could be applied in other educational research contexts.

## **10.3 Miscellaneous Emergent Issues**

The research findings have enabled the developments of an ontology which goes from a macro to a micro-level, set within the context of the broadening literature in the field of e-Learning. By layering the findings in this way, it is hoped that in the future this ontology could be more widely published, with its lowest levels be linked to specific



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seminal papers related to particular topics. In addition, it may be possible then to turn this into an organic way of keeping the ontology up to date by deleting redundant issues and adding emergent topics and associated issues as they arise.

### ***10.3.1 Contentious Issues***

One of the most contentious issues relates to the elapsed time it took to bring this thesis to fruition. In view of the fact that the data was collected five years ago, and e-Learning is a rapidly advancing area of study and knowledge, it may be considered that the findings have revealed nothing new. This criticism is to some extent both understandable and valid. However, notwithstanding this as a weakness, the findings herein have been published elsewhere (Appendix 3) as soon as data analysis on relevant sections were completed and have confirmed findings from other studies. However, of the few studies carried out by other researchers into critical success factors for e-Learning since this study began, most have done so by investigating relatively local studies, i.e. a single course or a single institution. It is therefore hoped that the work described in this thesis is at least confirmatory and complementary to these other studies carried out in the interim.

### ***10.3.2 Implications for other e-Learning Theoretical Stances***

As the use of technology to enhance learning is reaching a higher level of maturity, there is a heightened awareness of both the potential for changing the way that technology can enhance sometimes dry and static information and the way that learners better engage with their tutors, peers and relevant subjects. This has meant that more researchers are engaging in e-Learning research, and it is felt that there is a fine line

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between speeding up the process of conducting such research and creating unnecessary delays by having protracted research designs. One way forward may be to create research designs that are inherently phased and results published as soon as a particular phase is complete. This will help to overcome the criticism mentioned in 10.2.1., i.e. that findings may become outdated and therefore lose their relevance.

### ***10.3.3 Implications for Continuing Professional Education within HE***

The implications for those responsible for the continuing education of professionals within HE are that this process needs to be timely, speedy and relevant to the individual concerned. This issue is highlighted in a recent publication by Dron (2006) who contests that there are attempts to 'commodify' learning within HE where material can be provided, the learner processed and turned out as a knowledgeable product. Yet, the educational process can be seen as a number of personal transactions and therefore not easily transferable to mass transaction. This being the case, learner autonomy is a highly desirable goal as it allows the individual to select and tailor the learning to their own needs in a timely fashion and to ask for assistance (and tutor control) only when this is actually needed.

This view concurs with those who advocate a move from VLEs to PLEs (Personal Learning Environments). The relatively recent proliferation of what is described as Social Software means that it is now much easier to put the control of learning into the hands of the learner, providing HEIs do not put unnecessary constraints in the way because of security concerns and a desire to manage and monitor everything that happens within the institutional information system.

## **10.4 Additional Outcomes of this Research**

In order to demonstrate the ongoing positive effects that this research has had, it is worth mentioning additional tangible outputs in the form of further collaborative research papers, listed in Appendix 4, and follow-on workshops.

### ***10.4.1 Formation of the Montreal Band***

During one of the four CSF Research Workshops (E-Learn 2002), a number of researchers were so enthused by the process of the focus group discussions that they decided to form a Special Interest Group (SIG) to continue collaboration for the duration of the conference. These deliberations consolidated the group's interests in e-Learning, and post-conference, this small group formed an online community called "The Montreal Band" or TMB for ease of reference. In early 2003, TMB set up a collaborative space in Groove (peer-to-peer software) to continue discussion and research into e-Learning. Various members of TMB began writing joint research papers (de Loght *et al.*, 2005; Shortridge and de Loght, 2004; van Petegem *et al.*, 2004; van Petegem *et al.*, 2003), and one paper in particular (Menchaca *et al.*, 2003) was selected as best paper presented in the session entitled 'Applications of ICTs in Education'.

### ***10.4.2 Cascading Emancipatory Effect – Training the Trainers***

In addition to writing collaborative papers, one of the leading members of TMB, Professor Michael Bischoff, organised an "Expert Discussion Forum on Online Learning" to bring together e-Learning tutors of a federal flagship project in Germany, The Virtuelle Fachhochschule (VFH). The VFH (also known as the Virtual University of Applied Sciences) is a virtual organisation with decentralised and distributed

management and participants from twelve universities of applied sciences, two universities, the federal employers' association, unions, and businesses in six federal states. The first Expert Discussion Forum was held from 7-10<sup>th</sup> June 2004 at the University of Applied Sciences, Lübeck, Germany. Members of TMB acted as the Forum Organising Committee and Session Chairs, as well as presenters for various sessions. This event was so successful that it was repeated the following year.

### ***10.4.3 Other TMB Events***

This cooperation has continued and TMB organised yet another collaborative workshop "Supporting the Co-Evolution of Interprofessional Communities of Practice (CoPs) for Workplace Learning". This pre-conference workshop was held during Online Educa (2006), held at the Hotel InterContinental in Berlin, [http://www.hoffmann-reif.com/e3091/e74/e4029/proj\\_files4033/pre\\_conference\\_2006.pdf](http://www.hoffmann-reif.com/e3091/e74/e4029/proj_files4033/pre_conference_2006.pdf) to help others explore the process of developing online communities. A snapshot of part of this workshop is available at [http://www.ucl.ac.uk/images/workshop/berlin06\\_gallery/designs/participating\\_in\\_online\\_communities.html](http://www.ucl.ac.uk/images/workshop/berlin06_gallery/designs/participating_in_online_communities.html).

## **10.5 Recommendations for Further Research**

Many of the issues highlighted through the process of conducting this research are still extant. For example, copyright remains as a restrictive issue whereby content is considered to belong exclusively to an individual or to a particular institution. The problem of copyright and IP ownership has not been satisfactorily resolved. This then could therefore be regarded as a reason for limited or non-use of learning resources and consideration needs to be given to how much content actually needs protection. An associated issue is the extent to which software such as RSS feeds could enhance CMS.

Another possibility is that with the CSFs for e-Learning within HEIs identified in this research, it may be that these can perhaps be combined with studies currently exploring benchmarks for good practice. As benchmarking is closely associated with critical success factors, as having defined and measured CSFs, these can be used for target setting, monitoring, and strategic benchmarking (Bendell *et al*, 1998:36).

“[...] compare (business) processes which cut across various functions and in quite different industries. Opportunities discovered by this process are likely to be the most innovative and to create breakthroughs for unprecedented improvement.”

Bendell, T., Boulter, L. and Goodstadt, P. (1998:83)

Furthermore, according to Leibfried and McNair (1994:24), benchmarking is an external focus on internal activities, functions, or operations, in order to achieve continuous improvement, with an overriding objective of benchmarking is to identifying best practice. Therefore, it is thought that the CSFs identified here might be used to further explore and verify findings from such benchmarking studies. Yet another possibility would be to carry out an in-depth case study of one or more institutions, and thereby discover whether the CSFs revealed in this study still hold true and if not, how they might differ in reality in different locations.

Given that this research identified CSFs at a given period, i.e. during 2002, it would be enormously beneficial to repeat the whole study and determine where CSFs identified have endured and which have faded away with time. This would allow researchers and practitioners to assemble a longitudinal view that may help to see trends, possibilities and dead-ends that are not worth pursuing.

## 10.6 Final Thoughts

Currently, there is a buzz of excitement in the e-Learning community around new possibilities offered by social software, often described as Web 2.0. By embracing software tools such as FaceBook, MySpace, Flickr, blogs, wikis, etc., dynamic people all around the world, young and old, have displayed a desire to have control over their own ideas and learning processes, and have expressed their aspiration to become authors and actors in this online world. Social software is currently being explored as a means of tapping into this enthusiasm and as a means of providing personalised learning. Yet, despite the fact that these ICT tools and applications are seen as possibilities for the facilitation of learning, as yet, there is still a lack of clarity and understanding behind the motivation of users for adopting these new channels and tools. In addition, within the context of formal HE settings with conservative assessment procedures, it is difficult to conceive of truly sustainable learning projects that can make full use of the flexible nature of these tools.

Furthermore, despite the current enthusiasm for and promises of social software, it must be noted that there are a vast number of academic staff who are yet to embrace the more established tools that are already in place. Academic acceptance has long been recognized as one of the fundamental issues for successful e-Learning in HE and this problem is still extant. Whilst it is true that some technologies are becoming easier to use, at the same time others are increasing in complexity with more and more features being added at an increasingly rapid pace. Thus, within e-Learning, it is felt that it is the “human” issue that is paramount, and that this concern will remain centre-stage for the foreseeable future. It seems clear that the creation of effective e-Learning environments within traditional HE settings is still a real challenge that will require effective processes of change management and good communication between all stakeholders.

Finally, it may appear that many of the issues identified in this research are obvious. However, not all that is obvious is formalised and therefore used to bring about useful change. The strength of these research findings is that they were elicited from a wide range of seasoned veteran e-Learning researchers and practitioners from across the world. It is obvious that using ICT to support learning and teaching is complex, and it is felt that if the funding was to be forthcoming, future research might focus on longitudinal implementation studies within a number of institutions to verify whether these CSFs continue to apply over time. This research provides a formalisation that may be used by academics, practitioners and HE decision-makers to improve the quality of e-Learning in HE.

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## Appendix 1 – CSF Focus Group Data Collection Sheet

In your view, what are the most important CSFs for the various aspects of the Learning Framework?

Infrastructure	Enabling Technologies	Curriculum Development	Instructional Design	Deployment

Which aspects of the Learning Framework are most important to you as a professional and why?

## Appendix 2: Sample Module Outline

<b>Module Title:</b>	MA [XXX] Research Methods
<b>Module Code:</b>	[XXX]
<b>Pre-Requisites:</b>	None
<b>Status:</b>	Approved module: [XXX]
<b>Credits:</b>	30 credits
<b>Semester:</b>	AUTUMN / SPRING
<b>Timetabling:</b>	[XXX]
Day School One	Friday 17 <sup>th</sup> October
Day School Two	Friday 16 <sup>th</sup> January
Day School Three	Friday 12 <sup>th</sup> March
Day School Four	Friday 14 <sup>th</sup> May
Self Study with Tutorial Support	Periods between Day Schools
<b>Module Coordinator:</b>	[XXX]
Other staff	[XXX], plus other departmental staff for dissertation supervision
<b>Version Date:</b>	[XXX]

### Aims:

This module aims to introduce students to theoretical and practical issues surrounding the conduct of research, and to provide students with sufficient knowledge to be able to develop a viable dissertation proposal and go on to produce an acceptable piece of research.

### Learning Objectives:

By the end of the module students will be able to:

- Describe [xxx]
- Devise [xxx]
- Explain [xxx]
- Prepare and submit [xxx]

### Learning Methods:

The course is prepared for distance learning. The course material comprises units, each of which constitute the equivalent of one week of a taught course. The content of the units is designed to motivate further reading and study in depth, and should not be viewed as the whole course. Accordingly, course units are supplemented by references to further reading.

**Assessment:**

Students are required to submit all of the following: coursework. However, the final assessed mark will be based on the final dissertation submission.

An initial dissertation proposal of not more than four A4 pages in length by [DATE].

This proposal will be reviewed and approved by the Departmental Research Committee.

An expanded dissertation proposal not exceeding 3,000 words in length by [DATE].

The expanded proposal should be double or one and a half spaced, in A4 format. Further details about the content and format of the above pieces of work are covered in the documentation for Unit 1 and 5 of the Research Methods Module.

Work-based Dissertation circa 20-25,000 words to be submitted by [DATE].

**Syllabus:**

The module units are as follows:

Unit 1	Introduction to the Module
Unit 2	Preparing to do a Dissertation
Unit 3	What is Research?
Unit 4	Research: Basic Concepts
Unit 5	Choosing a Research Topic
Unit 6	The Literature Review
Unit 7	Research Methodologies Overview
Unit 8	Qualitative Research I
Unit 9	Qualitative Research II
Unit 10	Quantitative Research
Unit 11	Presenting Data and Results
Unit 12	Inferential Statistics

**Core Readings:**

Knight, P.T., (2002) *Small-Scale Research*, London, Sage.

General reading for this module is as follows:

Black, Thomas R. (1999) *Doing Quantitative Research in the Social Sciences: An Integrated Approach*, London: Sage.

Erlandson, David E. et. al (1993) *Doing Naturalistic Inquiry: A Guide to Methods*, Newbury Park, Calif.; London: Sage.

Mason, Jennifer (1996) *Qualitative Researching*, London: Sage.

Neuman, W. Lawrence (2000) *Social Research Methods: Qualitative and Quantitative Approaches*, 4th ed. Boston; London: Allyn and Bacon.

Additional readings specific to the units are provided as appropriate at the end of individual units.

### Appendix 3: List of Publications Related to this Thesis

- McPherson, M.A. (2002a) "Organisational Critical Success Factors for eLearning Implementation". In Kinshuk, Lewis, R.; Akahori, K.; Kemp, R.; Okamoto, T.; Henderson, L. and Lee, C.H. (editors.) *Proceedings of the International Conference on Computers in Education (ICCE 2002)*, Critical Success Factors for Implementing eLearning Workshop, 3-6 December 2002. Auckland, New Zealand, 1540-1541.
- McPherson, M.A. and Nunes, J.M (2002b) "The Changing Face of HE in the 21st Century: Critical Success Factors (CSFs) for Implementing eLearning" In *Proceedings of the World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education (E-Learn 2002)*, Critical Success Factors for Implementing eLearning Tutorial, 15-19 October 2002, Montreal, Canada. 81.
- Nunes, J.M. and McPherson, M.A. (2002c) "No Lectures On-Campus: Can eLearning Provide a Better Learning Experience?" In Petrushin, V.; Kommers, P.; Kinshuk & Galeev, I. (editors) *Proceedings of the 2nd IEEE International Conference on Advanced Learning Technologies (ICALT 2002)*, 9-12 September 2002, Kazan, Tatarstan, Russia, 442-447.
- McPherson, M.A. and Nunes, J.M. (2002d) "Critical Success Factor (CSF) for eLearning Delivery". In *Proceedings of the IEEE International Conference on Advanced Learning Technologies (ICALT 2002)*, Critical Success Factors for Implementing eLearning Workshop, 9-12 September 2002, Kazan, Tatarstan, Russia 555.
- McPherson, M.A. (2002e) "Organisational Critical Success Factors for eLearning Implementation". In *Proceedings of the IEEE International Conference on Advanced Learning Technologies (ICALT 2002)*, Critical Success Factors for Implementing eLearning Workshop, 9-12 September 2002, Kazan, Tatarstan, Russia, 555.
- McPherson, M.A. and Nunes, J.M. (2003a) "A Framework to Support eLearning Management". In McPherson, M.A., Henderson, L. and Kinshuk (eds.) *Post-Proceedings of the Workshop in the International Conference on Computers in Education (ICCE 2002) on The Changing Face of HE in the 21st Century: Critical Success Factors (CSFs) for Implementing eLearning*. Palmerston North, New Zealand: Massey University, pp.1-7.
- McPherson M.A. (2003b) "Organisational Critical Success Factors for Managing the Implementation of eLearning in Higher Education", In McPherson M.A., Henderson, L. and Kinshuk (eds.) (2003) *Post-Proceedings of the Workshop in the International Conference on Computers in Education (ICCE 2002) on The Changing Face of HE in the 21st Century: Critical Success Factors (CSFs) for Implementing eLearning*. New Zealand, Massey University, 8-14.
- Nunes, J.M. and McPherson M.A. (2003c) "Learning Support in Constructivist eLearning Environments", In McPherson M.A., Henderson, L. and Kinshuk (eds.) (2003) *Post-Proceedings of the Workshop in the International Conference on Computers in Education (ICCE 2002) on The Changing Face of HE in the 21st Century: Critical Success Factors (CSFs) for Implementing eLearning*. New Zealand, Massey University, 30-35.
- McPherson M.A. (2003d) "The ICCE 2002 CSF Workshop: Critical Success Factors for Implementing eLearning", In McPherson M.A., Henderson, L. and Kinshuk (eds.) (2003) *Post-Proceedings of the Workshop in the International Conference on Computers in Education (ICCE 2002) on The Changing Face of HE in the 21st Century: Critical Success Factors (CSFs) for Implementing eLearning*. New Zealand, Massey University, 39-42.
- McPherson, M.A. (2003e) "Planning for Success in eLearning in HE: A Strategic View" In Jakab, F and Čižmár, A. (eds.) *Proceedings of the 2nd International Conference on Emerging Telecommunications Technologies and Applications and the 4th Conference on Virtual University (ICETA 2003)*, 11-13 September 2003, Košice, Slovak Republic, 449-452.



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- McPherson, M.A. and Nunes, J.M. (2004) "Critical Research using Focus Group Interviews: An Approach to Elicit Critical Success Factors in eLearning" *In* Brown, A. and Remenyi, D. (eds.) *Proceedings of the 3rd European Conference on Research Methodology for Business and Management Studies*, Reading University, UK, 29-30 April 2004, pp.263-272.
- McPherson, M.A. and Nunes, J.M. (2006a) "Topped by Cross-Winds, Tugged at by Sinuous Undercurrents: e-Learning Organizational Critical Success Factors as Identified by HE Practitioners." *In* Hatzipanagos, S. and Whitelock, D. (eds.) *Proceedings of the ALT-C 2006 Conference: The Next Generation*. 5-7 September 2006, Heriot-Watt University, Edinburgh, UK. Abstract of full paper on pp.72 and online at: [http://www.alt.ac.uk/altc2006/timetable/abstract.php?abstract\\_id=857](http://www.alt.ac.uk/altc2006/timetable/abstract.php?abstract_id=857) [last accessed 11/06/07].
- McPherson, M.A. and Nunes, J.M. (2006b) "Organisational Issues for e-Learning: Critical Success Factors as Identified by HE Practitioners" *International Journal for Educational Management*, 20(7) 542–558.
- McPherson, M.A. and Nunes, J.M. (2006) "Flying High or Crash Landing? Technological Critical Success Factors for e-Learning" *In* Schofield, M. (ed.) *Proceedings of the 1st Conference on Supported Online Learning for Students using Technology for Information and Communication in their Education (SOLSTICE 2006)*, 3 May 2006, Edge Hill University, Ormskirk, Lancashire, UK. Available online at: <http://www.edgehill.ac.uk/SOLSTICE/Conference2006/documents/40.pdf> [last accessed 11/06/07].
- McPherson, M.A. and Nunes, J.M. (2007) "Kindling a Passion for Acquiring New Knowledge: Critical Success Factors for Creating Appropriate Curricula for e-Learning", *In Proceedings of the ED-MEDIA 2007-World Conference on Educational Multimedia, Hypermedia & Telecommunications*, June 25- June 29, Vancouver, Canada. pp. NOS?
- McPherson, M.A. and Nunes, J.M. (2007) "Negotiating the Path from Curriculum Design to E-Learning Course Delivery: A Study of Critical Success Factors for Instructional Systems Design", *In Proceedings of the Second European Conference on Technology Enhanced Learning - "Creating new learning experiences on a global scale"*, 17-20 September 2007, Crete, Greece.