E-Learning Technologies and Its Application in Higher Education: A Descriptive Comparison of Germany, United Kingdom and United States.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSRACT

There is a general agreement that we have entered the information economy, that higher education is a critical element in this knowledge society. This has placed a new demand on its teaching and research functions, with growing emphasis on lifelong learning and more flexible forms of higher education delivery. Notwithstanding, there is also a widespread scepticism as to whether educational systems will be able to overcome their traditional inertia and respond to the challenge of the knowledge-based revolution.

Currently the prominence of ICT and other external influencing factors; economic, social, cultural and the changing role of governmental policy are driving the inner life of the higher education sector. In that respect many higher educational institutions are turning to e-learning technologies for improving the quality of learning by means of access to resources, services, long distance collaborations and exchanges. However this transition has been characterized by a mixed sense of optimism, skeptism and a lack of "adequate benchmarks".

It is within this background that this explorative study sought to carry out a descriptive comparison between Germany, UK and the USA with the objective of identifying the current trends, establishing tendencies of differences or similarities and identifying future trends (next 5 years) across the three countries. This is directed at synthesising "best practices" which could facilitate international knowledge transfer and the future development of e-learning. In pursuance of these aims the study employed the use of both quantitative and qualitative data sources. In obtaining the quantitative data, national and international reports that detail out the activities of e-learning in higher educational institutions across the three countries were reviewed and relevant data filtered. Further explanations, clarifications as well as predictions of future trends were sought through expert interviews (n=30 experts).

The findings indicate that: 1) The three countries did not exhibit much differences in terms of policy however they exhibited differences in terms of strategy and tactics in e-learning. 2) The three countries exhibited differences in terms of the prevalent e-learning technologies used as well as the application of such technologies. 3) In terms of didactical approaches and orientation to either local or international markets the three countries exhibited differences iv) In terms of impact and limiting factors the three countries exhibited differences in scale and proportion though qualitative impact was difficult to estimate. 5) In terms of future trends or scenarios different projections were made across the three countries.

The implications of the findings are discussed and recommendations offered for further research.

E-Learning Technologies and its Application in Higher Education: A Descriptive Comparison of Germany, United States and United Kingdom.

CHAPTER- 1
INTRODUCTION

The application of Information and Communication Technologies(ICTs) have become so attached to contemporary educational delivery worldwide that it has virtually become impossible to deliver or receive formal education without the application of such advanced technologies in the processes. The all encompassing term -ICT- which covers a wide range of technologies for gathering, storing, retrieving, processing, analysing and transmitting or presenting information is, in reality, practically indispensable in the delivery of contemporary education. Consequently, governments and its agencies, the corporate sector, educational outfits and individuals increasingly continue to investment huge sums of capital, time and other resources in this powerful engine of growth to keep up-to-date with regard to the current demands and trends.

In line with this fact, higher educational establishments in particular have dramatically transformed their mode of operation. Today, the use of chalk and duster in our seminar rooms and lecture theatres are completely extinct on some campuses. In place of that, we now have interactive whiteboards powered by computers and projectors, learning management systems etc. Electronic learning mediums referred to as e-learning is increasingly becoming the established practice with a wide array of positive outcomes. In this vein my introductory chapter will examine today's knowledge society, the state of higher education in the UK, Germany and United States, e-learning as a current context for workforce education, what e-learning is, the historical background of e-learning, its benefits, the driving forces behind e-learning, the forms of e-learning, characteristics of e-learning, how it is delivered and organized, technology trends, the kinds of technologies being used, new organisational arrangements in e-learning, quality assurance and emerging policy issues.

1. TODAY'S KNOWLEDGE SOCIETY

In today's knowledge society it has become an established fact that the role of knowledge in socio- economic development is certainly not new. In the knowledge era, competitive advantage and human development will depend only on access to knowledge at the local, national, regional and global levels. This has been evidently described and anticipated by a French economist,

"Each student will be competing with other students throughout the world with similar skills, but also … the efficiency of the universities will be … a major factor in a country's

competitiveness. In other words, German universities [will be] competing less among themselves than with Japanese or American universities."

(Lesourne, 1988)

However, knowledge has taken on an even greater degree of relevance and a different shape with the advent and deepening of the knowledge economy and society. There are multiple drivers of this phenomenon, one of them being the way in which society is becoming more complex and unpredictable in both positive and challenging ways. One can point to globalization, the economic value of ideas, global scale economic activities and rapid development in science and technology, including information and communications technologies (ICTs), as examples of this change. (UNDESA/DPADM, 2003).

Consequently, these new challenges place a new and constant demand on the nations of the world for responses that is more creative, innovative, smarter, and more active in their use of knowledge. Yet, while we often have an abundance of information, there is equally often a pronounced deficit of knowledge, or at least a deficit in our ability to create, use and apply it meaningfully (DPADM, 2003).On the other hand the accepted fact that we now live in an information age labeled the "information society" appears to some, including myself, as insufficient to describe the phenomenal transformations that characterize our times (Vigilante, June 2003). In its Human Development Report of 2001, the UNDP emphasized that "the information age is an input and not the outcome along the road towards the transition to a knowledge society". The knowledge society is the society that knows how to use information. Boisot (1998) notes that knowledge assets are manifested in terms of technologies, competences and capabilities. Technology is defined as "socio-physical systems configured so as to produce certain specific types of physical effects." Key among the attributes of this society is the characteristic of being networked. And in today's globalize world networks define our lives and modes of production. In the industrial age, businesses and organizations were vertically integrated. Today, horizontal networks predominate. Production is increasingly organized among separate players and their complex interactions create the value chain that drives the technology based global economy. Global networks cover many areas of activities, for instance, scientific research and innovation, production, E-business, E-education etc.

According to Manuel Castells' (2000), who is probably the most lucid analyst of these global socio-technological transformations "networks create a global economy and a global wealth of knowledge that are interdependent, asymmetrical, and diversified. This is done with an extraordinarily variable geometry that tends to dissolve historic, economic and geographic factors". An experienced sailor can navigate a wild sea. But in the case of the networked society, the mere accumulation of experience and skills will not be sufficient. The metaphoric sailor in

the network age will need also great flexibility, creativity, intuition, imagination and speed. Change is no longer progressive, sequential, cumulative, gradual, but it is abrupt, proceedings in leaps, in multiple variable directions, often unexpected, of course it has a much faster pace.

According to Vigilante (June 2003), the technological and communication revolutions have created new patterns of economic, production and knowledge organization and also provoke deep social changes. Such change can create conflict, as the introduction of new technology challenges traditional cultural mores. The question is how to create a dynamic balancing act between integration into the networked society and our need and wish to protect our own identity? Probably we need to accept that identities are not static but evolutionary, and we need to recognize that each one of us has multiple identities. Thus in dealing with the network society, we must deal not only with technical changes but also with the structural systemic changes and effects of modernity. Treating IT as a sector is very different from managing the societal effects of the IT age. He further stressed that with such transformations come fundamental challenges and opportunities that requires a deliberate policy choice and continued efforts and investments. It also requires a shift in culture and an adaptation of the local population to fully embrace knowledge as a driver of social and economic development (Vigilante, June 2003). He concluded by highlighting that in a world where knowledge and ideas are driving forward development, ICT is the perfect vehicle for breaking down barriers to information and learning (Vigilante, June 2003).

Having established the preliminary issues above the central question then is how can ICT be used to overcome deficits in education? There are so many examples around the world of how countries have been able to harness ICT opportunities for development. Analyzing the regional context and challenges posed by ICT, in 2001, the UNDP introduced a Technology Achievement Index, which assessed countries capacities to make new technologies work for social and economic development. The index was based on measures of technology creation, technology use and human skills for learning and innovation. It also categorized countries into 4 groups: leaders, potential leaders, dynamic adapters and marginalized. Taking a cue from success stories worldwide – from Ireland to Costa Rica to Estonia – the common thread is the bold and deliberate decisions taken by governments to invest in knowledge and to create the regulatory environment, which would encourage the development and diffusion of technological innovations. In all cases the success started out with clear visions, designed to steer those societies towards a knowledge economy. In Ireland this was based on 30 years of progressive investments in education. And today even the smallest nations, like Mauritius, are making strategic decisions to build cyber parks and use its geographical and cultural/linguistic position to develop software products for Francophone Africa.

So what does it take to be part of the networked society and take advantage of its opportunities? According to vigilante (June, 2003), before attempting an answer to this question one must point out the fact that in the current information society a country could choose to be **an e-tiger** (a country determined to take radical policy decisions to be a front runner),**e-floater** (a country trying to keep pace with the most dynamic countries), **e-follower** (a country that is content to make the best use of what reaches it in due course) or an **e-skeptic** (a country which does not believe in the transformational and development potential of ICT and does not take any active steps).Only the first two types can stay networked. The rest will basically only receive residual **e-fall out** (willingly in the case of e-follower and unwillingly in the case of the e-skeptic).

It is worth noting that the *OECD Science, Technology, and Industry Scoreboard 2001Report,* recognizes at the outset that: "Investment in knowledge is by nature much more difficult to measure. A rough indication can be gained by including public and private spending on higher education, expenditure on R&D and investment in software. Investment in knowledge accounts for about 4.7% of OECD-wide GDP and would exceed 10% if education expenditure for all levels were included in the definition of investment in knowledge". Their interpretation of what constitutes a "knowledge-based economy" seems to be guided by emphasis on the following indicators in terms of percentage of GDP investments:

- Higher education,
- Expenditure on R&D, and,
- Investment in software

In the formative phase of developing theoretically sound measures, OECD interprets the inputs -- rather than outputs or outcomes -- as representative of a knowledge-based economy (UNDESA/DPADM, 2003). The report notes that: "Sweden, the United States, Korea and Finland are the four most knowledge-based economies, as their investments in knowledge amount to 5.2-6.5% of respective GDP." In other words, the more a country spends on higher education, on R&D and on software, the more it represents a knowledge-based economy (UNDESA/DPADM, 2003).

Thus one can assume that to be part of the networked society of course one answer lies with education. Another is the application of knowledge and skills and giving opportunities for technology research, development and use. Another is a government and societal vision of how to use technology. Where do we want to be in 10 years time? And once that question is answered – what do we need to do to get there? And yet another issue is the role of the private sector. How can we create a dynamic private sector partnership with the state and academic institutions? (Vigilante, June 2003).

2. KNOWLEDGE SOCIETY AND DIGITAL LITERACY

The impact of the telecom boom on education is inevitable. The unprecedented developments in ICT are closely linked to several other significant changes in our economy and society. This also results in a higher demand for education and training in response to the challenges of our emerging "knowledge economy" and "knowledge society". A digitally literate citizen will be able to learn and take responsibility for continuous personal learning development and employability (Digital Future for European Learning (2001), European e-learning Summit, Brussels, 10-11 May, 2001).

According to the *e-Europe: Promoting Digital Literacy Report*, 2004, a starting point for an understanding of digital literacy is:

> "The acquisition of the technical competence for using information and communication technologies, understood in a broad sense, in addition to the acquisition of the basic practical and intellectual capacities for individuals to completely develop themselves in the Information Society".
>
> (*e-Europe: Promoting Digital Literacy*, 2004)

According to most experts, this concept is basically precise and complete. Nevertheless, it is necessary to revise the capacities implied in the concept of digital literacy, in response to the experts' suggestions (e-Europe: Promoting Digital Literacy, 2004).

On the other hand, there is an unavoidable technical capacity that allows the individuals to use technological instruments as a means of accessing certain services and information. This first point focuses on a question: what are the minimal technical competences that determine if an individual is or is not *digitally literate*? Whatever the answer is, we are confronted with a dilemma. Some experts believe that an inclusive and comfortable climate could be created if the standard is lowered, making the basic skills for ICT use enough to consider an individual *digitally literate*. This favourable environment could motivate those groups affected by the digital divide to participate in ICT training activities. However, this idea conflicts with a concept of digital literacy that, introduces the capacity for producing and creating in new media. This concept requires advanced technical competences, and could continue to exclude, those that already feel intimidated by the current technological tools (eEurope: Promoting Digital Literacy, 2004).

However, minimal technical competences have to be sufficient to allow an individual to use ICT with a certain level of independence, although those competences might not be sufficient to consider someone *digitally literate*. From this point of view, it is necessary to promote an understanding of ICT functions related to their opportunities and benefits particularly to education. This understanding will establish the range and guide the efforts to acquire more and better technical competences. Perhaps, the most significant change that digital culture demands is

linked to the mental abilities to understand *networks*. This is why *digital literacy* requires that intellectual and cognitive capacities be modified to go beyond linear models, and be successful in non-linear and multimedia settings. Finally, the information society, as an ecosystem, makes social, economic, and political life possible with ICT intermediation. This implies the need to raise awareness about the correct uses of ICT for personal or group benefits, and to stimulate active participation and expressions in new media – such as producing new content and/ or creating new tools (e-Europe: Promoting Digital Literacy, 2004).

3. STATE OF HIGHER EDUCATION IN THE UK, GERMANY AND USA.

- State of UK's Higher Education

In its Widening Participation for Higher Education Policy Document (Nov 2006), the UK Department for Education and Skills acknowledges that forecasts by the Institute for Employment Research show that, of the 12 million jobs expected to become vacant between 2004 and 2014, 6 million will be in occupations most likely to employ graduates. The arguments for growth in higher level skills are strongly supported by the Leitch Review of Skills in the UK. The Interim Report 4 concludes that, even if the current ambitious Government targets for raising skills levels across the education system are met, the UK will continue to compare poorly with global competitors, with productivity trailing behind.

This highlights the fact that, a strategy of investing in high level skills, and increasing the proportion of adults with a degree, has a great potential to deliver a high economic benefit. The department of education and skills Higher Education White Paper (2004) on the future of UK Higher education acknowledges the success story of its universities over the last 30 years. It cites for instance that in the early 1960s only 6 per cent of under-21s went to university, whereas today around 43 per cent of 18–30 year olds in England enter higher education.

Further, according to the *"impact of higher education institutions on the UK economy"; Universities UK, May 200 study;* universities also make a substantial contribution to the strength of the national economy. In 1999–2000 they generated directly and indirectly over £34.8 billion of output and over 562,000 full time equivalent jobs throughout the economy. This is equivalent to 2.7 per cent of the UK workforce in employment. For every 100 jobs within the higher educational institutions themselves, a further 89 were generated through knock-on effects throughout the economy; and for every £1 million of economic output from higher education, a further £1.5 million is generated in other sectors of the economy.

Notwithstanding this success story, the department acknowledges the need for radical improvements and further transformation of its universities because "the world is already changing faster than it has ever done before, and the pace of change will continue to accelerate.

The department acknowledges that there is a danger of decline because many of the UK's economic competitors invest more in higher education institutions than they do. France, Germany, the Netherlands and the USA all contribute 1 per cent of GDP in public funding to higher education institutions, and Japan is planning to increase public investment from 0.4 per cent to 1 per cent. This compares to 0.8 per cent in the UK, rising to approximately 0.9 per cent by 2005. It further acknowledges that its competitors are looking to sell higher education overseas, into markets which have traditionally been seen as that of the UK.

In the context of that it identifies three areas that need improvements:

First, the expansion of higher education has not yet extended to the talented and best from all backgrounds. It points out that in the UK today too many of those born into less advantaged families still see a university place as being beyond their reach, whatever their ability.

Second, the need for a better progress in harnessing knowledge to wealth creation. And that depends on giving universities the freedoms and resources to compete on the world stage. To back our world class researchers with financial stability, turn ideas into successful businesses and undo the years of under-investment.

Third, to make the system for supporting students fairer. This aims at ensuring that notwithstanding the huge cost of higher education delivery, that no student is put off from going into higher education because they cannot afford the cost of studying while they are at university. And those who come from the poorest backgrounds should get extra support.

In the context of all these emerging challenges, UK's higher education's ambition is to continue its expansion and targets to increase participation in higher education 50 per cent of those aged 18–30 by the end of the decade, linked to a wider aim to prepare 90 per cent of young people for higher education or skilled employment. Moreover, since on latest estimates England currently has a participation rate for 18–30 year olds of 43 per cent, the further increase they need to achieve 50 per cent by 2010 is relatively modest ('Young participation in higher education' report by HEFCE, 2005). However my pivotal question to all these issues discussed above is what role will e-learning be playing in these emerging trends?

State of Germany's Higher Education

There are more than 300 universities and about 220 *Fachhochschulen* (Universities of Applied Science) listed in the official guidebooks and web-sites. Generally, decentralisation and the federal principle characterise German higher education. The "Hochshulrahmengesetz" (national law governing higher education) lays out the general aims and principles of higher education, governs teaching and research, rules on access, membership and human resources. The "Lander" (federal states) possess discretionary powers in the implementation of the national

law, finance 90% of higher education, leaving 10% to the national government (BLK, Statistisches, BMBF 8Anfrage An das BMBF 2002).

At the universities, for many decades a master's level degree was the first degree available and only the recent higher education reforms, which have introduced two-level programs at both the bachelor's and master's level have opened a chance to leave university earlier. The bachelor's degree was introduced to avoid the drastic rates of non-completers, which in some university subjects were as high as 75%. The Fachhochschulen / universities of applied science offer shorter and more practice-oriented programs. They generally lead to credentials at the bachelor's level, but more and more Fachhochschulen also offer master's programs for those students eligible for further study.

An enterprising new sector of private institutions in higher education has developed over the last two decades. Some of these institutions follow international patterns with their curricula, such as, for instance, ESCP-EAP in Berlin, or Internationale Fachhochschule Bad Honnef Another new development is the creation of corporate universities, such as Volkswagen AutoUni. Only few have reached a point beyond regular in-service training, and in most cases corporate programs are open to employees only.

Notwithstanding these positive developments one cannot say that the German higher education system is without problems. For instance, one could realize that the current spending on German higher education falls below OECD standards. Citing from the OECD, education at a glance 2001 report, with expenditure on education at 5.5% of GDP, Germany lies below the OECD average. On the average OECD member states spend 5.7% on their education systems. Further Germany's expenditure on higher education amounts to 1% of GDP. The mean of the upper half of OECD member states is 1.3%. Thus to enter the top 50%, Germany would need to invest an additional 5-6 billion euros per year on higher education.

Based on the HIS Studienabbruchstudie (2002), based on 1999/2000 figures, the current conditions at mass universities need improvement. It identifies that a lack of supervision leads to long study times. For instance the ratio of students to professors is 43:1, one in four students fails to complete his/her degree, 16% of students change their courses, in some subjects the shrinkage reaches 60%, the average age of a student is 26.5 years and on the average a degree takes six years to complete. Also getting admitted at a German state university can be a trying process. Many programs are restricted in terms of the numbers of new students, and start only once per year. Acceptance of foreign credentials is difficult, and credit transfers rarely happen without losses.

Consequently, in an address by the Federal minister for education and science; Dr. Annette Schavan describing Germany – as a Hotbed of Talent intimated that "we want to secure the future opportunities of the younger generation in Germany, we need superior quality in

education and training and we must support the many different talents and excellence in German science and research". Consequently, the Federal Government is providing a clear signal in its budget for 2006 where over 8 billion Euros have been earmarked by BMBF directed at giving education, research and innovation with life sciences, new technologies and sustainable development gaining the highest priority on its agenda and thus making Germany fit for the future. Consequently it had created the Higher Education Pact, which acknowledges the fact that the institutions of higher education are facing great challenges in Germany. On the one hand, higher education must be modernized within the framework of the Bologna reform, on the other hand, the number of persons qualified to enter higher education will rise considerably until 2020. In order to maintain the performance of institutions of higher education and to keep them open for a larger number of new entrants, the Federal Government and the Länder have agreed to the basic elements of the Higher Education Pact.

In terms of the internationalization of higher education, until the mid-1990s Germany often seemed to be a latecomer on the higher education scene, because there were barriers to reform approaches and, from the German side, not all European trends were considered desirable. From the mid-1990s the climate changed, especially because of the concern that the German higher education system had lost its attractiveness for foreign students and a further internationalization impetus was felt to be necessary. In that respect, German institutions of higher education have been supported since 2001 in developing their own study programmes abroad. The range of currently 29 projects covers all areas from summer schools to the establishment of new institutions of higher education. The single largest project is the "German University in Cairo", which was officially opened in early October 2003. It is the first foreign institution of higher education worldwide which is oriented to German standards and content of teaching (www.daad.de).

State of USA's Higher Education

Profiling American higher education according to the *Measuring up 2006 report,* currently over 4,000 colleges and universities offer degree-granting programs. 15% are public 4-year institutions, 25% are public 2-year institutions, 45% are private 4-year institutions and 15% are private 2-year institutions. It is estimated that in terms of appropriations or funding for Higher Education, State and local governments currently provide $72 billion for higher education, an increase of 20% since 1991.

According to Hunt Jr. and Carruthers, it is time to recognize that American higher education, as it evolved in the 20th century was, for all its success, a way station, not a destination. In the 21st century, higher education must respond to an expanding, knowledge-

based global marketplace. In responding, the results of past success—unparalleled facilities and faculties—can be a firm foundation, but only if the new context is clearly recognized. Recognition of the new context is necessary but not sufficient. What is now needed is a sense of urgency among policy leaders, educators, and business leaders comparable to the policy emphasis that other countries are placing on higher education—as reflected in shifting international rankings. Solutions may be complex, responsibilities dispersed, and priorities upset, but the central issue can be stated simply: The current level of performance will fall short in a world being reshaped by the knowledge-based global economy (Cited in Measuring up 2006, a National Report Card on Higher Education).

According to Wagner citing from the *Measuring up 2006, A national Report Card on Higher Education)*, taken together, the comparative information about participation, graduation, completion, and learning documents a sweeping shift toward greater levels of participation in higher education among a broad range of countries with advanced, market-based economies. That the United States stood in the late 1980s as a leading country explains partly why growth and improvements in access, participation, and completion are more clearly seen in other countries that previously relied on selective routes into their relatively small-volume higher education systems. Further, on several measures, the United States no longer holds the leading position. Policies adopted in a number of countries over the past 20 years have helped to foster increased rates of completion at the high school level, improved access to higher education, and stable if not higher rates of degree completion. The consequence is a trend across these countries toward convergence at higher rates of participation and completion in higher education (Wagner, Sept 2006).

Elaborating further on how American Higher Education Measure Up Internationally? The *Measuring up 2006* indicates that though the United States is still among the world leaders in the proportion of 35- to 64-year-old adults with college degrees, which reflects the spectacular gains of the four decades following World War II, first through the educational efforts of the G.I. Bill and continuing with the population explosion of the baby boomers. In the 1990s, however, as the importance of a college-educated workforce in a global economy became clear, other nations began making the kinds of dramatic gains that had characterized American higher education earlier. In contrast, by the early 1990s, the progress the United States had made in increasing college participation had come to a virtual halt. For most of the 1990s, the United States ranked last among 14 nations in raising college participation rates, with almost no increase during the decade. This U.S. performance has continued into this decade.

Consequently; what is at risk is America's future educational and economic leadership, if the nation's younger population does not keep pace with the educational attainment levels of

earlier generations and with the accelerating pace of higher education around the globe. In sum, United States is no longer the clear-cut top performer in participation and completion rates, it has been joined by other countries that have expanded access to and completion of higher education programs. As a result, as U.S. states strengthen higher education opportunity and outcomes, they may find that other countries also have stronger or improving performance levels, attesting to the heightened international competition in the delivery of higher education (Wagner, 2006).

Summary: State of Higher education across the UK, Germany and USA.

Drawing conclusions across the three countries citing entry rates into higher education, 2003 report of the OECD, **Table 1** below presents entry rates for each country, specifically the percentage of the population enrolling for the first time in higher education. **Table 2** also gives details of changes in higher education enrolments. The data cover new students in programs leading to academic degrees such as associate's or bachelor's degrees (or their first degree equivalents in other countries). For the U.S., new entrants in vocationally or occupationally oriented associate degree programs are included. For all countries, new entrants in vocationally oriented programs of less than two years' duration are not included.

Table 1: Entry rates into higher education, 2003

Country	New students as a percentage of the population
Iceland	83
New Zealand	81
Sweden	80
Finland	73
Poland [a]	70
Hungary	69
Australia	68
Norway	68
United States [b]	*63*
Italy	54
Denmark	53
Netherlands	52
Korea [a]	50
United Kingdom	48
Spain	46
Japan [a]	42
Ireland	41
Slovak Republic	40
France	39
Switzerland	38
Germany	36
Austria	35
Belgium	34
Czech Republic	33
Mexico	28
Turkey	23
Country average	**53**

[a] Calculated as gross entry rate (new entrants divided by the population at the typical age of entry).

[b] Includes vocationally and occupationally oriented associate's degree programs.

Sources: OECD, *Education at a Glance: OECD Indicators* (Paris: 2005), table C2.2; and OECD database.

Table 2: Changes in higher education enrolments, 1995 to 2003 (1995 enrolment = 100) (ranked by change in the rate of participation from the age group)

Country	Change in total enrollment	Change in enrollment accounted for by:	
		Change in the size of relevant age group	Change in the rate of participation from the relevant age group
Hungary	229	89	232
Greece	189	105	180
Korea	159	84	175
Czech Republic	170	93	174
Iceland	183	106	174
Sweden	146	95	155
Portugal	133	95	140
Denmark	122	90	137
Mexico	146	109	134
United Kingdom	126	97	131
Ireland	142	110	128
Spain	121	93	127
Australia	129	103	126
Finland	125	100	126
Norway	117	92	126
Belgium	116	97	122
Germany	104	85	119
France	103	94	110
United States	*112*	*107*	*105*
Austria (2002)	93	67	101
Average of above	**133**	**96**	**136**

Notes: See accompanying text box for explanation of indices and calculations.

Sources: OECD, *Education at a Glance: OECD Indicators 2005* (Paris: 2005), table C2.3. U.S. Bureau of the Census, *Current Population Reports—School Enrollment, 2005.* All data come from a special survey completed by participating OECD countries, except data for the United States. For the United States, the indices are calculated using data from the October Current Population Survey (CPS), as reported by the U.S. Bureau of the Census in table 1 of the annual series. The calculations here refer to the period 1995 to 2003. The differences in data sources and definitions reduce comparability of the U.S. and OECD survey data.

From the data above one can say that Higher education enrolments have grown substantially from 1995 to 2003 (see Table 2). Averaging across countries, enrolments grew by about one-third over this period—a continuation of a widely shared trend of robust growth dating back to the mid-1980s. For most of the countries for which data are available, increases in the size of the underlying populations were relatively modest, so enrolment growth is due mostly to increased participation rates, as these countries both drew more deeply from the population and retained those enrolled for longer periods. Several other countries improved participation rates from already relatively higher levels for example the United Kingdom and Germany. For the United States, increases in enrolments from 1995 to 2003 are accounted for as much by increases in population in the relevant age groups as by increases in participation rates. That is, higher education enrolments in the United States are expanding as much from increases in the size of the young adult population as from improvements in access and participation. Taken as a whole, these data confirm both the growth trend of higher education enrolments over time and the success of many countries in raising their rates of participation in higher education.

Concluding this section, one will acknowledge that all countries including Germany, the United States and United Kingdom face challenges in reducing gaps in higher education participation, completion, and learning by income, social class, region, or ethnic group in their national educational delivery as well as positioning them selves as global players in the higher education field of play. Consequently, the need to reduce inequality in access, completion, and learning is becoming increasingly important as the workforce demands in many countries

increase. How well each nation responds to this challenge promises to be a key policy question in strengthening the knowledge and skills of its population and the competitiveness of its workforce (Wagner, 2006). My main interest in this research is the strategic role that e-learning is playing or could be playing in the achievement of the national and international higher educational aims of the three countries.

4. E-LEARNING: CURRENT CONTEXT FOR WORKFORCE EDUCATION IN THE INFORMATION ECONOMY.

In today's information economy there is an increased demand for skilled workers. Skilled jobs now represent 85% of all jobs, in contrast to 20% in 1950 (Meister, 2000). For example, between 1998 and 2008 more than 2 million new skilled information technology (IT) workers will be needed to fill newly created jobs and to replace workers leaving the field (United States Department of Labour, Bureau of Labour Statistics. BLS projections to 2008). Further By 2006 nearly half of all workers will be employed in industries that produce or intensively use information technology products and services thus the need for continuous training (United States Department of Commerce 1999).

Currently it is estimated that 50% of all employees' skills become outdated within 3 to 5 years. To deal with this, corporate training budgets have increased 23.5% between 1994 and 1999 associated with a shift to use of web-based training for workers (Moe and Blodgett, op. cit., endnote 21, p. 229, Gregory, Wilson and Husman, 2000).Classroom use in corporate training is expected to drop from the current level of 78% to 64% by 2001. The market for web-based corporate learning is expected to reach $11.4 billion by 2003, up from $550 million in 1998. There is an increased growth in corporate universities in the last thirteen years. The number of companies that have opened corporate universities grew from 400 to 1,800 (Moe and Blodgett, op. cit., endnote 21, p. 229. Meister op. cit., endnote 23 in US Web Based Education Commission Report, Dec 2000). This current phenomenon as demonstrated by the statistics raises key questions for higher education as well as requires the adoption of strategic approaches. This is because developing an e-learning strategy is essential in setting a course that will enable a university, faculty or department to achieve predetermined goals. Without a strategic plan, short-term measurement of costs and return on investment may overshadow the longer-term benefits of e-learning as a means of producing knowledge workers (Rosenberg 2001).

5-WHAT IS E-LEARNING?

E-Learning means a lot of different things and it is understood differently by players with very different roles. The E-Content Report (2004) describes e-learning "as an umbrella term

describing any type of learning that depends on or is enhanced by electronic communication using the latest information and communication technologies (ICT)". It is also defined as "a generic term covering a wide set of ICT technology-based applications and processes, including computer-based learning, web-based learning, virtual classrooms, digital collaboration and networking" (Hambrecht, 2000; Kaplan-Leiserso's online glossary).

Simplifying, others refer to it as teaching and learning that is web-enabled (Rosenberg 2001: p 28-29, Govindasamy 2002: p 288; Garrison & Anderson 2003: p 2). Building on the above descriptions the *eEurope*: Promoting Digital Literacy initiative describes it as the "the use of new multimedia technologies and Internet for improving the quality of learning by means of access to resources and services, and long distance collaborations and exchanges". Further; The Commonwealth of learning in 1998 described e-learning in two ways: I) the application of information and communication technologies (ICT) to core institutional functions such as administration, materials development and distribution, course delivery and tuition, and the provision of learner services such as advising, prior learning assessment and programme planning. ii) As an organisation that has been created through alliances and partnerships to facilitate teaching and learning to occur without itself being involved as a direct provider of instruction.

Recognising these elaborate definitions that have been given e-learning over the years, one must point out that, the scope of such learning is unpleasantly broad. The globally available definitions may however create confusion as a result of the fact that, not only that the subject is equally new to course producers, to technology providers and to the end-users (i.e. the learners), but it hasn't actually found its common ground and market position yet (E-Content Report, 2004). Recognizably, the huge emphasis that has been given e-learning, especially by leading technology providers, might have resulted in the term rather being abused. However, as technology and business evolve, so does terminology, while other equally valid terms are likely to persist, e-learning seems to have finally captured the field.

6. E-LEARNING: HISTORICAL BACKGROUND

Historically, distance education can be traced back to the 18th century. The historical phases identified by Lorenzo García Aretio (2001) and cited by Alcalá, (n.d) are: 1) ***Correspondence teaching-*** This dates back to 1728, when Caleb Philipps, professor of short hand, published an advertisement in the Boston Gazette offering teaching materials and tutorials. However, the first testimony of an organized correspondence course in which there was bidirectional communication comes from England, in 1840, when Isaac Pitman initiated a short hand course. From those early stages, correspondence institutions appeared in the United States

and other European countries. 2) ***Multimedia teaching-*** This stage is a product of the 1960s, when the British Open University was founded (Aretio, 2001 cited by Alcalá, n.d). Here the use of printed materials was joined by audiotapes, videotapes, radio, TV broadcasts, telephone, etc. 3) ***Telematic teaching-*** This dates to the dates the 1980s. This decade marks the arrival of modern telecommunications in the education scene. 4) ***Teaching through the Internet-*** It is the Internet age and e-learning was described as fourth generation distance teaching, virtual campus, virtual teaching, flexible learning model, etc. It involved the application of two-way communication. Added to all these developments ICT supported education quickly became the hot topic in the 1990's due to spreading use of the World Wide Web and its fast developing applications.

7. BENEFITS OF E-LEARNING

It is of worth noting that the enhanced use of new technologies for educational deliveries have brought new opportunities to the non-traditional learner as well as to the traditional training institutions. Notwithstanding, for more than forty years information technology (IT) has been part of the infrastructure supporting universities. Essential functions such as central planning, budgeting, scheduling, grading, and maintaining student records have drawn on IT resources, beginning with mainframe computers and migrating to other platforms. In these respects universities are similar to other businesses, drawing upon IT resources to perform the routine tasks required to stay in business (Wilson, Sherry, Dobrovolny, Batty, & Ryder, 2000).

Accounting for benefits, one can say that the intensified spread of ICT and web-based technologies during the last ten years has brought about unprecedented access to information and resources. For instance the Internet has become a powerful new means of communication reaching to the far corners of the earth, making the world smaller, more connected, and transmitting information at nearly real-time speed. Currently; an estimated 377 million people are using the Internet, bringing with it rapid and radical change into our lives (US Web Based Education Commission Report, Dec 2000).

Further, the Internet is making it possible for more individuals than ever to access knowledge and to learn in new and different ways. At the dawn of the 21st Century, the education landscape is changing. On college campuses, there is an influx of older, part-time students seeking the skills vital to success in an Information Age thus enabling corporations to deal with the shortage of skilled workers and the necessity of providing continuous training to their employees. It is allowing for the creation of learning communities that defy the constraints of time and distance as it provides access to knowledge that was once difficult to obtain (US Web Based Education Commission Report, Dec 2000).

Also e-learning has successfully eliminated some of the major disadvantages of earlier distance learning solutions such as the long content update cycle, the lack of feedback mechanisms during the learning process and the response time of the student support tutoring systems through the facilitation of self paced learning process, flexibility, accessibility, convenience, time and other savings, highly customisable individual learning style, interactive and rich multimedia learning content, learner focused learning, more active participation in the learning process, easier content management, and ease of update. It also includes the capacity to link the content with other learning resources, use of distributed libraries, inexpensive worldwide delivery, integrated assessment and testing facilities, variety of measuring methods of the learning success, measuring ROI by monitoring and evaluating the learning progress and greater storage capacity resulting in the availability of more learning products(E-Content Report , 2004).

Currently, many see the rise in the availability of e-learning not only as a revolutionary opportunity to increase access to higher education, but also to hasten the overall pace of reform in higher education (Ehrmann n.d.). In contrast to the institutional status quo, what was once an eclectic assortment of individually accessed, non-credit educational courses is quickly being knit into comprehensive degree- and certificate granting programs (Phipps, Wellman, and Merisotis 1998). Little wonder that management pundit Peter Drucker, has predicted that the residential university campus as we know it will be defunct within 30 years. A better bet is that traditional higher education will change, not disappear. But the question that still remains is how will it change? (Gladieux and Swail 1999)

Consequently; the explosion of interest in virtual education over the last five years is enforced by the fact that the "the provision of education will be the biggest challenge for most governments as they attempt to attain the ideal of peace, freedom and social justice, while striving at the same time to position themselves to generate more wealth and compete in a global market." (Anon, 2001a). They are recognising that it cannot be done effectively without substantive reform to their education systems. For instance; recent EU policy has stressed the role of e-learning in improving innovation in the education and training of its citizens (Anon, 2001a). In a report on the European e-learning Summit, Viviane Reding, Commissioner for Education and Culture, described e-learning and innovation in education and training infrastructures as the "key to delivering a new European Information Society" (Anon, 2001a, p.4). Consequently it has produced an Action Plan for 2001-2004 to help achieve a "cohesive and inclusive society within a competitive, knowledge-based economy" by "bringing every citizen, home, school and business into the digital age and online" *(*eEurope, March 2000. p.2)

8. E-LEARNING AND UNIVERSITIES- DRIVING FORCES

According to a UNESCO report there are several global forces that are serving to raise the sense of urgency: **i)** World population in 2015 will be 7.2 billion, up from the current 6.1 billion. Ninety-five percent of the increase will be in developing countries. People in most countries will live longer, which will add to the demand for access to education and other services. **ii)** Globalisation, the unrestricted flow of information, ideas, cultural values, capital, goods and services, and people, will enhance not only the demand for education, but create need for more diversified content and greater flexibility of access (CIA, 2000; UNESCO, 1998). However, two trends running parallel to the globalisation process will have a significant impact on the development of global systems of virtual education. These are the creation of more small and medium-sized enterprises and an increasing desire to defend cultural, linguistic and religious identities. Each of these trends complicates inter-institutional collaboration and mitigates against the flow of globalised content across borders.

Cunningham et al. (2000), in the comprehensive analysis *The Business of Borderless Education,* identified the following forces as driving the growth of what they called the "alternative education market" in those jurisdictions: a) The globalised economy, with a growing demand for standardised products, services and technical infrastructure, and sophisticated communication systems. b) The emergence of a post-industrial information age and the explosive growth and distributed nature of new knowledge. c) The demands for greater access to tertiary education fuelled by rapid changes in the economy, the need to maintain and upgrade skills for employment, and industry's demand for "work-ready" graduates. d) The growing reluctance on the part of governments to fund the increasing demand for higher education.

The educational strategies that are being deployed in response to these forces are described with various names, that is, "Virtual education," "distance education," "distributed learning," "online learning," "Web-based learning," "e-education," "e-learning," or any one of a number of other labels. Current strategies typically involve the use of digital networks, either synchronously or asynchronously, for the delivery of courses, the management of administrative services as well as the provision of learner support services. This phenomenon is further buttressed by a recent report issued by the American Council on Education (ACE). It states:

> "The new distance education force transforming higher education may not be controlled by the traditional structures or providers of education or by traditional academic policies. Not only do the new forms of education portend a change for student populations, but also they will force faculty to develop new modalities of teaching and administrators to provide a new infrastructure for support".

Consequently, the advent of distance education is forcing many institutions to review and amend many of their existing policies and procedures (Parrish and Parrish, 2000). This is because currently there is a strong move naturally towards integrating computer assisted learning technologies (CAL) into the education curriculum (Dearing et. al., 1997); much of which has been motivated by the view that CAL offer many educational advantages over traditional teaching (Atkins, 1993). Thus due to the growing and diversifying demand for higher education, increased competition and globalisation, there is the need for higher educational institutions to outline clear and comprehensive strategies for ICT in relation to the types of technologies to use as well as make appropriate choices about the markets they can and wish to serve.

However the actual influence of these external conditions is determined by the way in which the internal actors perceive the changes in their environment and their ideas about future trends. But the current situation points to a gap between vision and reality or that the "Virtual University" works in theory but not in practice (Pollock & Cornford, 2002). Pollock and Comford continue further by highlighting that many higher educational institutions are still struggling to overcome the "pioneer" phase, while trying to move into a phase of more mainstream engagement. In order to be successful, indeed, the commitment of some dedicated individuals will not suffice; the institution itself must make a commitment (i.e. for support, resources and personnel) as well as develop a targeted implementation strategy. There is therefore the need for internal and external actors such as faculty or staff members, students and policy makers to know more about the implications of technology use (2002). For instance when one examines faculty use of e-learning though the availability of IT is becoming common, little is known about the actual extent of higher educational instructors' access to and use of the Internet and other telecommunications technologies.

Recent surveys of academic-computing officials at over 500 postsecondary institutions in the United States have shown that more than 40 percent of senior IT officials believe that their top priorities, and biggest challenges, are getting faculty to work with technology and helping them to integrate technology with instruction (Carlson 2000; Green 1999). As the typical college has doubled it's spending on information technology services over the past 10 years, it becomes increasingly important to know whether or not postsecondary faculty are using electronic mail, the Internet, and Web sites for instructional purposes (Smallen and Leach, 2000). For example a recent forum on technology use in higher education found that, due to a pervasive scepticism among faculty and administrators about the quality and effectiveness of online research and teaching, established professors were more inclined than their untenured counterparts to use information technology in teaching (Kiernan, 2000).

Thus summarising this phase of my discussion, one could realize that notwithstanding the overwhelming pressure brought to bear on higher education by the external forces already mentioned, certain debilitating internal factors, for example, faculty's perception and use of e-learning technologies could inhibit the total adoption of e-learning by higher educational institutions.

9. FORMS/CHARACTERISTICS OF E-LEARNING

The definitions of e-learning highlighted above encompass several forms of e-learning. According to the E-Content Report (2004), the following forms could be identified:

Firstly; as a means of communication. Here e-learning is used to support communication between students, teachers, tutors, or among a group of peers. The common features of these applications enables users to conduct synchronous and/or asynchronous communication, share common educational resources, facilitate working understanding concerning the co-ordination of work processes and procedures such as determining who does what, how and when.

Secondly; e-learning used for simulation. Here it is used to simulate real world environments thereby providing a link between the theoretical and practical worlds. For instance students can employ simulations to prepare themselves before engaging in practical sessions, to reflect on and repeat specific activities after these experiences, and to simulate practice when actual real-life practice do not exist.

Thirdly; e-learning used as a general resource. This is the use of computers and internet-based resources and services to enable students for instance learn through interactive e-learning units and rich media sources, using speech, video or interactive sequences or instructions. This is further evident in the availability of university intranets or learning portals for students to log into such systems when at work or from home, or have access to digital libraries.

Fourthly; e-learning used as Learning Management Systems (LMS). A LMS is software that deploys, manages, tracks and reports on interactions between learner and content and between the learner and the teacher. LMS combine with the capabilities of Learning Management Content System (LCMS) in content creation and storage. The LCMS can also serve as a data repository which allows developers and subject experts to share content and subject components over a network.

In terms of characteristics, just as the rise of ICT fundamentally changed the nature of how work and communication gets done; it has also influenced the nature of how people learn. Because most effective e-learning promotes self-regulated learning through appropriate coaching, it has encouraged more individuals to learn by themselves and to only learn what they really need to know to perform their task optimally. In terms of greater flexibility and timeliness, e-learning

can suit educational needs at any time especially where traditional classroom-based learning is disruptive.

Summarising one can say that e-learning products come in many forms including learning management systems, collaborative learning tools, assessment products, content development tools etc. These vary in terms of role, user, scalability, underlying infrastructure requirements and implementation approach. The e-learning market place is currently a very fragmented and rapidly evolving entity. With new products arriving, existing products being positioned as "e-learning" tools, and different vendors using different terminology, one need a more objective view of suitability of products against identified needs. This is because enabling applications and their related technologies do play a very important role however; they should never be in the front-line for the end users. Thus there is the need to compare different kinds of products to develop a coherent strategic approach to the use of technology in support of learning (E-Content Report, 2004).

10. HOW IS E-LEARNING DELIVERED?

The development of technologies employed to provide e-learning has resulted from a "push-pull" relationship between providers and the public. Technological advances have created awareness and demand among users, while usage has pushed providers to further develop technologies (Gladieux and Swail 1999). According to Sherron and Boettcher (1997), these advances have produced over the years four different generations of distance education technologies. Key differentiating characteristics of the generations of technologies of distance education include: 1) the number of individuals that can be simultaneously supported in communication (i.e., one-way, two-way, or multiple-way communication); 2) the amount and types of information (voice, video, data) that can be communicated (i.e., whether the communication channels are "broadband" or "narrowband"); and 3) the speed at which that information is communicated (i.e., whether the return rate is fast or slow).

Discussing further Sherron and Boettcher (1997), indicated that the technologies predominantly used in distance education in the early and mid-20th century (such as print, radio, and television) can be characterized as one-way narrowband communication. These first-generation distance education technologies, thus, were best used to transfer information primarily from faculty to student. This delivery mode did not typically incorporate any interaction among students and only supported minimal interaction between students and faculty. One additional constraint among first-generation broadcast technologies was that they were time dependent (i.e., radio and television broadcasts occurred only at specific, predetermined times that required the student to be listening or watching at those times).Second-generation technologies began to

emerge by 1960 and represented a significant advancement in that they addressed the time dependency issue of first-generation technologies. The advent of the VCR and cable television enabled "time shifting" of the broadcast portion of distance education courses, as well as the alternative of bypassing broadcast completely by making the content of courses available on videotapes that could be sent to students and viewed at any time. In other respects, however, distance education courses that employed this generation of technologies were not so different from the previous generation because in both cases there were little interaction among students and between students and faculty.

By the mid-1980s, the personal computer had found its way into use by distance education providers, followed not long thereafter by the advent of two-way videoconferencing. This third generation of distance education technologies, in contrast to previous generations, allowed faculty to convey increasingly complex and large amounts of information to students and enabled interaction among students and between students and faculty through the use of electronic mail, chat rooms, and bulletin boards. The advent of computer-assisted instruction, simulations, and other electronic resources accessed via computer disk, CD-ROM, or the Internet further characterizes this generation.

According to Sherron and Boettcher (1997), the emergence of fourth generation technologies represented still another progress. Interactivity among students and between students and faculty was increased, and the amount and types of information that can be exchanged was significantly greater and take less time to occur. Further they decreased the reliance on time and place and are enabling the implementation of completely virtual universities. The current landscape of e-learning has grown in sophistication in terms of the use of advanced technologies and employs the use of diverse categories of technologies cutting across second, third, and fourth generational technologies. Examples are two-way video with two-way audio, one-way pre-recorded video, Internet courses using synchronous and asynchronous computer-based instruction, and CD-ROM (Sherron and Boettcher, 1997).

11. HOW IS E-LEARNING ORGANIZED?

With the increased capabilities of newer generations of e-learning technologies, higher educational institutions are being forced to revisit, if not altogether redefine, their missions (Ehrmann n.d.; Gallick, 1998). In connection with this, the forces acting upon higher educational institutions are no different than those acting upon the larger society. New technologies are challenging fundamental assumptions about the nature and organization of work, as well as the need for workers to engage in continuous learning (Carnevale, 1991; Kelly, 1998). A range of unconventional providers, such as corporate universities and unaffiliated e-learning providers,

have entered the higher education marketplace, offering instruction and credentials in new settings and on flexible schedules (Gladieux and Swail, 1999).

As Oblinger and Maruyama (1996) pointed out, the institutional response to technology's pressure on organizational structures and relationships can be traced back over 20 years. Through the end of the 1970s, institutions generally acted individually with regard to e-learning, creating their own materials or purchasing them from other institutions. Progressing; with the advent of satellite technology in the 1980s, consortia of institutions formed to share the correspondingly high costs of course development and delivery. With the rise of the networked computer and the Internet in the 1990s new pressure has been brought on institutions to consider their markets in an even broader national or international e-learning marketplace, thereby fostering innovations and collaborations among institutions.

One way to conceptualize these new and emerging arrangements of institutions is by considering what distinguishes different types of higher educational providers, both in terms of who provides the education and who awards the degree or certificate. Phipps, Wellman, and Merisotis (1998), created such a typology and identified four basic types of organizational arrangements employed by institutions that provide e-learning:

a) **Enhancements to traditional campus-based instruction**. Perhaps the most prevalent form of e-learning occurs as an enhancement to campus-based instruction offered at traditional colleges and universities. With this type of offering, students are regularly matriculated, enrolled in the usual courses, taught by the same faculty, and are generally on campus all or most of the time they are studying. The instruction can be offered through off-campus centres as well as on campus. The distinguishing factor is that e-learning students are not in the same location as their instructors. This type of arrangement arises primarily through faculty initiatives to employ available technologies and may be particularly beneficial to students who live off campus or who work full- or part-time.

b) **Consortia or collaboratives**. This form of organization represents cooperative pooling and sharing arrangements among institutions. In these arrangements, multiple institutions join together to provide e-learning on a state-wide or regional basis. The authority to award degrees and credits, however, remains with each member institution and does not shift to the consortium.

c) **Contracted or brokered arrangements.** Contracted or brokered arrangements are configurations of institutions, faculty, or other providers brought together solely for the purpose of delivering e-learning. In contrast to consortia or collaboratives, the authority to award degrees and credits rests with the contracting or organizing entity, not with the originating institution.

d) **Virtual universities**. Virtual universities are institutions that offer most or all of their instruction via technological means and are distinguished by their nearly exclusive use of technology as the educational delivery device.

Summarising, as new types of organizational arrangements emerge, challenges to the flexibility of the higher education community may continue. For now, e-learning providers are offering traditional and non-traditional students alike the opportunity to pursue higher education through a variety of arrangements (Phipps, Wellman, and Merisotis 1998).

12. TECHNOLOGY TRENDS

The promise of widely available, high quality web-based education is made possible by technological and communication trends that could lead to important educational applications. Citing from the Web-based Education Commission report (Aug. 2000), a summary of the key trends that have been characteristic of technology is as follows:

The first trend is toward greater broadband access and better data packet handling capabilities. This trend for learners means a richer delivery of content via interactive environments than today's delivery of simple text.

The second trend is that of pervasive computing, in which computing, connectivity, and communications technologies connect small, multipurpose devices, linking them by wireless technologies. Such wireless solutions may enable underdeveloped and remote areas to quickly take advantage of the Web via wireless phones, two-way pagers, and handheld devices.

The third trend is digital convergence which merges the capabilities of telephone, radio, television, and other interactive devices. This include course materials, software, and reference guides delivered via text, video, audio formats or direct satellite connections to homes which offer another pathway for rich content delivery (American Public Television Stations. e-Testimony to the Web-based Education Commission. August, 31 2000).

The fourth trend is towards accelerating the pace of educational technology advances through the establishment of technical standards for content development and sharing

The fifth trend is the emergence of "adaptive technology" that combines speech recognition, gesture recognition, text-to-speech conversion, language translation, and sensory immersion to change the very substance of network-enhanced human communication.

A final trend is the dramatic drop in the unit cost of broadband. Bandwidth will decrease in cost and increase in power more rapidly than the advances in chip technology. Ubiquitous Internet access can become a viable option for all, rather than a privileged few (United States Department of Labour, Bureau of Labour Statistics. 2000. "Computer Prices Dip Again". Monthly Labour Review).

Summarising, there are indications that the trends discussed above are promising with potentially immerse benefits for e-learning. But to fully benefit from these trends, learners must have affordable and easy access to computing power necessary to bring these resources to the desktop, the laptop, or the appropriate Internet-enabled device(s).

13. WHAT KINDS OF TECHNOLOGIES ARE BEING USED?

Linking up to the discussions on the trends of technology it becomes relevant to have an overview of the current technologies that are being used for the delivery of e-learning. According to Bates (2001) citing Moe and Blodget (2000), the predominant technology being used for e-learning in the developed world is the **World Wide Web**, which in turn relies on the Internet. At the end of 1999, more than 196 million people globally were using the Internet and by the end of 2004, the number is expected to rise to 638 million. Several reasons have been advanced for the rapid application of the Web in education which is cited by Bates (2001) : a) Through the use of browsers and HTMLs, the Web provides universal standards and interoperability between different machines and operating systems, which allows for global reach and access. b) The Web can be transmitted both through already-existing infrastructure, such as analogue telecommunications networks, as well as through high-speed digital networks, giving it a wide range of technical flexibility. c) The Web is a low-cost technology for education because there is a relatively low cost of entry for educational suppliers and also due to the fact that the development of materials is relatively low cost by using simple computing language (HTML) for creating materials and the development of intermediary course authoring software (such as WebCT and Blackboard) that enables Web sites to be easily constructed.

Another technology that is being used extensively in education is **satellite broadcasting.** The features of Satellite broadcasting are that because of the relatively high infrastructure costs, it has high fixed costs but very low variable costs which make it most effective when many students receive a single programme. Also it provides a common standard of lecture or teaching to all students, wherever they may be located as well as fits a transmissive model of education, where students are expected to remember and understand what is being taught (Bates, 2001).

Video-conferencing is also widely used for educational purposes, to link multi-campus colleges and universities. Reasons alluded for their uses are that it saves instructor and student travel time between dispersed campuses. Also instructors do not have to make significant adaptations to their normal method of classroom teaching (Bates, 2001).

Lastly, **compact disk technology**, in the form of CD-ROMs or digital video disk (DVD), is also being used. Such uses tend to be for applications requiring large quantities of data in real time, such as multimedia applications (Bates, 2001).

14. NEW ORGANISATIONAL ARRANGEMENTS IN E-LEARNING

An overriding theme of today's literature on e-learning is the extent to which alliances among higher educational institutions and between such institutions and commercial interests are playing leading roles in the development and delivery of e-learning (Dirr, 2001). In part, the trend towards partnerships and alliances in e-learning reflect a larger trend in society. According to International Data Corporation (cited in Evans, 2000), which follows more than 200 electronic-learning companies, the e-learning market will grow from $550 million in 1998 to $11.4 billion in 2003. Much of the new investment in virtual education involves the development of new institutions as well as the creation of new partnerships and alliances among existing institutions and companies.

Most countries including Germany and the USA have opened at least one open and distance university since the U.K.'s Open University (UKOU) rolled out its successful model in 1970 (www.open.ac.uk). By 1997 John Daniel, Vice Chancellor of the Open University, in Mega-Universities and Knowledge Media, identified 11 mega-universities in the world that provide distance education, as follows: Anadolu University, Turkey, China TV University, China, Universitas Terbuka, Indonesia, Indira Gandhi National Open University, India, Sukhothai Thammathirat Open University, Thailand, Korean National Open University, Korea, National Centre for Distance Learning, France, The Open University, Britain, University of South Africa, Payame Noor University, Iran, and National Centre for Distance Learning, Spain (Dirr, 2001).

While Turkey's place as the largest enrolment of all distance education institutions in the world is undisputed (MacWilliams, 2000 cited by Dirr, 2001), new institutions continue to be opened in both developed and developing countries. For instance in the in the United States, the Arizona (state) Board of Regents plans to create the Arizona Regents University by combining distance education courses from the University of Arizona, Arizona State University, and Northern Arizona University. The plan is backed by elected officials (Carnevale, Sept. 12, 2000).The state of South Dakota in the U.S. created the Electronic University Consortium of South Dakota based on distance education and training courses available from six public universities (Electronic University Consortium, 2000). The Consortium offers courses for working adults, employees seeking career development skills, persons with disabilities and others. In addition The U.S. Native American community is working to form a Distance Education Institute that will provide culturally sensitive curricula (at both high school and college level) for the dispersed Native American population using electronic technologies (Craig, 1999).

Further, in the UK, the National Extension College and the University of Bradford Management Centre offer the Frontline degree programme for junior merchandisers at Coca-Cola Enterprises, Cadbury, and Schweppes Beverages Limited. Research showed that the

programme challenged some of the "vernacular theories" of traditional academics about how teaching and learning best occur. "The distance education methods, with an emphasis on learning and student centredness, bring into question the power of the academic to control the process" (Lentell, 2000). On the German front similar trends have emerged with the establishment of virtual universities as collaborative projects across various states. A typical example is the Virtual Hochshule Bayern among others aimed at promoting the development of e-learning course materials for use by universities. Additionally, in recent years, it has been common for tertiary institutions and businesses to form alliances to develop and deliver e-learning based education courses. A typical example is the venture of Universitas 21 (www.universitas.edu.au), a network of 18 prestigious universities in 10 countries (Maslen, June 2, 2000; Shecter, 2000; *Chronicle of Higher Education*, Dec.15, 2000).

Concluding, it is my impression that this trend is expected to continue into the future. In some cases, this may involve new relationships between existing institutions and existing businesses.

15. E-LEARNING AND QUALITY ASSURANCE

According to Hope (2001), as educational systems expand and develop to meet the needs of citizens in their jurisdictions, they are required to demonstrate that they are able to deliver significant improvements in terms of increased access, enhanced quality and reduced unit costs. E-learning systems have generally been introduced during the past 40 years to meet the increased demand for educational opportunities at all levels by supplementing face-to-face provision while striving to balance the access-cost equation by reducing infrastructure and full-time faculty costs. The very features of flexibility and accessibility which make e-learning an attractive option to the part-time adult learner also mean that it has frequently been viewed with suspicion by conventional institutions and the public, who are more comfortable with the traditional face-to-face education delivery. In such an environment, quality may be assumed to have been to a large extent assured by the qualifications of the fulltime tenured faculty member, who have total control of the pedagogical process, and by the qualifications of the students at entry (Hope, 2001, Commonwealth of learning, 2001).

The best single-mode or 100% web-based (only online) e-learning providers have been acutely conscious of the need to devise processes that can assure the quality of learning outcomes and thereby defend the legitimacy of their programmes and awards. Dual-mode or blended learning (distance and face-to-face) institutions, for their part, have been required to develop quality assurance protocols that demonstrate that their open and distance offerings are of equal quality to those offered in parallel by traditional classroom-based methods. In that vein, quality

assurance protocols in e-learning tend to focus on output measures which are able to demonstrate the value to the student by participation in the process. Large-scale, mature open universities such as the Open University in the U.K. and Open University of Hong Kong are systems driven organisations. From their establishment, in order to gain acceptance in the higher education community, they consciously adopted and adapted quality assurance measures from the conventional sector and sought to demonstrate the rigour and dependability of the systems which underpinned their educational processes such as program planning, course design, course delivery and student assessment (Hope, 2001, Commonwealth of learning, 2001).

Notwithstanding, the rapid development and use of instructional technologies in both distance and face-to face institutions since the late 1990s have resulted in a three-way convergence of distance and face to-face education and electronic technologies (Hope, 2001, Commonwealth of learning, 2001). In this new, flexible learning environment, the instructor or teacher is no longer the sole source of knowledge, but plays the role of facilitator, supporting active technology mediated student learning. In cyberspace, the physical proximity of teacher and student is irrelevant. Group, one-to-one, and one-to many interactions between student and student and students and teachers are freed from the tyranny of the fixed timetable by the capacity of Internet-based technology to provide opportunities for both synchronous and asynchronous communications. The emergence of the new instructional paradigm means that all institutions that use ICTs to facilitate the interaction of students with content sources, faculty support, information resources or other students, need to review and revise their quality assurance protocols to ensure that they are focusing on appropriate inputs, processes and outcomes. Robin Mason sums up the enormous shift in definitions of quality that has already taken place as a result of the "massification" of higher education by referring to the issue of access:

> "No issue so exemplifies the relative nature of educational standards as the subject of access. Where once the quality of an educational programme was defined by the number of students it turned away, in today's lifelong learning climate, equality of access to the traditionally disenfranchised is a much more highly regarded attribute than exclusivity"
>
> (Mason, 1998)

The technological developments that have led to the convergence of face-to-face and distance learning, and the emergence of a new flexible learning environment for on- and off-campus students of single- and dual-mode institutions, have also facilitated the emergence of providers of educational services that are dedicated to online learning such as virtual schools, colleges and universities that offer the opportunity to study anything, anytime, anywhere. Consequently, Hope (2001) indicates that for any program irrespective of the mode of delivery,

an institution must be able to demonstrate that: a) Learning outcomes have been set at the appropriate level and clearly communicated to students. b) Content and design of the curriculum and the teaching methodologies employed are effective in enabling the student to achieve the outcomes in terms of both the acquisition of knowledge and the development of related practical skills and abilities. c) Assessment is appropriately designed and rigorously administered to measure the achievement of the outcomes.

Furthering the discussion, Hope (2001) pointed out that the need for quality assurance in e-learning is currently driven by several factors:

Firstly; ***protecting local providers in a Global marketplace.*** Currently the application of new technologies in learning is not only removing the distinction between conventional and e-learning. It is also eroding political and geographical barriers to the movement of knowledge. This serves as the case notwithstanding the fact that structures exist for the regulation of educational activities. There has traditionally been less regulation across frontiers when it comes to distance education. The growth of the export trade in educational products during the last 10 to 15 years has alerted countries which are net recipients of such products that there is a need to erect barriers in order to safeguard their citizens and institutions against the worst excesses of some entrepreneurial providers, whose major concern is the financial bottom line rather than the educational experience of the students on the course. Butcher and Welch (1996) cited by Hope (2001) describe the problem in Nigeria in graphic terms: "Adventurous entrepreneurs see a juicy field of operation because of the imbalance of demand and supply with a ready market for ever-increasing applicants who are desperate for educational qualification through correspondence measures."

Secondly; ***protecting local consumers and promoting local values.*** In response to the need for guidance on how to select reputable and appropriately accredited distance courses, a number of hub sites have been developed which offer advice on how to avoid falling victim to diploma mills offering cheap degrees. Canada provides an example of an effort to protect the reputation and market share of higher education institutions in the global education marketplace. The Canadian government has funded the development of a consumers' guide, based upon extensive research into the literature relating to quality in technology-assisted distance learning. The guide is designed to be applied to education and training products (entire programmes and individual courses) at any level which is delivered through e-learning which is defined in the guidelines as "where the learner is in one location and the provider of the learning is in another and technology is used to make the link." In this context, the quality of the education and training products and services is defined in terms of what makes them effective and efficient.

Underpinning the guidelines is the belief that all learning products are a combination or system of inputs and resources, processes and practices, and outputs and outcomes.

Thirdly; ***marketing excellence***. At the same time as external accreditation agencies and educational policy-makers are seeking to realign their quality criteria to meet the needs of institutions and students, the role of the media is driving an increased emphasis on internal quality review and the publication of performance indicators. As higher education becomes more competitive, there is an increased consumer and stakeholder demand for market information. Publications already exist to meet this demand for rankings in relation to face-to-face institutions (See U.S. News and World Report:www.usnews.com/usnews/edu/eduhome.htm) and it will be a great idea to extent the same to e-learning programs.

Fourthly; ***the internalisation of quality assurance.*** If they are to achieve the prescribed benchmark standards of the relevant accrediting agencies and meet the demand for transparency in educational processes described above, virtual institutions must be actively engaged in what Massy (2001) describes as educational quality work (EQW) in the context of technology-mediated learning. Like much work in quality assurance in education, EQW has its roots in the ideas of Deming, Baldridge (see the 2000 performance criteria at www.quality.nist. gov/bcpg.pdf.htm) and ISO 9000, but is grounded in the context of academic operations. Massy postulates that the framework for quality management based upon EQW should empower and stimulate faculty to continuously improve teaching and learning (Massy, 2001 cited by Hope 2001).

Notwithstanding the above initiatives, the question that still remains is whether e-learning can make up on its quality promises? Factors such as low completion rates continue to reflect students' frustrations with those features of the virtual learning environment which do not match up to the on-campus experience. Despite the potential of technology to deliver convenient "any time any place" education, the primary demotivating factors for the virtual e-learner continue to stress the complaints of the distance learner, which stem from a sense of isolation from a learning community, the lack of access to student support services, unavailability of financial aid, lack of timely feedback and technical problems with delivery techniques.

In The Business of Borderless Education, Cunningham et al., (2000), described a series of "hot spots" for consideration by agencies seeking to accredit virtual courses and programs. They highlight those areas where the current practice of virtual providers frequently does not match the standards set for other accredited distance learning provision and affects stakeholder confidence. They include the standard of online information and library resources, verification of student identity, the use of part-time contract as opposed to full-time tenured academic staff, subcontracting of administrative and ICT functions to separate commercial companies, corporate management prevailing over academic governance, no or little research undertaken by faculty,

decoupling of research and teaching/course development, limited range of programmes (best-sellers) and discrepancies between measures of attendance in online and face-to-face modes.

However with all the hype that e-learning has been given as the avenue for unlocking worldwide learning opportunities; it is easy to lose sight of a number of barriers which continue to affect the achievement of quality goals. The first and most significant of these relates to inequality of access to the technology itself: the so-called digital divide. Even in the U.S. where the penetration of the Internet is reaching 43% (135.7 million users) and where online education is most prevalent, most Americans do not have a computer at home hooked up to the Internet, and those that do are using a 28.8K modem which effectively limits the ability of faculty and instructional designers to develop truly effective and appealing online courses (Thrall, 1999).

The accusation that a global, technology mediated education is "inherently immoral, consumerist, and sub-standard" (Mason, 1998) is one element of the vociferous opposition to virtual learning, expressed by traditional universities. This view highlights the concerns from the e-learning community that best practice will be derailed because of a chronic lack of funds in the public sector and an overriding concern for the financial bottom-line in the for-profit sector. The rapid development of ICTs and the resulting emergence of a common technology mediated flexible learning paradigm in both face to-face and distance teaching has necessitated a change in the role of faculty "from being mainly a content expert, to a combination of content expert, learning process design expert and process implementation manager" (Massy, 1997), which, at the very least demands that they undertake a serious reappraisal of their function, competencies and mode of interacting with students.

It is evident that e-learning will require the acquisition of new technological skills and knowledge, and that it has the potential to undermine faculty status prerogatives, may lead to the loss of faculty jobs, threaten ownership of intellectual property and decrease personal contact with students, while at the same time requiring them to provide 24-hour access by e-mail and to give prompt and clear responses to all queries. Klass (2000) in his paper acknowledges that the resistance from academics is to some extent motivated by self-interest but indicates that "many are troubled by the prospect that a combination of market forces and Internet technology will produce 'digital diploma mills,' undermine the fundamental faculty prerogative of tenure and accelerate the growth of an "instructional underclass" while at the same time, necessitating greater administrative control of academic activity; "the potential for administrative scrutiny, supervision, regimentation, discipline and even censorship increase dramatically."

In lieu of the above issues it is imperative that any policy-maker thinking of introducing e-learning should be ready to make a commitment to securing the technical, legal, financial, human

and pedagogical infrastructural requirements that will facilitate the enhanced delivery of such services.

16. EMERGING POLICY ISSUES

According to Phipps, Wellman, and Merisotis (1998), the pace at which institutions are moving into e-learning is remarkable. Indications are that e-learning which was once unwelcome within the academic community will continue to have a profound impact on higher educational institutions and their faculty (Phipps and Merisotis 1999, 29). The demands for technology will continue, not diminish; the opportunities for online education will grow, not recede" asserts Kenneth Green, project director of the Campus Computing Project in the USA (1997, J-9). Evidence of this can be seen in the increased adoption of e-learning, as well as recent legislations passed in the various countries supporting online education. For instance, Public Law 105-224 (enacted October 7, 1998 in the USA), which extends the authorization of programs under the Higher Education Act, contains three provisions related to online education: i) The Distance Education Demonstration Program, which is intended to test the quality and viability of distance education programs currently ineligible for student aid funds ii)The Learning Anytime Anywhere Partnerships program, which is intended to support innovative partnerships among colleges, employers, technology companies, and others to implement asynchronous distance education on a national or regional scale; and iii) The Web-Based Education Commission, which is charged with conducting a thorough study to assess the educational software available in retail markets for secondary and higher education students who choose to use such software.

The support and adoption of e-learning has led to the emergence of a number of policy issues that higher educational institutions face. Among them are:

a) **Equity of access to higher education**. Many assert that the primary benefit of online education is that access to higher education is increased. However, online education requires that students have access to appropriate and often costly technology as well as know how to use such technologies (Phipps and Merisotis, 1999). Concerns also about special challenges students with disabilities face in accessing distance education have been raised (*Chronicle of Higher Education*, 1999). Currently, there is very little information available on how many students are actually making use of e-learning course offerings as well as their characteristics. Without such information, there is no way that one can know whether e-learning is reaching those who might not otherwise have access to higher education, or simply accommodating those who already take advantage of such opportunities (Gladieux and Swail, 1999).

b) **The costs of developing and implementing e-learning programs**. Some have asserted that e-learning programs are a cost-savings approach to providing higher education, but cost

information is scanty (Gladieux and Swail, 1999). There is some evidence to suggest that these costs savings are not being universally realized (*New York Times* 1998). Given these concerns, it is important to note that more than 60 percent of colleges and universities do not have an information technology financial plan in place (Green, 1998).

c) **Accreditation of and quality assurance in e-learning programs**. In many e-learning initiatives many fear that quality assurance mechanisms are being bypassed, that the risk is a degradation of public perception about the meaning of a college degree and an increase in the potential for consumer fraud and abuse (Phipps, Wellman, and Merisotis, 1998).

d) **Copyright and intellectual property rights**. As more course syllabi, readings, and discussions occur on line, ownership of intellectual property is a continuing source of debate in the university setting. A fourth of colleges and universities have a campus policy regarding intellectual property for Web-based instructional resources developed by faculty (Green, 1998).

e) **Changes and challenges facing the role of Higher education faculty**. The rise of online education poses significant and substantial challenges to faculty compensation practices and existing norms of faculty development (Sherron and Boettcher, 1997), including promotion and tenure, course load, course updating, revision, and consistency across departments.

f) **Pressures on existing organizational structures and arrangements.** As previously mentioned, changes in e-learning technologies are having an impact on the strategic objectives and structures of participating higher educational institutions (Ehrmann n.d.; Gallick, 1998). For instance, institutions are being forced to define the differences between (traditional) residential and online programs, and new arrangements between business, government, and education sectors are emerging that are challenging the traditional organization of higher education.

Summarising this chapter, so far I have discussed the emergence of the networked society and the challenges it places on educational institutions. Also the current state of higher education across the three countries and the role that e-learning could play in enabling institutions meet the challenges. Further, e-learning as an emerging field was described highlighting form, technologies applied, current trends and policy issues. In lieu of that, this study aims at describing the current landscape of e-learning and its application in higher educational institutions across the USA, UK and Germany. In addition make projections (next 5 years) in terms of e-learning technologies, its applications, anticipated impact, future scenarios and the implications for international knowledge transfer. This has a key objective of extracting "good practices" for improving the adaptation, continued development of e-learning and the facilitation of international knowledge transfer. This will be achieved by understanding the mapping between theory and practice, practice and appropriate tool selection and their implications for networked societies.

CHAPTER-2
THEORETICAL BACKGROUND

There has been much written about e-learning practice however little attention has been given to e-Learning theory. Over twenty years ago, Perraton remarked that "distance education has managed very well without any theory" (1981, p13). The same can be said today of e-learning, though whether or not it has 'managed very well' may not be so accurate. Still, the incredible weight of published articles, institutional investment in practice and uptake of Web-based education tools in the past decade testifies that e-learning practice has achieved a momentum that will make it a central part of future education (Nichols, 2003).

However the vast bulk of literature in e-learning is practice-based and is typically presented in a descriptive format. The majority of conference presentations consist of a 'here's what we did and here's the evaluation' format which do little for transferability to other institutions or even other courses. In addition, the body of literature appears fragmented and there are few common terms used consistently. It is unlikely that e-learning practice will continue to evolve unless the theoretical underpinnings of e-learning are explored and debated, providing a wider platform and a common philosophy for e-learning development. There are few examples of academic literature specifically concerned with e-learning theory and unfortunately the use of technology in education has tended to be technology-led rather than theory-led (Ravenscroft 2001). It is well stated by Watson (2001:251) that "the cart has been placed before the horse." (Cited by Nichols, 2003).

Keegan (1983) cited in Holmberg (1997) suggested that theory could serve as a "touch-stone against which decisions – political, financial, educational, social can be taken with confidence". Keegan's comments related to distance education, which now has a firmly established theoretical basis thanks to the efforts of such theorists as Moore and Kearsley, Lockwood, Holmberg, Peters, Rumble, Rowntree and Mason. At present there is no such 'touch-stone' for e-learning and there are few theorists who can be readily identified as authoritative.

According to Nichols if literature is likened to a 'tree of knowledge' about a particular subject, the dire need for more e-learning theory becomes clear (2003). Practice based research can be likened to the branches of the tree, those parts that are readily visible and most easily appreciated. Theoretical principles can be likened to the roots; they do not provide any practical things for people like shade or fruit and neither are they aesthetically pleasing. However it is the root system that determines the health of the tree and also the extent to which it can grow. Unless attention is given to e-learning theory, the branches cannot stretch out for fear of toppling the entire structure. Unless attention is given to e-learning theory via debate and development, its practice cannot develop fully (Nichols, 2003).

The truth of theory's central role in the development of practice is recognized across all fields of activity. As Berger (2000) points out, "we tend to conduct life based on many theories that are below the level of conscious thought and accepted without examination. But, being conscious of theories and subjecting them to examination is essential because they are particularly important to change and learning." We can only test theories if we have them explicitly stated. The knowledge base of e-learning cannot be expanded with more accounts of how e-learning has been applied to particular courses. It is only by further exploring what lies beneath the surface of things through investigation that we can hope to provide e-learning with a more flourishing future. This is generally the case because globalization trends and innovations in the instructional technologies are widely believed to be creating new markets and forcing a revolution in higher education. Currently most countries are experiencing a paradigm shift in the mode and form of delivering higher educational services. A critical element in this paradigm shit is the enhanced use of technologies in providing better and optimized services to the patrons of higher education.

It is also worth mentioning that through e-learning higher education institutions are undergoing both organizational and behavioural changes as they seek new financial resources, face new competition, and seek greater prestige domestically and internationally. For example the higher education market which was historically been dominated by universities (Watson 2000:27) is radically undergoing transformations. Currently, global networks and marketplace for higher education has grown significantly. For instance efforts are being made internationally to converge and standardize undergraduate and graduate degree programs. Universities seek new avenues to fund and promote the commoditisation of their knowledge production capabilities. Many higher education institutions are recruiting relatively new pools of students outside national borders. In this quest, most are seeking to apply new instructional technologies to expand enrolment and to enhance the viability and profitability of international ventures. Facilitated by e-learning technologies, there is the spectre of a competitive environment between existing and new HE providers, including the rise of new non-traditional and for-profit competitors. With this more competitive global framework has come talk of a need for international accreditation processes and new efforts at quality review (Douglas, 2005).These current and emerging issues have brought with it multifaceted issues.

Thus this chapter attempts to undertake a theoretical/ literature review by providing an analytical framework for understanding e-learning technologies and its applications in higher education. Aspects considered in this section are: A) Social Construction of technology as opposed to technological determinism B) Educational technology and Social Shaping of Technology Theory. C) Evolution of e-learning: A theoretical overview of Drivers for change, policy context, the growing and diversifying demand for higher education and structural issues.

D) E-learning technologies and applications: Overview of E-learning models, trends of educational technologies and applications. E) E-learning and Learning Processes: Review of Didactical approaches or learning theories, implications for instructional design F) E-learning and Learning Processes: How effective is e-learning in terms of Student Learning Outcomes and Impact on Faculty Members. G) International Knowledge transfer: Global e-learning, main controversies, Review of cultural and pedagogical issues.

1. SOCIAL CONSTRUCTION OF TECHNOLOGY (SCOT) AND SOCIAL SHAPPING OF TECHNOLOGY (SST) THEORIES.

Social Construction of Technology

The theories of Social Construction of technology (SCOT) and Social Shaping of Technology (SST) which has common orientations serve as the theoretical basis of this study.

Central elements of this theory came from the thoughts and ideas developed by Weibe Bijker in "The Social Construction of Technological Systems" (1987) and "Of Bicycles, Bakelites and Bulbs" (1992); as well as the work of Donald MacKenzie: "The Social Shaping of Technology" with Judy Wajcman (1985) and "Inventing Accuracy" (1993). The social construction of Technology (SCOT) theory argues that technology does not determine human action, but that human action shapes technology (Pinch and Bijker; Kline 1992). Key concepts include: 1) Interpretive flexibility. That "Technological artefacts are culturally constructed and interpreted which means that not only that there is flexibility in how people think of or interpret artefacts but also that there is flexibility in how artefacts are designed."2) Relevant social groups share a particular set of meanings about an artefact. 3) Wider context. This implies that „the socio-cultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to an artefact". These propositions are supported by Marx: "People construct (make) history, but they do so within the circumstances transmitted from the past". "The legacy of technology."

In terms of orientation the main focus of this theory entail: i) **firstly;** seek to understand the links between social and technical processes. ii) **Secondly;** the meaning of an artefact, that is the nature of truth as social construction focus on the elements of flexibility of interpretations, consensus building and closure mechanisms and that this activity is carried out within a socio-cultural milieu. iii) **Thirdly;** that science and technology are socially constructed sub-cultures in the sense that both are human or social constructions. iv) **Fourthly;** the boundaries between them are the product of social negotiations. v) **Fifthly;** that technology is shaped by human engineers, Market forces, Consumer needs and demands as well as all groups and individuals who are also social products.

The Social Construction theory achieves this by attempting to link the activity of individuals to wider social processes, power, internal structure of technology and new ways to theoretically ground the relationship between society and technology in order to allow for action such as macro and micro level analysis of technology within the framework of political analyses and change.

According to Keel (2006) the constructionist element of this theory advocates; a) that the meaning of a technic does not lie in technology itself. This implies that it is up to the user to develop and apply appropriate techniques of usage. b) The interaction of Actor-network and Technological Systems to produce desired effects or impacts. c) Avoiding the linear analysis of technological development. d) Avoid asymmetry: include focus on failed technology: How a particular technic becomes seen as successful. e) Focus on the internal dynamics that is the details of technologies and the social context in which these details come to have particular meanings and applications. f) The common evolution of Technology and Society and g) Invention and Creativity as Social Processes. Individuals matter, yet only within particular social contexts- the inevitability of inventions.

Theory Requirements

Relating the specific requirements of this theory, Keel (2006), highlights the following concepts: A) the theory considers both change and continuity by specifying the conditions in which either occurs. B) It explains the success and/or failure of a particular technic as being the result of socio-technological developments and not necessarily as a cause of these developments. Success does not equal an artefact that "works," but what works is a product of the eye of beholder. C) In terms of Actor/Structure Integration, the theory advocates for the understanding of specific individual actors within particular situations as well as options and choices constrained by structural elements. D) In terms of interrelationships, the theory advocates that there is no a priori distinction between Societies, Technology, Politics, Economics, etc.

Consequently the total outcome will be the construction of an understanding of socio-technical change which is probabilistic in the sense that they are neither simply rational and goal directed nor purely idiosyncratic and spontaneous. Thus Socio-technical change is contingent on a variety of factors, including systematic structural constraints and other contingent factors. However the theory does not go without criticisms. The SCOT approach tends to have difficulty in accounting for closure. The possibilities of `interpretative flexibility' (i.e. of `choice') seems endless. Actor-network studies remain sceptical about the nature and influence of broader social and economic structures of power and interests, insisting that actors create the world anew (Latour 1983, 1986 & 1988), and implying that technologies (and social systems generally) are

highly malleable to local actors. It has been noted that much of their early research has involved micro-level studies, focusing upon the scientific or R&D laboratory, and tending to examine current technological fields, in which the broader institutional context is fluid (Russell & Williams 1988, Rosen 1993, Russell 1994). Recently, researchers from this tradition have shown more interest in the relative stability of certain larger scale structures, practices and the context of innovation (Law and Callon 1992, Callon 1993). This concern with the stabilization of socio-technical systems signals an attempt to engage with other traditions in the field (Law and Bijker 1992).

Social Shaping of Technology (SST) Theory

The Social Shaping of Technology (SST) theory is a central theory on technology which share common concepts with the Social Construction of Technology (SCOT). One can argue that a variety of scholars, with differing concerns and intellectual traditions, find a meeting point in the SST theory. They are united by an insistence that the `black-box' of technology must be opened, to allow the socio-economic patterns embedded in both the content of technologies and the processes of innovation to be exposed and analysed (MacKenzie and Wajcman 1985, Bijker and Law 1992). SST stands in contrast to post-enlightenment traditions which did not problematise technological change, but limited the scope of enquiry to monitoring the social adjustments it saw as being required by technological progress. SST emerged through a critique of such "technological determinism". The social shaping perspective emerged from a long-standing critique of crude forms of technological determinism (Edge 1988), which held: i) that the nature of technologies and the direction of change were unproblematic or pre-determined (perhaps subject to an inner `technical logic' or `economic imperative'). ii) That technology had necessary and determinate `impacts' upon work, upon economic life and upon society as a whole: technological change thus produces social and organizational change.

SST studies show that technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use. SST research investigates the ways in which social, institutional, economic and cultural factors have shaped: i) the direction as well as the rate of innovation ii) the form of technology: the content of technological artefacts and practices iii) the outcomes of technological change for different groups in society. The theory argues further that every stage in the generation and implementation of new technologies involves a set of choices between different technical options. It thus goes beyond traditional approaches, concerned merely to assess the `social impacts' of technology, to examine what shapes the technology which is having these 'impacts', and the way in which these impacts are achieved (MacKenzie and Wajcman 1985). SST alongside

narrow "technical" considerations considers a range of "social" factors that affect which options are selected, thus influencing the content of technologies, and their social implications. Simply establishing that technologies are 'socially shaped' leaves open many important questions about the character and influence of the shaping forces.

In seeking to grasp the complexity of the socio-economic processes involved in technological innovation, SST has been forced to go beyond simplistic forms of social determinism which, like technological determinism, see technology as reflecting a single rationality. For instance a critique has been made of the dominant neo-classical tradition of economic analysis, with its assumptions that technologies will emerge readily in response to market demands (Coombs et al 1987).Central to SST is the concept that there are `choices' (though not necessarily conscious choices) inherent in both the design of individual artifacts and systems, and in the direction of innovation programmes. If technology does not emerge from the unfolding of a predetermined logic or a single determinant, then innovation is full of several paths or more branches. Different routes are available, potentially leading to different technological outcomes. Significantly, these choices could have differing implications for society and for particular social groups.

Thus the character of technologies, as well as their social implications, is problematic and opened up for enquiry. This implies that we can analyze the social influences over the particular technological routes taken (and their consequences). This opens up two sets of questions:

First; SST stresses the negotiability of technology (Cronberg 1992), highlighting the scope for particular groups and forces to shape technologies to their ends and the possibility of different kinds of (`technological' and `social' outcome).

Second; it raises questions about irreversibility (Collingridge 1992, Callon 1993). This points to the extent to which choices may be shut out. Earlier technological choices pattern subsequent development (Rosenberg 1994). Certain options may be selected and become entrenched - for example as a result of the tendency of new technologies to develop cumulatively, erected upon the knowledge base and social and technical infrastructure of existing technologies - particularly where increasing returns to scale of investment result in 'lock-in' to established solutions (David 1975, Arthur 1989, Cowan 1992). Consequently; SST points to closure, that is the ways in which innovation may become stabilized (Pinch and Bijker 1984) as well as the possibility of changing earlier choices (Latour 1988).

As the case is, SST proponents differ over their characterization of such `choices', and in their approaches to the stability of technologies with related differences over the roles and significance of large-scale social and economic structures, as opposed to the activities of individuals and groups. Long-established debates within social sciences have resurfaced in this

field, with a number of theoretical disputes. Having established the social construction of scientific truths, researchers from SST have extended this approach to the study of technological artifacts. They have sought to identify instances where technologies could be designed in more than one way, with choices between different technical options, and to explain why one way of designing the artifact was successful. This is rarely a simple "technical" issue, but is patterned and shaped by the particular "selection environment", in other words, social factors enter into such explanations. The analysis proceeds "outwards", from the technology to the context shaping it.

In effect, this approach has been presented as offering a "new sociology of technology", summed up by the phrase Social Construction of Technology (SCOT) (Pinch & Bijker 1984). These writers have also been strongly influenced by actor-network theories - in particular, by the research programme led by Michel Callon and Bruno Latour at the École des Mines in Paris. Together they have engaged in a vigorous programme of debate and publication (see e.g. Bijker, Hughes & Pinch 1987, Pickering 1992). SST has often been taken (unhelpfully, we would argue) to be synonymous with the SCOT approach.

Clarifying some of the theoretical issues being advocated by both the Social Construction of Technology (SCOT) and Social Shaping of Technology (SST) theories, Markus and Robey (1988) specifically propose a general theory of technology consisting of the causal structures of agency (technological, organizational, imperative, emergent), its structure (variance, process), and the level (micro, macro) of analysis. Orlikowski (1992) notes that previous conceptualisations of technology typically differ over scope (is technology more than hardware?) and role (is it an external objective force, the interpreted human action, or an impact moderated by humans) and identifies three models: 1) **Technological imperative:** focuses on organizational characteristics which can be measured and permits some level of contingency. 2) **Strategic choice:** focuses on how technology is influenced by the context and strategies of decision-makers and users and 3) **Technology as a triggerer of structural change** thereby viewing technology as a social object.

2. EDUCATIONAL TECHNOLOGY AND SOCIAL SHAPING OF TECHNOLOGY (SCOT).

According to Feenberg (1999), the first educational technology was writing, and like every subsequent educational technology, it had its critics. Plato, most famously, denounced the medium for its inability to recreate the give and take of spoken discourse:

> "The painters' products stand before us as though they were alive, but if you question them, they maintain the most majestic silence. It is the same with written words; they seem to talk to you as though they were intelligent, but if you ask them anything about

> what they say, from a desire to be instructed, they go on telling you just the same thing forever"
>
> (Plato 1961, p. 521 cited by Feenberg, 1999).

Thus, in Plato's view the technology of writing had the power to destroy the dialogic relationship that ought to occur between teacher and student. As he sees it, the medium in which we communicate determines the quality of our interactions. But this is a deeply flawed view, as many contemporary scholars have argued. Rather, the social impact of technology depends on how it is designed and used and to an extent the level of the available technology. Writing can lend itself to ongoing dialogues between teachers and students, and speech can easily become one-sided.

However, while Plato may have made an unfair generalization about writing, his critique still had merit in at least one respect: its worth keeping in mind that whenever a new educational technology is introduced, we ought to be wary lest reformers configure it in a way that closes off the process of intellectual exchange. There is something about dialogue, and the active involvement of the teacher, that is fundamental to the educational process and that must be woven into the design of any new instructional tool within the context of distance education or e-learning (Feenberg, 1999).

With this backdrop, many educators since the early 1980s have been making frank efforts with considerable progress through the application of computer and other digital technologies to develop new forms of collaborative learning between teachers and students on one hand and students and students on the other hand (Harasim, et al., 1995: chap. 3; Berge, 1999). E-learning, in particular, comes with an enormous potential in this regard by way of enabling great improvements over previous models. Distance learning programs, for example, have always achieved some success with using the mail and other forms of electronic communication such as e-mail to maintain written interaction. With the Internet, for the first time, we have an educational technology that supports rapid and convenient communication, and there's every reason to think that Socratic dialogue can flourish in this medium.

Unfortunately, though, the current phenomena of technology enabled instruction tend to emphasize quite a different set of possibilities for the Internet. We have seen a new round of interest in "teacher less education," or the automation of key parts of the teaching-learning process. Neither television nor stand-alone computers ever managed to accomplish this feat, but many believe that such possibilities wait for us just a few miles down the information superhighway (Feenberg, 1999). Though earlier attempts failed for purely technical reasons, the Internet does show promise. In its ability to transmit graphically exciting materials, programs, and text, it represents a considerable advance over earlier means of delivering distance education. It can even offer crude imitations of teacher-intensive tasks, such as answering questions using

FAQs (Frequently Asked Question lists) and "Ask the Expert" help programs. "Intelligent agents" can adapt computer-based programs to students' learning styles (Kearsley, 1993).

Why is there the current drive to computerize or digitalize highly skilled educational tasks? On one hand an argument is put forward that technology can deliver certain kinds of education more effectively than can faculty in real world contexts. Also that it offers "consumer-friendly" options for working adults to have access to education and training at any time, any where without much disruptions to the schedule. But in the final analysis, the main reason for e-learning is obvious: to cut costs. Of late skilled workers are expensive, and e-learning is a time-honoured strategy for reducing the need for them. However that remains a debatable issue. This is because to derive maximum educational benefits from e-learning one requires not only the technology but also the expertise of faculty, technologies and other staff.

In addition that the attempts to similarly do away with the human element in a technology enabled teaching scenario have never been very successful in the past, but many observers are beginning to believe that new technologies can do the trick. Perhaps it will be possible to create a system whereby a variety of educational tools are delivered over the Internet and supplemented by the recorded performances of a few star professors. Then, low-level staff will perform the last few remaining tasks, such as notifying students of the availability of materials or of tests and deadlines (Feenberg, 1999).

Is such a gloomy version of the future really possible? Is it the case that professors will disappear as have weavers, shoemakers, and typesetters? Probably not, but whether our uses of technology are about to lead to mass deskilling is less relevant than the fact that this idea occupies a key place in the imagination of some educational reformers. Much of today's higher educational reform, with its orientation to the enormous potential of virtual universities hints at the obsolescence of the traditional campus and its teaching methods, arousing suspicion among faculty that technology will be used against them. Perhaps in our present debates about the computer's role in shaping the future of higher education in making plans for the use of our new media, do we intend to relegate the faculty's control of the educational process to the background? Or our intension is to tap its potential to supplement or complement the activities of our faculty. When this becomes clearer it is my opinion that most of the structural and human related "non-acceptance" of technology enabled education will disappear (Feenberg, 1999).

Educational Technology – A New Orientation

Currently; contemporary thinking in the education world has long since left behind the industrial era's fascination with deskilling of faculty. Shoshanna Zuboff made a particularly persuasive contribution to the field with her book *In the Age of the Smart Machine* (1988 cited by

Feenberg, 1999) by arguing that we can continue to de-skill and digitalize educational activities, or we can choose to take a new path, one that leads to what she calls "informating," which involves the cooperation of skilled workers and computers in ways that enhance the productivity of each. Zuboff's work emphasizes the *complementarity* of human, computer and other digital capabilities. Within education such complementary activity can manifest itself when the professor manages the complex and unpredictable communication of the classroom, while data is delivered in e- textbooks or other electronic forms by computers and other digital technologies.

However this view is opposed to technological determinism, the belief that innovations cause unique patterns of social change. The determinist view is increasingly challenged in technology studies by social explanations of technological development (Pinch and Bijker, 1987) which has been elaborately discussed above. We now believe that innovations confront us with a choice, not a destiny. The computer and other ICT based technologies are certainly a case in point. Unfortunately, though, higher education has not entirely gotten the message. Many college presidents continue to sell their constituents on the *inevitability* of computerization, as though the very existence of these new devices sets the reform agenda in some clear-cut and unambiguous way. And there still exists plenty of faculty opposition to the supposed consequences of e-learning, as though their impact were pre-determined (Feenberg, 1999; Farber, 1998).

Arguing strongly on the lines of society shaping technologies and its artefacts one can say that technology does not determine whether teaching will be digitalized, computerized or informated. Technology by itself does not hold such power. We ourselves make the decisions that influence and direct the future development of educational technology. And this is precisely why it is so very important for higher education to include a wide range of actors in technological design, adoption and diffusion (Wilson, 1999). Students and faculty bring a number of considerations to the table, including the desire to create tools that support human interaction, a desire that has already manifested itself forcefully in the earlier evolution of the computer. But the case is always that we listen so attentively to our technology experts that we end up ignoring these other voices, which is faculty and students.

Notwithstanding; in shaping the future of our educational technologies, economic and political realities now look to play the leading roles. Higher education seems increasingly occupied with corporate rather than professional models of organization. The erosion of traditional faculty status continues to decline. Even the older universities that now teach a declining fraction of students employ more and more part timers in the search for "flexibility." And it is becoming more difficult to resist arguments against full time professorships. In short, there exists a great deal of temptation to think of technology as a managerial tool for centralizing

the university. And if we are not careful, something like this may actually happen in the confusing environment created by technological change (Feenberg, 1999).

3. EVOLUTION OF E-LEARNING: A THEORETICAL OVERVIEW

Evolution of E-learning

E-learning describes the use of technology to support and enhance learning practice. Within the last few years the international environment has changed remarkably with respect to the application of ICTs in higher education. For example, most educational institutions are developing or planning to develop Web based course delivery capability. As well, a significant number of governments, institutions, university Web sites and e-portfolios have emerged to chronicle the burgeoning numbers of virtual education initiatives. Further evidence of this increased activity is highlighted in the literature examining the processes of "e-education" (Bjarnason et al., 2000; Cunningham et al., 2000; Erhmann, 2000; Kerry et al., 2000, Johnston et al., 2001).

Further, other authors have described the increasing use of ICT as an evolutionary process that has been underway for some time. For instance, Farrell (2001) citing Tapsall and Ryan (1999), writing from an Australian perspective, described the evolution of delivery modes of e-learning in three main phases: distance education, open learning and flexible learning. They argue that the first phase, distance education, emerged in response to the needs of learners who were unable to access campus-based institutions because of geographical distance, work and other personal related commitments. The second phase, open learning, which also seeks to respond to the problems of distance, is focused on meeting the needs of those who are disadvantaged in terms of entry qualifications and, therefore, need to be served through "second chance" enrolment policies and alternative programmes and delivery models. Finally, they postulate that the third phase, flexible learning, in the context of Australian universities, is less about distance or those at a disadvantage rather it aims at providing "more" education to "more" students (anywhere, anytime) at "less" cost thus serving as a tool of "massification" and expansion. Flexible delivery modes employing the use of such technologies such as CD-ROMs and Internet are aimed at providing solutions to some of the problems confronted by on-campus educational delivery. Tapsall and Ryan argue that, as a result, face-to-face and distance and open learning modes are converging which implies that students in all types of venues are increasingly learning through the use of the same technologies (Farrell, 2001 citing Tapsall and Ryan, 1999).

Another trend that has accounted for the evolution of e-learning is that within the last few years higher education has become a priced commodity in which people seek to invest for their own personal gain, to ensure equality of opportunity and as a route to a better life (Davies,

1998). As a result, providers of Higher Education are finding themselves competing more than ever for students, funding, research, and recognition within the wider society. Whilst competition has always been an issue for universities, historically the focus was national rather than international. During the last decade and through the development of e-learning higher education has become more "global". As the market continues to grow, new entrants will offer innovative world-class solutions at low cost ("Lifelong learning," 1998), making it impossible for the 'static' or 'complacent' providers to compete. Despite this seeming urgency, professed by many, US Economist ("Lessons of a virtual timetable,"2001) stresses the dangers of 'jumping on the band-wagon' too soon or without due diligence". Building on this argument, Pollock and Cornford (2000) acknowledge that in the implementation of e-learning, institutions will bear the risk of destroying those processes that offer important forms of support to students. Thus, higher educational institutions need to consider the implications for everyone involved before implementing any new e-learning strategies.

While technology alone might not be the answer to all of higher education's problems, according to Daniel (1996), it certainly can play a key role. The benefits of utilising technology, particularly for developing online collaborative activities are well documented (Redfern & Naughton, 2002). Relationships can also be fostered within the context of an online environment. According to O'Donoghue & Singh (2001), technology can serve as a powerful medium particularly for part time and working students who find attendance requirements and study difficult. The implications are clearly multi-faceted. The higher educational institution will itself necessitate physical, cultural and managerial transformations. Students will require support in adapting to a potentially unfamiliar learning context. Also there are enormous implications for faculty members who will be under pressure to introduce and develop often more innovative approaches to their teaching and delivery.

Another view on the evolution of e-learning is offered by Peter Dirr in (1999) cited by Farrell (2001). In his opinion two main elements have characterized this process. One is that the technology application decisions have been driven primarily by technology, not by consumers. The other is that the applications have been oriented to a traditional academic paradigm. He cites for example that the widespread use of video-conferencing, which has enabled instructors to retain many of the old pedagogical methods, but has done little to accommodate the learner's need for flexibility. Dirr (1999) argues that institutions have failed to employ the full potential of newer technologies and have not taken full advantage of the capabilities available to both learners and instructors (Dirr, 1999 cited by Farrell, 2001)

Further, Farrell (2001) citing Jim Taylor (1999) has suggested that the evolution of e-learning is about to enter a fifth phase. In his view, the first generation of distance education, the

correspondence model, employed the use of print technology. The second generation, the multimedia model, employed the use of print, audio and video technologies. The third generation which was based on the tele-learning model involved the use of telecommunications technologies to provide opportunities for synchronous communication. The fourth which is based on the flexible learning model is based on online delivery via the Internet. He further stressed that even though this fourth generation of e-learning is still building up; a fifth generation is beginning to surface. According to Taylor (1999), this generation will use automated response systems that scan the text of incoming e-mail and respond intelligently without human intervention, thereby decreasing the cost of online tuition and increasing access to learning opportunities on a global scale He refers to this as the "intelligent flexible learning model" that will bring about an enhanced benefit in terms of economies of scale and cost effectiveness (cited by Farrell, 2001).

Another perspective presented in the literature is that currently higher educational institutions are searching for a unifying vision to guide their investments in teaching, learning and technology (Ehrmann, 2000 cited by Farrell, 2001). He examines separately the so-called "campus-bound" approach with the "campus-based" approach. In his opinion the "campus-bound" approach assumes that the quality of a programme is heavily dependent on the books, laboratories, faculty, students, etc. that are on-site. On the other hand, the "campus-based" approach which he refers to as the new approach is oriented to the concept that some of the resources and some of the learning are off-site. Within this current framework networks enable staff and students to use a World Wide Web of academic resources and, as a result, they may only be on campus part of the time.

Summarising; the fact remains that some higher educational institutions are less advanced than others in the use of e-learning, yet no one wants to use a label that isn't thought to be the most current such as e-learning. This review on the evolution of e-learning emphasises how fast and radical the nature of technology enabled (e-learning) education is changing. But a synthesis of available literature emphasises the main point that the growth of e-learning activities is largely occurring in countries with mature economies and established institutional and ICT infrastructure such as Germany, the United Kingdom and the United States. But in the face of these developments, it is an acknowledgeable fact that the need for an enhanced development and use of e-learning is even greater in developing countries as they face the challenges of equipping their human capital with the competencies needed for today's knowledge society. But for this to be the case the current "digital divide" and its causes must be addressed (Kenniston and Kumar, 2000 cited by Farrell, 2001).

The Growing and Diversifying Demand for Higher Education: Review of Drivers and Trends.

Reviewing the literature; the external factors influencing the inner life of higher education institutions, including the use of ICTs can generally be categorized into economic, social, cultural, and technological factors as well as the changing role of governmental policy (Middlehurst, 2001, Mc. Burnie, 2001). According to Middlehurst and Mc. Burnie (2001), economically the emergence of the knowledge economy, whereby economic productivity and growth is increasingly aligned with the development and application of new and applicable knowledge, creates a growing demand for a highly educated and flexible work force, leading to a further massification of higher education and to an increasing need for lifelong learning opportunities.

Further, the process of globalisation, characterized by increased trans-national economic interdependence and competition, leads to the emergence of an international higher education sector in which a growing number of traditional and new types of higher education providers compete with each other. Within all these contexts of change and development, ICT is both driving and enabling the processes toward a knowledge-driven global economy. It allows higher education providers to accommodate the specific needs of students in terms of mode, pace, place and time of study and to cater for different and new target groups and specialized markets both locally and internationally (CHEPS, 2000).

From an international perspective, the growing demand for higher education can roughly be distinguished into two main trends. First is the rapidly growing need for the widening of initial access to higher education. Internationally the numbers of degree students are estimated to rise from 42 million in 1990 to 97 million in 2010 and 159 million by 2025 (West, 1997). This trend is observed in certain developing countries and in particular in transition countries (e.g. in Southeast Asia, Latin America and southern Africa), which are quickly integrating into world production and trade schemes and which often have a rapidly growing young population. Secondly, there is the increasing need for more diversified and flexible types of higher education, including lifelong learning, corporate training, etc., in countries that are changing from post-industrial into knowledge economies.In the context of higher education, not only is there a continuing growth in demand, but also a change in student demographics. According to Kerrey (2000), only 16% of the college students in the US now fit the traditional 18-24 fulltime and live on campus profile. In the adult, continuing education, or lifelong learning context, which is made up of the "earning and learning" market a massive growth is already occurring and it is the expectation that it will even increase more (Collis, 1999, Goldstein, 2000, OECD, 2001).

A recent survey conducted in the UK further stresses on the growing demand for higher education worldwide as the main driving force for borderless education. The report further

points out that "there is indeed not only a demand for more of the same, but in particular a demand from this new group of learners, working adults, for lifelong, relevant, and flexible learning opportunities"(CVCP, 2000). Also in the USA, several reports confirm that the market for distance education consists largely of part-time students in full-time employment. And that the global competition for students focuses especially on those involved in continuing professional education and lifelong learning (Taylor, 2001). For example, The International Data Corporation expects distance education to grow by 33% each year for the next five years, with an estimated 2.2 million students in 2002 (IDC, 2000). Also the OECD notes that it is especially in this area of lifelong learning that ambitious plans to serve huge global markets are being developed by higher educational institutions and through other government initiatives (OECD, 2001).

The Policy Context

According to Van der Wende (2002), the national policy context in which the evolutions in e-learning is occurring will define to a large extent the type of institutional responses that will emerge. The following trends are therefore important to consider. In many countries the expansion of higher education access has been accompanied with a decreasing per capita funding of higher education, resulting in a call for more cost-effective solutions and mixed sources of funding. The ability of ICT in achieving such cost-effective solutions is often discussed in this context. Deregulation of higher education, enhancement of institutional autonomy, and the introduction of more market mechanism types of steering are used by governments to make institutions more responsive to new demands, increasing competition and market opportunities. (Van der Wende, 2002).

Consequently, an emphasis on the individual benefits of higher education and user-pay methods enhances the involvements of private providers and investments. These trends are both pushing and enabling institutions to actively search for additional sources of institutional income by expanding their educational offers through increased collaboration with for instance the corporate sector. Of course, important differences can be noted between countries in the extent to which these trends have been executed. As a result, higher education incentive systems are still quite different and the motives and possibilities of institutions to engage in new initiatives are quite diverse (Van der Wende, 2002).

In a number of countries (e.g. the US, Australia, the UK, Germany, and the Netherlands) governments have identified higher education export as a promising economic activity and an important source of additional income. Consequently, they stimulate their institutions to expand their markets internationally. Their interest in doing this can be illustrated with the following

examples. "U.S. higher education and training have a major stake in ensuring that their interests as an industry are properly represented, both for domestic information purposes as well as for international trade negotiations" (NCITE, 2000)."Internationalisation in the UK can be summarized as the mobilisation of the skilled human resources needed to make the UK a more internationally competitive trading nation and to maximise export earnings by selling education services to paying customers" (Elliot, 1998, p. 32). These examples and in particular the vocabulary they employ make clear that other than the usual public-policy based values and arguments for higher education are at stake here. In fact, other parts of government than the departments or ministries of education are leading this agenda. Consequently, the education ministers of OECD countries have asked the OECD to play a broker role in bringing the education community more abreast on what is happening on this issue (OECD, 2001).

In Europe the emergence of transnational education and especially e-learning provided by foreign institutions has also led to some concerns. Recent studies (Dos Santos, 2000, Adam, 2001) show that the main importers of trans- national education in Europe are Greece, Italy and Spain. The main exporters to these countries are the UK and the US. The reports are quite honest in stating that TNE can widen access to quality higher education and that its growth is often a sign that the national systems are not responding to the needs of the students. This can refer to quantitative needs which imply that the existing national higher education capacity is not able to adequately cope with the increasing national demand. At a more general level, non-European providers who are entering the European market are seen as a threat to European higher education, which calls for the enhancement of the international competitiveness of European higher education itself. This notion became one of the central aims of the Bologna Declaration, which started a process of European-wide reforms in the higher education sector (Van der Wende, 2001a).

Further, Souleles (2004) citing the Dearing Report (1997) proclaimed that ICT would spearhead improvements in higher education. The report predicts increasingly active partnerships between the academic sector and industry. This prediction is quite the case at the moment because there is an increased proliferation and pursuance of e-learning. Yet, despite the large investments in e-learning expectations have not always materialized (Ryan et al, 2001), and the contribution towards learning outcomes is debatable (Holt, 2001, p.272). Laurillard (2002), for example suggests that that pressure for change and the rapid implementation of these technologies have hindered cutting edge research into the theory and practice of e-learning leading to the current increased need for qualitative and quantitative research into the phenomena.

Taking a look at the state of research work conducted into the phenomena of e-learning, one can say that the early research on e-learning focused on the comparison of functionality between different packages, but not on the learning experience actually or the process of implementing and managing e-learning in higher education. Recent research focuses on the significance of new managerial approaches, the need for organisational and cultural change and the importance of grassroots support as some of the critical elements for the effective implementation of new learning technologies (Kenny, 2002).

Further, Uys (2002, p.58) calls for the employment of organizational change procedures in handling the several issues that have emerged as a result of the continual adoption of e-learning in higher educational institutions. Contrary, Kezar et al. (2002) argued against the suitability of such managerial approaches to the higher education context. In their view such approaches are too general in nature with a common emphasis on strong leadership, collaborative processes and motivational systems thereby presenting organisational changes as broad and uniform. Alvesson (2002) also dismisses such models that assume the existence of uniform cultures. He argues that organisational transformation entails more than as advocated by such models since it a complicated process of negotiation meanings and symbols among divergent cultures within an organisation.

One of the main elements that serve as an impediment in the on-going ICT induced transformations in higher education among others is the element of existing university cultures. Carlson (2001) cited by Souleles (2004) sees culture "as the shared values, attitudes and norms on what is acceptable and unacceptable within groups of employees". Generally it is often the case that the proponents and implementers of institutional changes take such existing cultures for granted. Even within the main cultures of universities one could still point to several Sub-cultures which are reflected in the activities of departments, units and faculties. Continuing, Carlson emphasises that it so happens that even such sub-cultures may not be similar to the main institutional culture, not to mention radical organisational change of an entire existing culture (2001). This becomes quite clear when one attempts an institutional change, that there is the need to consider underlying assumptions and values of an institution. The fit between existing culture and proposed change can inhibit or facilitate organizational change (Carlson, 2001 cited by Souleles (2004).

In that vain, Marginson (2000), cautions against the error of attributing too much to the influence of globalisation because many perceive in different perspectives the extent to which global forces impact on social change. However he admits that globalisation is a collection of powerful world systems situated outside the nation state and independent from it. In Marginson's description "these systems are working back towards the inner core of states, affecting our

practices". He sees these forces as infiltrating the daily activities of higher educational institutions thus exposing them to constant external pressures (2000).

Souleles (2004) citing Uys (1998), emphasises the point that e-learning promotes and brings about a phenomena of "globalisation of education". In that respect there is the need to accept the full effects associated with the introduction of these technologies. Therefore the challenge for higher educational institutions is to establish global partnerships and alliances in the international educational market which will enable them overcome their institutional weaknesses as well as build on their current strengths. In contrast, Noble (1998) cautions about what he perceives as the 'commodification of education' driven by software companies and other commercial interests. He warns against using "technological transformation" as a decoy to the commercialization of higher education (Cited by Souleles, 2004).

One of the external forces that impacts upon higher education is change in the nature of manufacturing. Currently; there is consensus that the nature of work in advanced economies is drifting away from traditional manufacturing modes of production, towards more innovative provision of services and production operations by employing ICTs (Saunders, 2000, p.1006). As a result countries are responding to the growing need for highly trained and skilled human capital as economies increasingly depend upon knowledge-related skills and competencies to handle information based activities. Education and training are perceived as instruments of economic policy. States who adopt an interventionist approach through education and training, as well as labour market policies, aim to facilitate the development of a high-wage, high skilled economy (Dudley, 1998, p.23). The need for a more highly skilled workforce to service new industries and participate in the world knowledge economy is now a high priority for many countries. The emphasis on wider participation in higher education is also known as the shift to the provision of mass education. This also brings with it the need for retraining and lifelong learning. A person will need to retrain at least five times in a working lifetime and such retraining requires the equivalent of three months of full-time learning (Bates, 2000, p.10-13 cited by Souleles, 2004).

Two paradigms to elaborate on the nature of external pressures on higher educational institutions have been advanced by Sadlak (1998). The quantitative paradigm relates to the statistics on student populations. Increased efforts are being made on a global scale in expanding higher education. All societies, whether modern or developing, are experiencing an increasing demand for access to higher education. To keep student participation rates constant in the developing world, one sizeable new university has to open every week to meet the demands of the young and growing population (Sadlak, 1998, p.103 cited by Souleles, 2004). The informational paradigm relates to a different set of numbers. In 1998 in the United States there were three hundred colleges and universities offering virtual degrees to over one million students.

By the turn of the century the number of online students is likely to triple (Sadlak, 1998, pp.102-103). It is also a fact that the current crop of Students is accustomed to electronic communications and web-based activities. They are also accustomed to independent choice, not simply in technology but in sources of information. The informational paradigm suggests that there is already a significant and a great momentum towards adopting and using learning technologies by both students and institutions.

Bates (2000, p.8) builds on the assertion above by arguing that higher education around the developed world has expanded during the last ten years, forcing both states and institutions to seek alternative means of funding the sector. Now wider access to higher education is more a rule than an exception for all countries. The argument for the continuation of expansion activities is based, among other things, on forecasts concerning the evolution of labour markets, which show that in the course of the next decade some 40% of all jobs in the industrialized countries will require sixteen years of education and training. The shift from "only a privileges few" type of higher education to a mass higher education has forced higher educational institutions to re-evaluate their role.

This momentum is further supported by claims that ICTs will continue to evolve exponentially, contributing even further to rapid globalization. Computers will become more and more affordable and commonplace. National and international networks are becoming faster and cheaper to access. Some predictions points to the fact that in ten years most educational institutions in the United States will deliver some portion of their curricula online (Duderstadt, Atkins, & Houweling, 2002). The widespread use of the Internet and email has almost certainly been a catalyst for these demands. Online learning technologies are perceived as the only way to efficiently address the huge increase in higher educational needs because of the distributed and flexible potential that technology enhanced education brings and using the web to teach (Uys, 1998b, Butland, Conole, Jones & Cook, 2000).

Synthesising the ideas generated in the literature so far; one can say that e-learning has become an alternative paradigm to traditional campus based education, and as such it requires new management models, appropriate for the emerging information society. Laurillard (2002, p.214) argues that the implementation of e-learning cannot take place without institutions making the necessary adjustments. According to her this calls for a new capacity to learn and generate new knowledge in response to the external environment and subsequent internal changes. Also institutions need more 'robustly adaptive' mechanisms so they can become 'learning organizations' (Laurillard's, 2002, p.215). For Laurillard one of the essential elements in that process is the sharing of tacit knowledge through formal and informal gatherings. This is further buttressed by Uys (2000, pp.1-4) who advocates that such new forms of learning requires new

forms of management. In his opinion the functions of management have to be practised in an entirely new way via adopting such approaches as 'open management style'. This point is supported by Bates (2002); who dismisses the current organisational structure of most universities based on largely historical reasons as unsuitable to new forms of technological delivery. In his opinion newer forms of organization place emphasis on ICTs, provide for customised and tailored services, have decentralised workers directly networked to clients, are inspired by strong leadership characterised by a broad vision, and have senior management which integrates, co-ordinates and facilitates.

Kenny (2002) cited by Souleles (2004) offers a different approach for the re-organization of higher educational institutions which is not driven by market language and global requirements, but rather based on the analyses of the unique task of managing the adoption and diffusion of e-learning. This is because several surveys indicate that projects associated with the introduction of new technologies have a higher level of uncertainty. The management process used in these projects became progressively more open as the levels of uncertainty in the projects increased. Thus in Kenny's opinion incorporating ICTs in higher educational institutions is a high risk task which requires continuous improvement through modification of plans, looser project management approaches, and the action research process of the reflective practitioner at all institutional levels. The more complex the project is, the more flexible the management style becomes (2002). For instance a survey undertaken by Radloff (2001), identifies a number of obstacles for managers of institutions and academic staff when introducing learning technologies. In that respect there is the need for managers of higher educational institutions to develop a vision of what the enterprise of higher education should be or look like. This vision needs to be communicated to all stakeholders as well as include an agenda for change (Kenny, 2002, p.331). Institutional leaders should manage the change in an environment of empathy, with skill and understanding, taking risks and 'going out on a limb'. Uys (2002, p.67) considers the creation of a shared vision as the most important function of institutional leadership. He suggests that it should involve wide consultation and have a clear educational purpose.

Holt et al. (2001) examined environmental imperatives and stakeholder needs when implementing IT in higher education. They compared the interests of the various stakeholders, and finalized that between total centralisation and extreme decentralisation, a balancing act is needed. This requires the participation of all stakeholders, and a respect for different views and rationales with educational objectives at the forefront of the process. Academic staff will need to reflect on their approach to teaching and learning. The engagement of faculty and teaching staff is another critical factor for the effective implementation of e-learning. Faculty development seems to work best when supported by a range of strategies (Bates, 2000, pp.95-121). This

includes staff incentives and staff support and professional development. There is some evidence that support required for staff to adapt can be under-estimated and under-resourced (Kenny, 2001 cited by Souleles, 2004).

From a pedagogical perspective the advantage of incorporating e-learning in the curricula is compared to traditional delivery methods. The later places the educator at the centre of the teaching and learning experience. The learners are passive recipients. Pedagogical support for e-learning is based on the potential to promote active and collaborative learning; the educator becomes the facilitator of the learning process and the learner is an active participant. However this in no way suggests that online instructional material and methods are pedagogically sound. The current proliferation of e-learning does not in itself entail this. Bennett et al. (1999) elaborate further on the kind of staff development required to develop appropriate online delivery. Staff development should raise awareness, empower academics to participate in discussions about online learning, and enable them to understand how the technology can be applied to their own context. Staff opportunities to discuss online learning can contribute to dissemination of best practice. Similarly, Bates, (2000, p.102) argues that showing how the technology works is not sufficient. Staff needs to know why it is important to use the technology in teaching. The paradigmatic shift from tutor-centred to a learner-centred system of delivery will not happen overnight and must be accompanied by institutional commitment to incorporate research findings into professional development activities (Van Dusen, 1997).

Concluding, it is worth noting that higher educational institutions and their organisational structures are often based on historicity and as such a radical transformation of such strong cultures may not be the case overnight. It requires the time and appropriate approach for the effective adoption and diffusion of e-learning.

Structural Issues for Traditional Universities

The rapid growth in e-learning, experienced particularly during the 1990s, has overcome many of the barriers to Higher Education (National Committee of Enquiry into Higher Education, 2001b cited by O'Neill, Singh, and O'Donoghue (2004), providing traditional universities with an opportunity to meet the changing worldwide demand for education. According to Goddard (1998) the demand for higher education is expanding exponentially throughout the world and by 2025 as many as 150 million people will be seeking Higher Education. This increase in demand is widely attributed to the changing culture of employment, where a job for life is no longer the norm (Katz, 2001). Society requires higher levels of skills and qualifications to fill the same 'worthwhile' jobs (Davies, 1998), and individuals see education as a status provider (Pritchard & Jones, 1996).Volery and Lord (2000) point to the capacity

constraints and resource limitations that can be overcome through the implementation of e-learning, creating a new opportunity to satisfy this growing demand.

According to O'Neill, Singh, and O'Donoghue (2004), the growth in demand will be a transition in the type of students undertaking higher education. The educational needs of individuals are now seen to be continuous throughout a working life, as labour markets demand knowledge and skills that require regular updates. A phenomenon of 'life-long learning' has begun and according to Davies (1998) this new concept is quickly gaining social and political recognition as Governments recognise the positive impact of education on the health and growth of modern economies. But there is significant body of research that argues that e-learning is not the only way to meet the changing demand for Higher Education. Hoare (2001) cited by O'Neill, Singh, and O'Donoghue (2004) propose that modern economies rely on lifelong learning to fulfil demand for new knowledge, abilities and capabilities.

However, Cooper (1999) does not believe that e-learning can sufficiently provide lifelong learning for everybody. Many of the students of a virtual university will not have the skills to learn independently and, consequently, it is unlikely that they will be successful in an e-learning environment. Instead, foundation courses must be provided locally and delivered face- to-face for those who need them. Such findings imply that the implementation of e-learning by traditional universities will not be the answer to the problem of changing demand. However, most innovative Higher Education institutions can make use of opportunities derived from technological progress to offer lifelong learning to many, and thus can contribute to the fulfilment of the needs of a diverse consumer base (cited by O'Neill et al; 2004).

Considering the nature of the current competitive educational environment there is the need to match the growing diversity of the higher education population with the appropriate course offerings of universities as students demand more from their knowledge providers. A report by the National Committee of Enquiry into Higher Education (2001a) states that "a system growing and responding to the needs of an increasingly heterogeneous group of students must work actively to maintain its diversity and offer choice to intending students". Volery and Lord (2000) claim that those universities that do not embrace the opportunities presented by technological developments will be left behind. Goddard (1998) agrees that the competitive environment is changing, as diversity in demand presents opportunities for new entrants to the market.

Other research (Currie, 1999; Johnston, 2001; Paton, 2001) further emphasises Goddard's (1998) view that e-learning provides opportunities for new entrants into the Higher Education market. Goddard proposes that traditional universities implementing e-learning will face competition from two main rivals: corporate universities and virtual universities. Corporate

universities present possibly the biggest threat to traditional institutions in their facilitation of lifelong learning. For example, six UK companies have now established corporate universities offering qualifications from National Vocational Qualifications (NVQs) to PhDs. According to Hoare (2001), the impact of e-learning on the world of business has been significant, particularly in meeting the needs of 'employees who cannot be out of their jobs. This type of competition represents a challenge for traditional universities. Implementation of an e-learning strategy must offer the same benefits as a corporate university or else be at a competitive disadvantage when recruiting graduates into postgraduate courses.

Virtual universities present slightly different competition issues, mainly involving the potential to overcome international boundaries and recruit students from around the world. The University of Phoenix, one of the largest virtual universities in the world has 48,000 students, most of who are in full time work (Goddard, 1998). According to O'Neill, et al; (2004) citing Currie (1999) students will be able to demand learning when and where they want it through virtual universities. As they can and will go to global providers for this, it will become more difficult to protect the reputation of traditional providers. (National Center for Education Statistics, 1999). At the same time as these figures were being produced in the US, industry reports were estimating that the e-learning market in Europe would have grown from 2001 figures of $0.8billion by more than 120% in 2001 to reach almost $6-10 billion by 2005 (IDC, August 2nd, 2001; Hambrecht, 2000). So gradually the competition in the higher educational market employing e-learning will continue to grow exponentially.

4. E-LEARNING TECHNOLOGIES AND APPLICATIONS.

E-Learning Models

Winn (2002) reviews a series of research to summarize the trend of educational technologies with respect to the learning content, the formats of instructional messages, and the computer interface between materials and learners. Some research also focuses on how to apply information technology to enhance both teaching and learning. For example how Learning Management Systems (LMS) are used as supporting tools for the instructor to guide and evaluate students' learning process in a systematic way (Winn, 2002).

However "learning" in the academic world emphasises broad foundational knowledge, theory and analytical skills. E-learning may be used to supplement either traditional contact education or print-based distance education or it may be a complete replacement of the traditional modes. Richards (2002)argues that "a distinction must be made between what may be referred to as an add-on model of e-learning and a more integrated approach which goes beyond a mere transmission or delivery of content to promote more interactive and effective learning". Generally it would be difficult to make this distinction, as e-learning should be based on using the

technology to support a good learning experience. A good learning experience is one in which a student can "...master new knowledge and skills, critically examine assumptions and beliefs, and engage in an invigorating, collaborative quest for wisdom and personal, holistic development" (Eastmond & Ziegahn, cited by Jonassen et al 1995: p7). The most valuable activity in a classroom of any kind is the opportunity for learners to work and interact together and to build and become part of a community of scholars and practitioners (Jonassen et al 1995:p7).

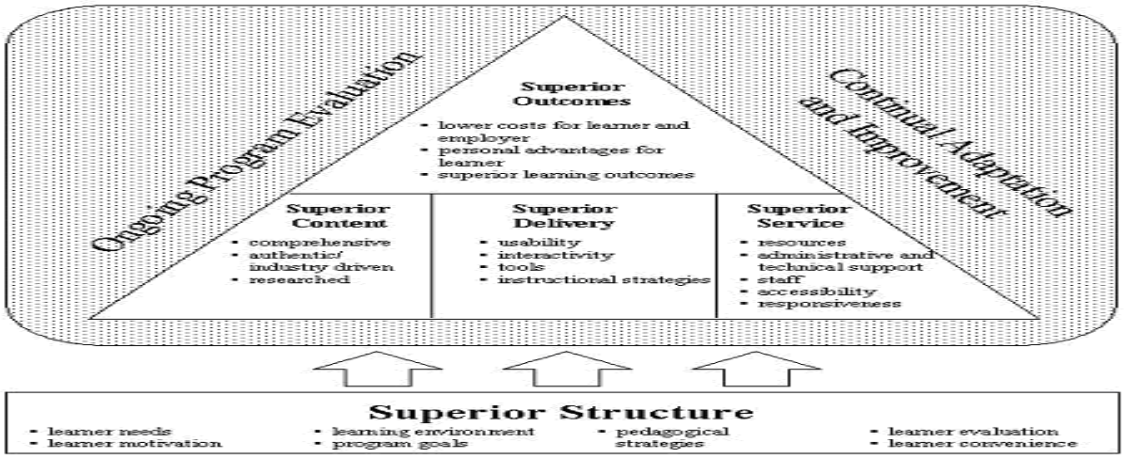
E-learning models or approaches have evolved from classroom replication towards models that integrate technology and pedagogical issues. While the first e-learning models emphasised the role of the technology in providing content, delivery in terms of access and electronic services, more recent models place more emphasis on the pedagogy such as online instructional design and the creation of stimulating online learning communities. The e-learning models reviewed illustrate this evolution.

Firstly; Content, service and technology model- This emphasises the point that e-learning had been through a "hype cycle" triggered by the high expectations of the potential of technology as well as by the developers of these technologies. But this hype slowed down when the realities of e-learning became clear. The fact represented was educators and learners were unable to adapt to e-learning as expected and the desired learning outcomes expected were not being achieved (Logan 2001; Taylor 2002). In this growth and experimentation phase of e-learning in the 1990s, universities, public and corporate institutions, incited by technology learning management system vendors, based their e-learning initiatives on a model comprising three elements. First, provision of service to the student, content and technology. Owing to the continuous ICT developments, the focus was primarily on the use of technology to create convenient virtual learning environments for learners to access anywhere, any time. The design of instruction and the training of educators and learners for online teaching and learning had less emphasis. Within this model of thinking many educators and technology developers operated on the thinking that the delivery of traditional learning content using e-learning.

The demand-driven learning model **(see figure below)** which partly follows this line of thinking was developed in Canada as a collaborative effort between academics and experts from private and public industries (MacDonald et al 2001). Although this model is based on the technology learning management system vendors' model of technology, content and service, the technology is seen as support or a tool to achieve the desired learning outcomes in a cost-effective way. The primary aim of this model is to encourage academics to assume a more proactive role in the development and use of technology in the teaching process by emphasising high quality content, delivery and service. Content should be comprehensive, authentic and researched. Delivery is web-based and the interface of e-learning programmes should be user-

friendly with communication tools to support interactivity. Service should include the provision of resources needed for learning as well as any administrative and technical support needed.

Figure 1- The Demand Driven Learning Model



Source: MacDonald, C. J., Stodel, E., Farres, L., Breithaupt, K., and Gabriel, M. A. (2001). Cited in *The International Review of Research in Open and Distance Learning* [Online] 6:2.

As technology is fundamental to e-learning, this model provides a valuable framework for understanding the importance of investing in ICT infrastructure to support content, delivery and service. However, this model also highlights the importance of realising the changing needs of learners and their employers and the pedagogical changes that must be made to content and services to meet these needs (MacDonald et al 2001).

Secondly; Instructional design models- one of the essential elements in the successful implementation of e-learning is the need for careful consideration of the underlying pedagogy, or how learning takes place within an online environment. This is rightly reflected in the words of Conrad (2000) when he defined effective e-learning as: "... The integration of instructional practices and Internet capabilities to direct a learner toward a specified level of proficiency in a specified competency".

Within this framework instructional value is added by customising content for the needs of the learners, presenting outcomes-based learning objectives, logically sequencing material to reinforce those objectives, provision of hypertext links on existing and desired skills and knowledge of learners and designing objective-based, interactive learning activities that learners must complete to receive some form of evaluation (Conrad, 2000).

A review of literature point to several approaches oriented towards the instructional design school of thought. For example Collis and Moonen (2001) identify institution, implementation, pedagogy and technology as the key components for developing online learning materials. Jolliffe, Ritter and Stevens (2001) describe an 18-step process. Kerri Conrad's (2000)

development model for an e-learning experience has 7 stages comprising 21 tasks. Sanjaya Mishra (2001) identifies seven important factors when designing an online course. Alexander (2001:p240) concludes that successful e-learning takes place within a complex system involving the students' experience of learning, teachers' strategies, teachers' planning and thinking, and the teaching/learning context. However, all these models within this thinking emphasise the following:

A) Conducting a needs analysis that will investigate such factors as demand for instruction in the specific subject, demand and need for an online course, equivalence of an online course with face-to-face programmes and costs.

B) Putting together student profiles that will identify their needs and expectations in terms of age, gender, culture, work experience, prior knowledge, prior experience with e-learning, goals and motivation, attitude towards e-learning, learning patterns and styles, computer literacy, access to computers and the Internet and affordability of e-learning.

C) Institutional support for e-learning initiatives which should research into the vision and mission of the institution, lifelong learning as a goal of the institution, implementation costs and sustainability, experience of the lecturers and web designers, training for the lecturers, technological infrastructure, hardware and software and staff training in the systems and equipment.

D) Pedagogical choices that meet the requirements of the subject and the needs of the target learner group in terms of learning models and objectives, delivery methods, assessment and interaction.

E) Development strategy which covers the use of available web tools such as e-mail or an integrated course delivery software package such as WebCT or Blackboard.

F) Learning communities which emphasise on interaction in all its forms between and among learners, learners and educators, learners and information or content, as an essential element in the learning process (Moore 1993:20; Laurrillard 2000:137; Palloff & Pratt 1999). With the existence of high levels of interactivity within the e-learning environment learners are able to assume control and directly influence their learning outcomes (Garrison and Anderson 2003: p115). This is being further buttressed by the fact that lately more researchers in the field of e-learning have shifted their focus to examining online communication in the virtual environment in terms of how online interaction can be facilitated through the effective use of online communication tools as well as the adoption of online communication and methods of motivating learners to participate in online discussions, chats, etc (Blignaut & Trollip 2003).

Adoption, Diffusion and Exploitation of E-learning Technologies

Despite the rhetoric and excitement generated by the new form of learning, which promised to reach the "parts that other forms of learning could not reach", the growth and penetration of e-learning has not fulfilled its predictions. More importantly, given the recent thrust of European Union educational and training policy to invest heavily in e-learning to make Europe "the most dynamic knowledge economy in the world" (Reding, 2001), the transfer of a method of learning delivery that was "born in the USA", and which is particularly suited to its educational context (short-term time perspective, long travel-to-work times, highly connected electronic and information infrastructure, vertical individualist culture, high value on hard work and self discipline, large-scale and expository approaches to teaching; preparation for work conducted outside of work, has not been without its problems (Reding, 2001).

Thus a general question which arises is what are the factors that are likely to promote or obstruct the adoption, diffusion and exploitation of e- learning in any particular educational institution or country? Providing answers to such a question may be of enormous help to heads of higher educational institutions, policy makers and educational practitioners with an interest in the development of e-learning not only within their own institutions or countries but also to serve as best practices for international technology- based education.

Acknowledging the fact that much of the antecedent knowledge on open and distance learning is strong most notably in the UK, Australia and Scandinavia with its traditions of open universities, etc. and the needs of these countries to bridge geographical distances in a cost-effective way, the current technologies associated with e-learning are largely US-based. Consequently, we see the problem, in part at least, as one of assessing the effectiveness of technology transfer across nations, which has long been recognised as a more complex problem than of diffusing technology within a particular country because of cultural and institutional constraints (Kedia & Bhagat, 1988).

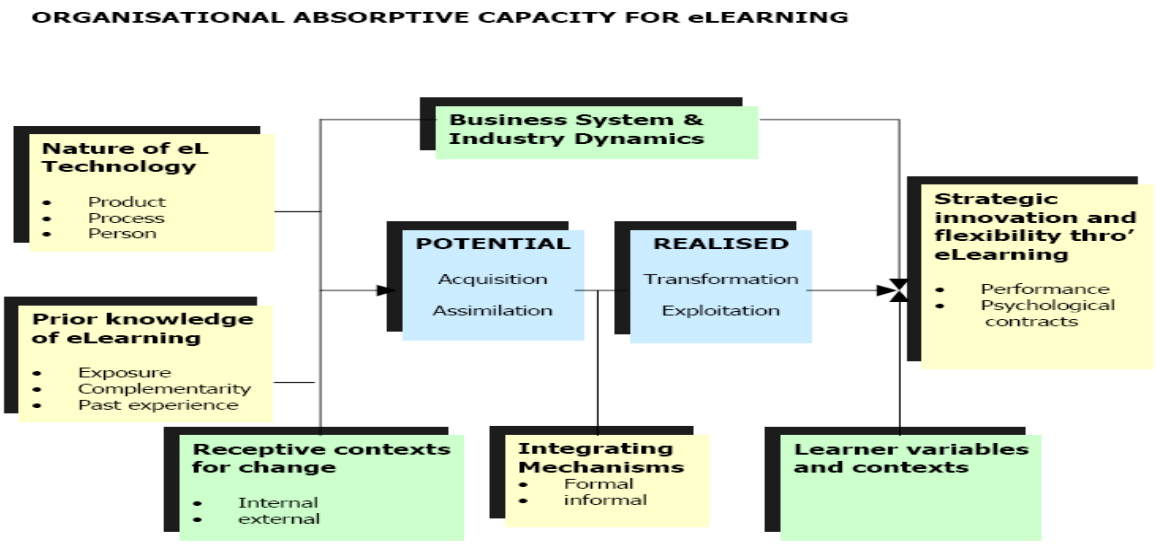
Consequently; Graeme Martin and Angela Jennings (2002), proposed a model for the adoption, diffusion and exploitation of e-learning which is cited in the Scottish enterprise research report (2002). The basis of their model is as follows:

First, they see the effectiveness of e-learning technology transfer across countries, the dependent variable as directly related to three antecedent organisational and national level factors or independent variables. These antecedent variables are: a) The nature of the e-learning technology, b) The prior knowledge of organisations and countries about e-learning and its antecedents, and c) The cultural distance between transacting organisations.

Second, they see this relationship between the dependent and independent variables as being moderated by a series of national and organisational level variables and contexts which

includes: a) Differential rates of absorptive capacities for e-learning among organisations, b) Learner variables and contexts, c) Nationally receptive events and contexts for change, the specific business system and industry dynamics of member states and, d) The existence of nationally integrating mechanisms that focuses of the diffusion of e-learning within states.
The concepts outlined by the model are depicted in the figure below.

Figure 2: Organisational Absorptive Capacity for E-learning Model



(Source: Graeme Martin and Angela Jennings in 2002, cited by the Scottish enterprise research report, 2002)

The Key Antecedents

(a) The nature of e-learning technology.

The nature of what is being transferred, in this case the various conceptions and forms of e-learning technology has an obvious and direct influence on the success of transfer. Here, we have to make a distinction between e-learning products (content), e-learning processes for organizing and delivery (the infrastructure) and e-learning as a method of learning (the person-embodied features). It is usually argued that the process and person aspects of a technology are more difficult to transfer across nation boundaries (Kedia & Bhagat, 1988). Their belief is that, in the case of e-learning technology, certain forms of content also present particular problems, particularly when they involve cultural assumptions.

(b) Prior knowledge of e-learning.

It was the assumption of the model that the prior knowledge of e-learning by educational institutions and national government bodies will directly influence the effectiveness of e-learning transfer. For example institutions and countries that have a long history of positive success with

open and distance technology enhanced learning and organisations and countries whose philosophies of learning fit with the philosophies of learning embodied in particular forms of e-learning technologies will be much receptive of new e-learning technologies than those without such as historical background.

(c) Organisational cultural distance between transacting organisations.

Although learning technology transfer across countries is strongly influenced by national governments and other bodies, such as the European Union (EU), expressing strong interests and devising policies for their constituent organisations to diffuse and exploit e-learning in their own interests and that of the nation state's interest, often such direct transfer is conducted at organisational level. So, for example, learning technology might take place between two transacting organisations in different countries, for example, a vendor-customer relationship between a US-based content developer and a UK-based training department of a corporation, or between the headquarters of Multinational Enterprise to one or more of its subsidiaries in a host country. At organisational level, the cultural distance between the transacting organisations will directly influence such transfer. Common to both levels of analysis, however, are the constraints imposed by business system, institutions and cultural factors and the nationally receptive contexts and integrating mechanisms that facilitate or hinder the transfer of e-learning.

The Moderating Factors

Following earlier work by Kedia and Bhagat (1988), Zahra and George (2002) and Brown, (2002), the model above suggests that the effectiveness of the transfer of e-learning technology and methods of learning from one organisation to another or from country to country are moderated by the following organisational and national variables:

a) The absorptive capacity for e-learning in organisations. This which includes such factors as the potential for acquiring and assimilating knowledge of e-learning and realising such potential knowledge by transforming and exploiting it which is usually influenced by the strength of formal and informal organisational integrating mechanisms (Zhara & George, 2002; Martin, Robson & Jennings, 2002). Also they may be influenced by the local versus cosmopolitan orientations of the management team, the existence of a strong technical core of people capable of understanding the technology and strategic orientation of the recipient organisation (Kedia & Baghat, 1988).

b) The general business system features of the recipient country. This deals with such factors as the nature of its education and training systems, labour markets, career systems, political, economic and social features that go to make up a country's institutional framework (Whitely, 1992, Hollingsworth and Bower, 1997, Ferner, 2001).

c) Nationally receptive contexts for change. This includes such features such as technological infrastructure, government coercion and inducements, perceptions of national crises in education and the appointment of key national officials to promote such changes.

d) The **existence of national integrating mechanisms** and bodies, such as economic development agencies, educational institutions offer the mechanisms for debate and knowledge dissemination.

e) Learner variables and contexts, which can be examined at the organisational and national level covering such factors such as the attitudes and skills to technology-based learning, learner motivations and patterns of participation.

Processes for Technology Adoption

The term learning technologies covers a wide array of concepts. A technology is an artefact designed to address a specific problem or need in the world. While we usually refer to hardware and software tools when speaking of learning technologies, a learning technology is often more than that. They may be resources intended for self-guided learners, designed interventions for instructional use, or new methods and models that solve specific instructional problems (Collis, 1996)

Lowry (1996) cited by Wilson et al (forthcoming) defines three different relationships of technology to end user, each with different adoption concerns: 1) Firstly; **Market-type adoption**. In this case, the technology is intended for mass distribution, like a software program, or hardware innovation. Examples would be Dream weaver as a web-authoring tool or an upgraded PC platform that allows easier sharing of data among peripherals. The relationship between the developer and the end user is distant, and responsibility for successful adoption rests primarily with the adopting organisation. 2) Secondly; **Client-type adoption**. In this case, a contractor develops a technology for a particular client. This custom-developed resource may draw on some generic technologies, but the designed solution addresses the specific concerns of the client. Resources of this kind are most commonly software programs, but a number of innovations and resources can be developed at this level. In these cases, designers and end users share responsibility for successful adoption of the resource. 3) Thirdly; **Classroom-type adoption**. Many times a teacher develops a technical solution or resource him/herself, with intended use limited to their own classroom or program. Here the designer and user roles are combined into one person, and adoption fades as an issue because the teacher is presumably aware of her own needs.

Over the years, researchers have changed their views of technology adoption, just as they have changed their views of e- learning. Indeed, adoption is in many ways a learning process for

individuals and organisations. For instance Wilson et al; (2000) conveyed three ways of viewing technology adoption, each relying on a fundamentally different metaphor of learning.

I) Technology adoption seen as consumer behaviour. It stresses on outcome which is measured in terms of units purchased or number of programs installed. This position is consistent with behaviourist models which reflect the fact that what users are thinking is secondary to their behaviour. General surveys at the state or regional level become useful benchmarks of adoption levels over time. These demographic data then become valuable information in the hands of policymakers and administrators seeking to allocate resources in fair and effective ways (Becker, 1994).

II) Technology Adoption seen as a process of information diffusion. This Information outcome leads to the decision to adopt a technology resulting in a rational choice to use or not use the new technology. This perspective relies principally upon a view of learning which emphasise information acquisition (Mayer, 1992, 1996). A prospective user engages in a process of inquiry concerning the technology. After learning more about the pros and cons, the user commits to a testing, followed by a full-scale adoption and implementation of the technology (Hall & Hord, 1987; Rogers, 1995).

III) Finally, technology adoption seen as the assimilation of new cultural tools and practices. This view is consistent with theories such as the activity theory that stress learners' participation within communities of practice. The focus is on socially constructed meanings and the sharing of those meanings through participation in purposive activities. The technology itself, in addition to its physical form and function, is also a social construction whose meaning is shared among community members. How the technology fits into existing social purposes and practices will largely determine its prospects for its appropriation and use by the community (Lave & Wenger, 1991).

Further, examining the facilitating conditions for technology adoption and integration, a key question that emerges is what conditions are favourable to such adoption? Developing a list of contributing factors Ely (1990, 1999) reported one such framework of facilitating factors. Based on field research in Chile, Peru, and Indonesia, Ely's list includes attention to technology, human, and contextual variables. He and his students conducted a number of correlation studies to add empirical support to the framework. The eight conditions that facilitate the implementation of educational technology innovations (adapted from Ely, 1999) are: 1) Dissatisfaction with the status quo leading to a feeling of the need to change. This phenomenon is linked to leadership. 2) Expertise accesses the knowledge and skills required by the user. This is connected to available resources, rewards & incentives, leadership, and commitment. 3) Resources which include things needed to make it work such as funding, hardware, software,

technical support, infrastructure, etc. This is linked to commitment, leadership, rewards and incentives. 4) Time which is connected to participation, commitment, leadership, and rewards & incentives involves a prioritised allocation of time to make it work. 5) Rewards or incentives. This is linked to participation, resources, time, and dissatisfaction with the status quo. It serves as internal and external motivators proceeding and following adoption.6) Participation. This involves a shared decision-making; full communication; good representation of interests which is linked to time, expertise, rewards & incentives. 7) Commitment. Firm and visible evidence of continuing endorsement and support. This is linked to leadership, time, resources, and rewards & incentives. 8) Leadership linked to participation, commitment, time, resources, and rewards & incentives as well as competent and supportive leaders of project and larger organisation.

Another project that studied conditions was the Peakview project (Wilson & Peterson, 1995; Wilson, Hamilton, Teslow, & Cyr, 1994). The research pointed to a number of conditions that contributed to the technology adoption success, including a supportive leadership, technical support, abundant technology, and extensive staff training. This research, and many studies like it, can be made to fit into Ely's framework quite comfortably. Another leading research into technology adoption emanates from Everett Rogers (1995). While his concept is applicable to diverse fields his work continues to guide theory and practice in educational technology innovations. Construing the process of adoption primarily in information-diffusion terms, he came up with a list of six perceived features of the technology that largely determine its acceptance. Here the technology is the focus rather than the environment or external conditions. They are: i) **The Simplicity of the technology**. Within this domain he seeks to ask the question whether the technological innovation is easy to understand, maintain, and use as well as explained to others easily? ii) **Trialability**. This domain attempts to know whether the innovation can be tried out on a limited basis or whether the decision to adopt it can be reversed. iii) **Observability**. This domain attempts to know whether the results of the innovation will be visible to others, so that they can see how it works and observe the consequences. iv) **Relative Advantage.** The central element here is whether the innovation is seen as better than that which it replaces? Also whether the innovation is more economical, more socially prestigious, more convenient, and more satisfying? v) **Compatibility.** This domain looks at the question whether the innovation is consistent with the values, past experiences, and needs of the potential adopters. vi) **Support.** This examines whether there is enough support to do this? Are there enough time, energy, money, and resources to ensure the project's success? Is there also administrative and political support for the project?

These characteristics as highlighted by Roger (1995) can serve as important reference points when a person or institution considers the options of whether to adopt or reject an

innovation or technology. The more features present, the more likely the technology will be adopted. Rogers's concept cites a number of research studies supporting these perceived features. In effect once a framework of contributing factors has been developed; it can be readily converted into an assessment instrument to evaluate a situation, or serve as a guide towards the preparation for successful adoption.

A similar analysis of contributing conditions as postulated by Rogers can help individuals and institutions to understand why innovative projects often fail. For instance in a study by Latham (1988), he categorized a number of features common to failed innovations which include: **i)** A situation whereby educational practitioners become disillusioned because the innovation is more difficult than expected, causing too much disruptions as well as taking too much time. **ii)** A situation whereby those who support the innovation leave an institution or are no longer available. **iii)** A situation whereby people lack training which results in the loss of enthusiasm. **iv)** When the funding for the innovative project runs out. **v)** When there is inadequate supervision and support from management. **vi)** The program lacks accountability. **vii)** There is a "take-if-or-leave-it" attitude on behalf of program promoters.

These features that have been highlighted above are reminders to practitioners of the potential pitfalls to avoid in their efforts to develop effective technology integration programs. But, notwithstanding all these features and typologies that have been discussed above it is of worth noting that they may not be necessarily sufficient conditionality for the efficient adoption of technological innovation in a university setting. Another necessary factor is an in-depth understanding of how change happens. For example; what are the regular processes, whether there is a predictable cycle through which individuals and groups pass as they move toward complete adoption and use of a new technology?

Reviewing the literature, one can explore the efforts for the smooth adoption of technological innovation either by progressive linear stages or by systemic cycles of change. Rogers (1995) is one of many researchers who present the adoption process as a series of linear stages. His five-stage model covers the following stages:

Stage 1: Knowledge. At this stage the institution becomes aware of the innovation and begins to learn about it, resulting in increased knowledge and skill.

Stage 2: Persuasion. At this level the institution forms an attitude or an image about the innovation through discussion and interaction with others.

Stage 3: Decision. This is the stage whereby the institution resolves to seek additional information, leading to a decision to accept or reject the innovation.

Stage 4: Implementation. At this level the institution gains additional information needed to put the innovation into regular use.

Stage 5: Confirmation. This the level where the institution looks for benefits of the innovation to justify its continued use. At this level the use of the innovation becomes regular and promoted to other people or a decision could be arrived to discontinue it.

Along with the rise of technology in recent years, critics' voices have become increasingly prominent. David Noble (1989, 1996), Neil Postman (1995), and Theodore Roszak (1986) are names associated with the resistance movement. Such critics often question the assumptions of unerring technological progress, grand explaining narratives, privileged methods of inquiry, and objective meanings (de Vaney, 1993, 1994; Hlynka & Belland, 1991; Hlynka & Yeaman, 1992). Post-modern theorists are similar to activity theorists in their analysis of culture and practices, but they differ somewhat by distancing themselves from an objective, truth-finding agenda (Giroux, 1983, 1985). Their larger concern is to raise questions about current practices, and stimulate more conversation about fundamental values and aims. However, critics can be doubly irritating to technology advocates. They not only oppose something we tend to see value in, but they have such different worldviews. A scientific worldview often clashes with a view shaped by critical traditions in the arts and humanities (Wilson, 1997). But it is important to listen carefully to critical voices and to learn from them. Sherry (1998) found that late adopters were quite articulate in voicing their concerns about the impact of the Internet on their core teaching strategies. They felt that the Internet may not support their vision of learning.

Concluding, in order to integrate learning technologies into higher educational institutions successfully, leaders must be sensitive to the huge impact differing viewpoints can have on the adoption process. Because higher educational institutions often pride themselves in democratic processes of shared governance, we must continue the "values" of conversation concerning new technologies. This is because learning technologies are here to stay, discussion of values and goals are essential parts of the process, thus assuring that technology remains in the service of the community and not the reverse (Wilson et al; 2000).

5. E-LEARNING AND LEARNING PROCESSES

Greeno, Collins & Resnick (1996) identified three broad perspectives, which make different assumptions about what is crucial for understanding learning processes. These are the i) associationist /empiricist perspective which primarily perceives learning as an activity. ii) The cognitive perspective which sees learning as achieving understanding. iii) The situative perspective which sees learning as social practice. Each of these assumptions contributes differently to the design of e-learning products in terms of specifying learning outcomes, designing learning environments, instructional methods, and the development of appropriate assessment.

Nevertheless, the following four clusters of e-learning approaches can be regarded as evolving through the three lines of pedagogical thinking (Terry Mayes & Sara de Freitas, 2005):

First; Subject matter focus or Associationist which includes E-training, computer based training (CBT), learning objects, and some intelligent tutoring models.

Second; Focus on individual-tasks, formative assessment and dialogue or Cognitive/ constructivist approaches which include Dialogue models, Laurillard's conversational model, and most intelligent tutoring systems, IMS Learning Design.

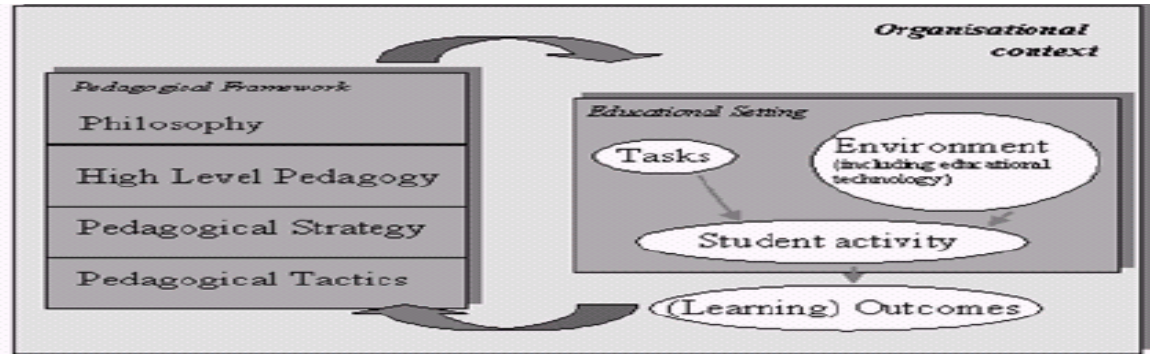
Third; Focus on group tasks and discussion or socially mediated constructivist which covers approaches such as Computer Supported Instructional Learning Environments (CSILE), Salmon's e-tivities and Dialog Plus.

Fourth; Focus on building communities of practice such as the CSALT networked learning model

Examining the influences of some of these models taking the CSALT networked learning model developed by Peter Goodyear and his colleagues (2001) at Lancaster University as a case, one can say that the model is based firmly on both constructivist and cognitive principles. The model aims particularly at tutors in higher education and includes a pedagogical framework as well as providing an overview of the broader issues surrounding networked learning. The pedagogical framework defined here introduces four levels of pedagogy: *philosophy, high-level pedagogy, strategy and tactics*. The upper two levels, that is philosophy and high-level pedagogy are considered as declarative or conceptual and the lower two levels, that is strategy and tactics are regarded as procedural or operational.

The model (see figure below) suggests a distinction between the tasks designed by the tutor and the activities carried out by the learner. Interestingly, the networked learning model also integrates an element of the systems approach through a deeper analysis of the management by tutors of networked learning activities. The model is sensitive to organizational context and asserts its importance particularly in higher education settings.

Figure 3: CSALT Networked Learning Model



Source; Goodyear, 2001.

Elaborating further on learning processes and e-learning, there is the need to emphasise that the role of technology in the delivery of the learning activity cannot be underestimated. Research on development, choice and use of presentational technologies, content authoring technologies, transmission or delivery technologies and support technologies have been theoretically reviewed and discussed. For instance Collis & Moonen (2001) developed the flexible learning approach, which produced a comprehensive account of technology in the service of flexibility. Nineteen dimensions of learning flexibility are described. The model relates all aspects of flexibility to two simple pedagogical dimensions: acquisition and contribution. A flexibility-activity framework is then mapped onto types of technology, both core and complementary, current and future. The approach is unusual in its attempt to deal with all issues in terms of the '4 Es' of implementation:

1) **Environment:** This relates with an institution's profile with respect to technology use or application.

2) **Educational effectiveness:** This deals with both short and long-term payoff of technology application.

3) **Ease of use:** This reflects the level of flexibility of use.

4) **Engagement:** This deals with individual self-confidence in the use of technology as well as the cots associated with such engagements.

Further theoretical reviews posit that e-learning is a means of implementing education that can be applied within varying education models, for example, face to face or distance education as well as within different educational philosophies for example behaviorism or constructivism. It is also possible to apply different education philosophies using e-learning. This point is emphasised by Thorpe who indicated that "if e-learning is a means to education, then it can be applied in accordance with varying pedagogies" (see Thorpe 2002). This can be traced to the history of the use of technology in education. Initially, computers were applied in behaviourist modes in accordance with Skinner's work (Ravenscroft 2001), which emphasized the teacher's control over what is learned and how it is to be learned. More recently, emphasis is on the constructivist use of technologies, which provide students with opportunities to construct their own meanings of learning. Skinner's behaviourism, Piaget's cognitive constructivism and Vygotsky's social constructivism can all be facilitated through e-learning. For instance Tam (2000) provides an excellent overview of how technology can be used for constructivist purposes.

Weller (2002) lists the following as pedagogies or didactical approaches: **constructivism**, **resource based learning**, **collaborative learning**, **problem based learning**, **narrative based teaching** and **situated learning**. This continues to buttress the fact that technology is pedagogically neutral and can therefore be applied quite to all of the pedagogies listed above.

Reviewing the processes of learning and learning design, Koper (2001) developed the concept of modelling 'units of study'. Building upon this idea Koper further developed the concept of educational modelling language (EML). Koper also defined the key actors in the learning process as: learners, staff and developers of units of study. The framework for units of study that Koper describes in his work in 2001 has been taken up and developed by the IMS Learning Design group, which aims to 'work towards establishing specifications for describing the elements and structure of any unit of learning' (IMS Global Learning Consortium 2002, p. 3). According to his concept Units of learning here include: resources, instructions for learning activities, templates for structured interactions, conceptual models, learning goals, objectives and outcomes and assessment tools and strategies.

Pedagogical Approaches and Learning Theory

To elaborate further on some of the didactical approaches described above, the following established pedagogical approaches will be discussed in detail in the context of learning theories and instructional designs for e-learning. This will be done by investigating into the available literature on learning theories and their implications for online instructional design. In a review of literature Mergel (1998) indicated that the main schools of learning theory are **Behaviourism**, **Cognitivism** and **Constructivism.**

A: *BEHAVIOURISM*

According to Schuman (1996) cited by Mergel (1998), Behaviourism is based on the concept of observable changes in behavior and focuses on new behavioural patterns being repeated until it becomes automatic or a normal part of one's behaviour. As a learning theory, this concept can be traced back to Aristotle, whose essay "Memory" focused on associations being made between events such as lightning and thunder. Other scientists such as Hobbs (1650), Hume (1740), Brown (1820), Bain (1855) and Ebbinghause (1885) (Black, 1995) built on Aristotle's thoughts.

The theory of behaviourism focuses on examining overt behaviours that can be observed and measured (Good & Brophy, 1990). It considers the mind as a "black box" in the sense that a response to stimulus can be observed quantitatively, totally ignoring the possibility of thought processes occurring in the mind. Some important personalities involved in the development of the behaviourist school of learning are Pavlov, Watson, Thorndike and Skinner. Pavlov's (1849 - 1936) work focused on the aspects of classical conditioning or stimulus substitution.

Thorndike (1874 - 1949) employing his "the methods of exact science" examined educational problems by emphasizing "accurate quantitative treatment of information". "Anything that exists, exists in a certain quantity and can be measured" (Johcich, as cited in Rizo,

1991). His theory, **Connectionism,** stated that learning was the formation of a connection between stimulus and response. In doing so he formulated the "law of effect", the "law of exercise" and the "law of readiness". The "law of effect" stated that when a connection between a stimulus and response is positively rewarded it will be strengthened and when it is negatively rewarded it will be weakened. Thorndike later revised this "law" when he found that negative reward, (punishment) did not necessarily weaken bonds, and that some seemingly pleasurable consequences do not necessarily motivate performance. The "law of exercise" pointed to the fact that the more an S-R (stimulus response) bond is practiced the stronger it will become. As with the law of effect, the law of exercise also had to be updated when Thorndike found that practice without feedback does not necessarily enhance performance. The "law of readiness" postulated that because of the structure of the nervous system, certain conduction units, in a given situation, are more predisposed to conduct than others. On the whole Thorndike's laws were based on the stimulus-response hypothesis. He believed that a neural bond would be established between the stimulus and response when the response was positive. Learning takes place when the bonds are formed into patterns of behavior (Saettler, 1990 cited in Mergel, 1998).

Watson (1878 - 1958), using Pavlov's ideas believed that humans are born with a few reflexes and the emotional reactions of love and rage. All other behavior is established through stimulus-response associations via the processes of conditioning.

Finally; Skinner (1904 - 1990), in the same vein like Pavlov, Watson and Thorndike, believed in the stimulus-response pattern of conditioned behavior. His theory covered changes in observable behavior, ignoring the possibility of any processes occurring in the mind. In his writings he pointed out how the principles of operant conditioning function in social institutions such as government, law, religion, economics and education (Dembo, 1994). However Skinner's work differs from that of his predecessors (classical conditioning), in that he looked at operant behavior, that is, voluntary behaviours used in operating on the environment. His Operant Conditioning Mechanisms revolved around the concept of: 1) Positive Reinforcement or reward: which establishes that Responses that are rewarded are likely to be repeated. 2) Negative Reinforcement: This states that Responses that allow escape from painful or undesirable situations are likely to be repeated. 3) Extinction or Non-Reinforcement: This posits that Responses that are not reinforced are not likely to be repeated. 4) Punishment: Responses that bring painful or undesirable consequences will be suppressed, but may reappear if reinforcement contingencies change. He extended these concepts to Behavioural Shaping based on Reinforcement Schedules. According to him once the desired behavioural response is accomplished, reinforcement does not have to be 100%; in fact, it can be maintained more

successfully through what Skinner referred to as partial reinforcement schedules which include interval schedules (fixed and variable) and ratio schedules (fixed and variable) (Mergel, 1998).

In terms of weakness Mergel (1998) indicates that the learner may find themselves in a situation where the stimulus for the correct response does not occur, therefore the learner cannot respond. However it's main strength is that the learner is focused on a clear goal and can respond automatically to the cues of that goal (Mergel, 1998).

Behaviourism and Instructional Design

Paul Saettler (1990), cited by Mergel (1998) indicated that behaviourism did not have an impact on educational technology until the 1960s. He highlighted six areas that show the impact of behaviourism on educational Technology: A) The **Behavioural Objectives movement;** B) The **teaching machine** phase; C) The **programmed instruction** movement; D) **The individualized instructional** approaches, E) **Computer-assisted learning** F) **The systems approach** to instruction.

a) The **Behavioural Objectives movement**

A behavioural objective states learning objectives in "specified, quantifiable, terminal behaviours" (Saettler, pp. 288, 1990). Behavioural objectives can be summed up using the mnemonic device ABCD (Schwier, 1998 cited by Mergel, 1998), where A –refers to the Audience, B – the Behavior, C - Condition and D - Degree of correctness. Consequently to develop behavioural objectives, a learning task must be broken down through analysis into specific measurable tasks. The learning success may be measured by tests developed to measure each objective (Saettler, 1990). Typical applications that have been developed along the Taxonomic Analysis of Learning Behaviours thinking include:

- **Gagne's Taxonomy of Learning** - Robert Gagne developed his taxonomy of learning in 1972 which comprised of five categories: a) verbal information b) intellectual skill c) cognitive strategy d) attitude e) motor skill
- **Mastery Learning**- This learning concept was originally developed by Morrison in the 1930s. His formula for mastery was "Pretest, teach, test the result, adapt procedure, teach and test again to the point of actual learning." (Morrison, 1931, cited in Saettler, 1990). This concept assumes that all students can master the materials presented in the lesson. Bloom further developed Morrison's plan, but mastery learning is more effective for the lower levels of learning on Bloom's taxonomy, and not appropriate for higher level learning (Saettler, 1990).
- **Bloom's Taxonomy of Learning** - In 1956 Bloom and his colleagues commenced with the development of taxonomy in the cognitive, attitudinal and psychomotor domains.

Bloom's Cognitive taxonomy is: a) knowledge b) comprehension c) application d) analysis e) synthesis f) evaluation.

- **Gagne's and Brigg's Model-** This model focused on the following: a) action b) object c) situation d) tools and constraints e) capability to be Learned.

This movement influenced the thinking of most teachers in the late 1960's by way of writing and incorporating behavioural objectives in teaching and learning activities. There were, of course, people who questioned the breaking down of subject material into small parts, believing that it would lead away from an understanding of the "whole" (Saettler, 1990).

b) **Teaching Machines and Programmed Instruction Movement**

B.F. Skinner is the most current and probably best known advocate of teaching machines and programmed learning. According to Saettler (1990), cited by Mergel (1998); contributors to this movement include the following:

- Pressey - introduced a multiple-choice machine at the 1925 American Psychological Association meeting.
- Peterson - a former student of Pressey who developed "chemosheets" in which the learner checked their answers with a chemical-dipped swab.
- W.W.II - devises called "phase checks", constructed in the 1940s and 1950s, taught and tested such skills and disassembly or assembly of equipment.
- Crowder - designed a branched style of programming for the US Air force in the 1950s to train trouble-shooters to find malfunctions in electronic equipment.
- Skinner - based on operant conditioning his teaching machine, 1954, required the learner to complete or answer a question and then receive feedback on the correctness of the response.

Considering the early use of Programmed Instruction, one can say that after the experimental use of programmed instruction in the 1920s and 1930s, B. F. Skinner and J.G. Holland first used programmed instruction in behavioural psychology courses at Harvard in the late 1950s. The use of programmed instruction concentrated on the development of hardware rather than course content. Concerned developers moved away from hardware development to programs based on analysis of learning and instruction based on learning theory. Despite these changes, programmed learning died out in the later part of the 1960s because it did not appear to live up to its original claims (Saettler, 1990).

c) **Individualized Approaches to Instruction**

Similar to programmed learning and teaching machines; individualized instruction began in the early 1900s, and was revived in the 1960s. The Keller Plan, Individually Prescribed Instruction, Program for Learning in Accordance with Needs, and Individually Guided

Education are all examples of individualized instruction particularly in the U.S. (Saettler, 1990 cited by Mergel, 1998).

Keller Plan (1963) - Developed by F.S. Keller, a colleague of Skinner, the plan was used for university college classes. According to Saettler (1990) the main features of the Plan are: a) Individually paced b) Mastery learning c) Lectures and demonstrations motivational rather than critical information d) Use of proctors which permitted testing, immediate scoring, tutoring, personal-social aspect of educational process.

Individually Prescribed Instruction (IPI) (1964) - This approach was developed by Learning Research and Development Center of the University of Pitsburgh. This approach lasted till the 1970s when it lost funding and its use dwindled. According to Saettler, 1990, the main features of IPI are: a) Prepared units b) Behavioral objectives c) Planned instructional sequences d) Used for reading, math and science e) Included pre-test and post-test for each unit f) Materials continually evaluated and upgraded to meet behavioural objectives.

Program for Learning in Accordance with Needs (PLAN) (1967)- According to Saettler, 1990,cited by Mergel, 1998 the PLAN was developed with Jon C. Flanagan serving as its leader under the sponsorship of American Institutes for Research (AIR), Westinghouse Learning Corporation and fourteen U.S. School districts. It was however abandoned in late 1970s because of upgrading costs. The main features of PLAN are: a) Schools selected items from about 6,000 behavioural objectives b) Each instructional module took about two weeks instruction and was made up of approximately five objectives c) Mastery learning d) Remedial learning plus retesting.

d) **Computer-Assisted Instruction (CAI)**

This approach was first used in education and training during the 1950s. Early work was done by IBM and other researchers such as Gordon Pask, and O.M. Moore (Saettler, 1990). Computer assisted instruction grew rapidly in the 1960s when federal funding for research and development in education and industrial laboratories was implemented. Despite money and research, by the mid seventies it was apparent that CAI was not going to be that successful. Some of the reasons that accounted for this are: a) CAI had been oversold and could not deliver b) The lack of support from certain sectors c) Technical problems in implementation d) The lack of quality software e) High cost.

In terms of orientation, Computer-assisted instruction (CAI) was based on drill-and-practice and controlled by the program developer rather than the learner. Little branching of instruction was implemented although it did allow the learner to determine the sequence of instruction or to skip certain topics (Saettler, 1990).

e) **Systems Approach to Instruction**

According to Saettler, 1990, the this approach developed out of the 1950s and 1960s focus on language laboratories, teaching machines, programmed instruction, multimedia presentations and the use of the computer in instruction. This approach is depicted in the form of computer flow charts with steps that the designer moves through during the development of instruction. The systems approach involved setting goals and objectives, analyzing resources, devising a plan of action and continuous evaluation or modification of the program (Saettler, 1990).

B: ***COGNITIVISM***

According to Schuman (1996) cited by Mergel (1998), **Cognitivism is** "based on the thought process behind the behavior. Changes in behavior are observed, and used as indicators as to what is happening inside the learner's mind". By the early 1920's researchers had began to find limitations in the behaviourist approach to understanding learning. For instance behaviourists were unable to explain certain social behaviours. For instance, children did not imitate all behavior that had been reinforced. Furthermore, they may model new behavior days or weeks after their first initial observation without having been reinforced for the behavior.

As a result of such observations, Bandura and Walters departed from the traditional operant conditioning explanation that the child must perform and receive reinforcement before being able to learn. They stated in their book, *Social Learning and Personality Development*, 1963, that an individual could model behavior by observing the behavior of another person. This theory leads to Bandura's Social Cognitive Theory (Dembo, 1994 cited by Mergel, 1998). According to Good and Brophy, Cognitive theorists acknowledge that much learning involves the building of associations which is established through contiguity and repetition, as well as the reinforcement through the provision of feedback about the correctness of responses. But on the other hand, cognitive theorists view learning as involving the acquisition or re-organization of the cognitive structures through which humans' process and store information (1990, pp. 187 cited by Mergel, 1998).

One of the key proponents in the development of cognitivism is Jean Piaget in the 1920's. The key concepts highlighted by the **Cognitive Theory** according to Mergel (1998) are:

1) Schema – Which is an internal knowledge structure that may be combined, extended or altered to accommodate new information.

2) Three-Stage Information Processing Model – these details out the fact that input first enters a sensory register, then is processed in short-term memory (STM), and then is transferred to long-term memory (LTM) for storage and retrieval.

3) Meaningful Effects – states that meaningful information is easier to learn and remember (Cofer, 1971, cited in Good & Brophy, 1990) if a learner links relatively meaningless information with prior schema (Wittrock, Marks, & Doctorow, 1975, cited in Good & Brophy, 1990).

4) Serial Position Effects – This emphasises the fact that it is easier to remember items from the beginning or end of a list rather than those in the middle of the list, unless that item is distinctly different.

5) Practice Effects – This indicates that practicing improves retention especially when it is distributed practice.

6) Transfer Effects- This aspect emphasises the effects of prior learning on learning new tasks.

7) Interference Effects – This occurs when prior learning interferes with the learning of new material.

8) Organization Effects – This indicates that when a learner categorizes input such as a grocery list, it is easier to remember.

9) Levels of Processing Effects – Words may be processed at a low-level sensory analysis of their physical characteristics to high-level semantic analysis of their meaning. The more deeply a word is process the easier it will be to remember (Craik and Lockhart, 1972, in Good and Brophy, 1990).

10) State Dependent Effects - If learning takes place within a certain context it will be easier to remember within that context rather than in a new context.

11) Mnemonic Effects - Mnemonics are strategies used by learners to organize relatively meaningless input into more meaningful images or semantic contexts.

12) Schema Effects - If information does not fit a person's schema it may be more difficult for them to remember and what they remember or how they conceive of it may also be affected by their prior schema.

13) Advance Organizers - Advance organizers prepare the learner for the material they are about to learn. They are not simply outlines of the material, but are material that will enable the student to make sense out of the lesson.

In terms of weakness Mergel (1998), indicates that the learner learns a way to accomplish a task, but it may not be the best way, or suited to the learner or the situation. However the main Strength of this concept is that the goal is to train learners to do a task the same way to enable consistency.

Cognitivism and Instructional Design

The cognitive theory as applied to instructional design focused on the internal mental processes of the mind and how they could be utilized in promoting effective learning. The cognitive approach built on the "task analysis" and "learner analysis" design models of the behaviourist tradition. The new models addressed component processes of learning such as knowledge coding and representation, information storage and retrieval as well as the incorporation and integration of new knowledge with previous information (Saettler, 1990). Because Cognitivism and Behaviorism are both governed by an objective view of the nature of knowledge and what it means to know something, according to Mergel (1998) the transition from behavioural instructional design principles to those of a cognitive style was not entirely difficult. The goal of instruction remained the communication or transfer of knowledge to learners in the most efficient, effective manner possible (Bednar et al., in Anglin, 1995). The influence of the cognitive theory in instructional design is evidenced by the use of advance organizers, mnemonic devices, metaphors, chunking into meaningful parts and the careful organization of instructional materials from simple to complex.

Relating the Cognitive theory to Computer-Based Instructional (CBI) systems one could realize that computers process information in a similar fashion to how cognitive theorists believe humans process information, that is within the processes of receiving sensory information, storing it and retrieving it for use or application. This analogy makes the possibility of programming a computer to "think" like a person conceivable, that is artificial intelligence (Mergel, 1998). Artificial intelligence involves the computer working to supply appropriate responses to student input from the computer's data base. Examples could be the use of the program SCHOLAR to teach facts about South American geography in a Socratic Method or LOGO which is designed to help children learn to program a computer (Saettler, 1990).

C: ***CONSTRUCTIVISM***

According to Schuman (1996) cited by Mergel (1998), **Constructivism is** based on the idea that we all construct our own perspective of the world, through individual experiences and schema. Constructivism focuses on preparing the learner to problem solve in ambiguous situations. Although Bartlett (1932), pioneered what became the constructivist approach (Good & Brophy, 1990), if one examines the literature of many philosophical and psychological theories of the past, elements of constructivism may be found in the writing of such people as Bruner, Goodman, Kant, Dewey and Habermas. The most profound influence was Jean Piaget's work which was interpreted and extended by von Glasserfield (Smorgansbord, 1997).

Constructivists believe that "learners construct their own reality or at least interpret reality based upon their own perceptions of experiences, so an individual's knowledge is a function of

one's prior experiences, so are mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind" (Jonasson, 1991 cited by Mergel, 1998).

However one question that is often posed to this school of thought is that if each person has their own view about reality, then how can we as a society communicate and/or coexist? Jonassen, addressing this issue in his article *Thinking Technology: toward a Constructivist Design Model,* contended that "Perhaps the most common misconception of constructivism is the inference that we each therefore construct a unique reality, which reality is only in the mind of the knower, which will doubtlessly lead to intellectual anarchy." Also that "A reasonable response to that criticism is the Gibsonian perspective that contends that there exists a physical world that is subject to physical laws that we all know in pretty much the same way because those physical laws are perceivable by humans in pretty much the same way." Jonassen concludes by emphasising that perhaps "Constructivists believe that much of reality is shared through a process of social negotiation..." (Mergel, 1998).

According to Cobb (1996), cited in Smorgansbord (1997), the main views of constructivism revolve around what is described as "**Realistic" and "Radical Construction".** Realistic constructivism emphasises the fact that cognition is the process by which learners eventually construct mental structures that correspond to or match external structures located in the environment. On the other hand, radical constructivism point to the fact that cognition serves to organize the learners' experiential world rather than to discover "ontological" reality. The key **assumptions of Constructivism** according to Merrill (1991), cited in Smorgansbord, (1997), are: a) Knowledge is constructed from experience b) Learning is a personal interpretation of the world c) learning is an active process in which meaning is developed on the basis of experience d) conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning e) learning should be situated in realistic settings and testing should be integrated with the task.

Constructivism and Instructional Design

According to Mergel (1998), the shift of instructional design from behaviourism to cognitivism was not as dramatic as the move into constructivism appears to be, since behaviourism and cognitivism were both objective in nature. Behaviorism and cognitivism both support the practice of analyzing a task and breaking it down into manageable chunks, establishing objectives, and measuring performance based on those objectives. Constructivism, on the other hand, promotes a more open-ended learning experience where the methods and results of learning are not easily measured and may not be the same for each learner. While

behaviourism and constructivism are very different theoretical perspectives, cognitivism shares some similarities with constructivism. An example of their compatibility is the fact that they share the analogy of comparing the processes of the mind to that of a computer.

It is worth noting that despite these similarities between cognitivism and constructivism, the objective side of cognitivism supported the use of models to be used in the systems approach of instructional design. Constructivism is not compatible with the present systems approach to instructional design, as Jonassen points out:

> "The conundrum that constructivism poses for instructional designers, however, is that if each individual is responsible for knowledge construction, how can we as designers determine and insure a common set of outcomes for leaning, as we have been taught to do?"
>
> (Jonasson, [On-line] cited in Mergel, 1998)

In the same article, Jonassen, [On-line] cited by Mergel (1998) itemizes the following implications of constructivism for instructional design: a) Provide multiple representations of reality which avoids the oversimplification of instruction by representing the natural complexity of the world. b) Present authentic tasks through contextualization. c) Provide real-world, case-based learning environments, rather than pre-determined instructional sequences. d) Foster reflective practice. e) Enable context- and content-dependent knowledge construction. f) Support collaborative construction of knowledge through social negotiation, not competition among learners for recognition

Jonassen points out that the difference between constructivist and objectivist, that is behavioural and cognitive, instructional design is that objective design has a predetermined outcome and intervenes in the learning process to map a pre-determined concept of reality into the learner's mind, while constructivism maintains that because learning outcomes are not always predictable, instruction should foster, not control, learning. With this in mind, Jonassen looks at the commonalties among constructivist approaches to learning to suggest a "model" for designing constructivist learning environments. Thus a constructivist-based instructional design should concentrate on creating learning environments that enables the construction of knowledge that is based on 1) Internal Negotiation 2) Social Negotiation 3) Is Facilitated by Exploration of Real World Environments and Intervention of New Environments 4) Results in Mental Models and provides Meaningful, Authentic Contexts for Learning and Using the Constructed Knowledge 5) Requires an Understanding of its Own Thinking Process and Problem Solving Methods 6) Modelled for Learners by Skilled Performers but Not Necessarily Expert Performers 7) Requires Collaboration Among Learners and With the Teacher and 8)

Provides an Intellectual Toolkit to Facilitate an Internal Negotiation Necessary for Building Mental Models (Jonasson, [On-line] cited by Mergel, 1998).

According to Mergel (1998), the main weakness of constructivism is that in a situation where conformity is essential, divergent thinking and action may cause problems. The main strength of this approach is that because the learner is able to interpret multiple realities, the learner is better able to deal with real life situations. If a learner can problem solve, they may better apply their existing knowledge to a novel situation.

Drawing conclusions one can say that the technological advances of the 1980s and 1990s have enabled designers to move toward a more constructivist approach to design of instruction. One of the most useful tools for the constructivist designer is hypertext and hypermedia because it allows for a branched design rather than a linear format of instruction. Hyperlinks allow for learner control which is crucial to constructivist learning; however, there are some concerns over the novice learner becoming "lost" in a sea of hypermedia. To address this issue, Jonassen and McAlleese note that each phase of knowledge acquisition requires different types of learning and that initial knowledge acquisition is perhaps best served by classical instruction with predetermined learning outcomes, sequenced instructional interaction and criterion-referenced evaluation while the more advanced second phase of knowledge acquisition is more suited to a constructivist environment. (Jonnassen and McAlleese, [On-line]). Further Reigeluth and Chung suggest a prescriptive system which advocates increased learner control. In this method, students have some background knowledge and have been given some instruction in developing their own metacognitive strategies and have some way to return along the path they have taken, should they become "lost"(Davidson, 1998).

Most literature on constructivist design suggests that learners should not simply be let loose in a hypermedia or hypertext environment, but that a mix of old and new that is both objective and constructive instruction design be implemented. Davidson's (1998) article, suggesting a criteria for hypermedia learning based on an "exploration of relevant learning theories", is an example of this method. Having noted the nature of instructional design, one must point out that not all theorists advocate a "mix and match" strategy for instructional design. For instance Bednar, Cunningham, Duffy and Perry challenge such instructional systems design. They for instance question the objectivist ideology completely and have adopted what they consider a constructivist approach to instructional design (Bednar, Cunningham, Duffy & Perry, 1995).

Is There One Best Learning Theory for online Instructional Design as well as for all educational systems?

Learning theories provides the foundation for effective instructional design (Shiffman, 1995). However; depending on the learners, their situation and cultural context, different learning theories may apply. There is therefore the need for instructional designers to understand the strengths and weaknesses of each learning theory to optimize their use in appropriate instructional design strategy. According to Wilson (1997), learning theories are useful because they open our eyes to other possibilities and ways of seeing the world. Whether we realize it or not, the best design decisions are most certainly based on our knowledge of learning theories.

It is worth noting that the function of instructional design is more of an application of theory, rather than a theory itself. Therefore trying to tie Instructional Design to one particular theory is like school vs. the real world. What we learn in a school environment does not always match what is out there in the real world, just as the prescriptions of theory do not always apply in practice. Thus from a holistic point of view, instructional designers find what works and use it depending on their situations and contexts.

In terms of what works and how it can be used to fit into different educational philosophies as well as give some "international" focus in our approach to instructional design depends on several factors. First of all we do not need to abandon the systems approach but we must modify it to accommodate constructivist values. We must allow circumstances surrounding the learning situation to help us decide which approach to learning is most appropriate. It is necessary to realize that some learning problems require highly prescriptive solutions, whereas others are more suited to learner control of the environment (Schwier, 1995). Reigeluth's Elaboration Theory which organizes instruction in increasing order of complexity and moves from prerequisite learning to learner control may work in an approach that combines all the theories, since the learner can be introduced to the main concepts of a course and then move on to more of a self directed study that is meaningful to them and their particular context.

Having compared and contrasted behaviourism, cognitivism and constructivism, Ertmer and Newby (1993) feel that the instructional approach used for novice learners may not be efficiently stimulating for a learner who is familiar with the content. They do not advocate one single learning theory, but stress that instructional strategy and content addressed depend on the level of the learners. They hold the opinion that the strategies promoted by different learning theories overlap, that is the same strategy for a different reason and that learning theory strategies are concentrated along different points of a continuum depending on the focus of the learning theory and the level of cognitive processing required. This implies that instructional designs employed across institutions in a particular country, and even in between countries are likely to vary depending on the type of audience, the context as well as the overall educational philosophy of the institution or country concerned.

6. IMPACT OF E-LEARNING

E-Learning and Student Learning Outcomes

As e-learning grows, so has interest in its effectiveness. E-Learning by itself does not provide guarantees for improving the quality of learning. E-learning is a dynamic and evolutional concept that stems from the concept of traditional learning education, adapted to the specifics of the environment in which the process develops. Therefore, e-learning requires a paradigm change, a model, content, and method of transformation that allows resources and online services, as well as collaboration and long distance exchanges, to be a real added value in the educational process.

Research on the effectiveness of e-learning typically seeks to compare the performance, attitudes, and satisfaction of e-learning students with those of traditional on-campus students (Phipps and Merisotis 1999). Like research on other educational interventions, the e-learning literature largely describe information that is not based on facts or careful study in nature (Hanson et al. 1997), contains a considerable amount of cross-referencing, where many reports and reviews cite similar research or reference each other, and consists of only a rather small body of high-quality original research (Phipps and Merisotis 1999). Three recent reviews of the distance education research offer some insights into its effectiveness. An often-cited report titled; *The No Significant Difference Phenomenon* (Russell 1999) compiles hundreds of sources that indicate that the learning outcomes of e-learning students are similar to the learning outcomes of traditional on campus students. This work also suggests that the attitudes and satisfaction of e-learning students are generally positive. Other reviews of these findings are more critical (Phipps, Wellman, and Merisotis 1998), arguing that there is not conclusive evidence to indicate that student learning outcomes are higher in the vast majority of e-learning settings than in traditional on-campus ones.

Hanson and his colleagues (1997) in their review of the e-learning literature on the impact of e-learning concluded that: a) e-learning is just as effective as traditional education in regards to learner outcomes. b) e-learning learners generally have a more favourable attitude toward e-learning than traditional learners have, and distance learners feel they learn as well as if they were in a regular classroom. c) Successful e-learning learners tend to be abstract learners who are intrinsically motivated and possess internal locus of control. d) Each form of e-learning technology has its own advantages and disadvantages in contributing to the overall quality of the learning experience.

Despite these tentative views, studies comparing the outcomes of e-learning students with traditional on-campus students, while commonly conducted, have been criticized by many as inappropriate (Hanson et al. 1997). This is because it is likely that when different media

treatments of the same informational content to the same students yields similar learning results, the cause of the results can be found in a method which the two treatments share in common giving up your enthusiasm for the belief that media attributes cause learning (Clark 1994, 28). In addition to general concerns about quality and appropriateness, researchers also have identified gaps in the existing research base on e-learning. For instance, according to Phipps and Merisotis (1999) the research on e-learning: i) Often emphasize student outcomes for individual courses rather than for a total academic program; ii) Does not take into account differences among students; iii) Does not adequately explain why the dropout rates of e- learners are higher; iv) Does not take into consideration how the different learning styles of students relate to the use of particular technologies; v) focuses mostly on the impact of individual technologies rather than on the interaction of multiple technologies; vi) Does not include a theoretical or conceptual framework; and vii) Does not adequately address the impact of access to resource materials and support services.

Perraton (2000) notes that one feature of using technology for education is student support services of various kinds. This requirement has both organisational and costs implications and is often labour intensive, even when using different technologies. It follows that learner support is an important consideration when implementing virtual education interventions. Several types of support should be made available to learners. Bester (2001) notes four types: i) Support of all kinds on a regular basis offered by educators both through face-to-face contact and other forms of communication including telephones, the post and computer. ii) Interaction between learners on both a group and on a one-to-one basis. iii) Provision of any necessary learner support in educational courses. iv) Provision of access to the necessary facilities, including a space in which learning activities and interaction between learners can take place, as well as access to computers, laboratories and other resources that might be necessary within the learning process. A fifth type of support necessary for institutions to consider when supporting virtual education is easy access to administration procedures that are necessary when registering and paying for courses and when there is the need to make enquiries.

Elaborating further on the implications of e-learning for Students, it is widely acknowledged that the implementation of e-learning leads to a fundamental shift in learning styles; however research into the effects of this shift is not adequate. Singh and Priola (2001) summarise a number of opposing views. Firstly, Knight (1996) proposes that e-learning will benefit students who are used to being 'spoon fed' on the basis that students become active participants in the learning process. This view is collaborated by Hawkes and Cambre (2000) who argue that in order to gain results, students must take responsibility of their own learning. Secondly, and in contrast to Knight, is the view of Kershaw. Kershaw (1996) proposes that

students will not automatically become conscientious, self motivated individuals and that success in fact depends on the level of interaction between students and lecturers that is required to stimulate good results.

Further, due to the lack of conclusive evidence relating to the effects of a change in learning style, it seems appropriate to assume that not all students respond well to an e-learning environment. Cooper (1999) points out that, independent learners have the potential to be successful in distance education, however those lacking in the skills to study independently or those who posses high levels of self regulated skills will not cope well in a virtual environment. Under such circumstances, institutions implementing e-learning need to be aware that students will react differently to the changing paradigm of learning and rather than implement changes across the board, should aim to offer courses tailored specifically towards the different learning styles and needs of students. In failing to take such action, universities run the risk of low success rates and at worst, failure.

The issue of isolation caused by e-learning has sparked a rigorous debate amongst researchers. The lack of interaction associated with certain e-learning programs is of prime concern to Cooper (1999) who remarks, "electronic contact cannot currently sustain the qualities and multi-dimensionality of the kind of tutor-student relationship that real learning seems to require". This opinion is further supported up Bourner and Flowers (1997) who suggest that if technological developments are to be incorporated into higher education; this should be accompanied by increased human contact. Moore (2000) claims, from experience, that distance learners require a great deal of interaction, although mainly with the purpose of giving reassurance that everything is 'going okay'. According to Michailidou and Economides, (2003) the development of a virtual world motivates students to participate in the educational process by exploring and playing with the lesson material. It can potentially provide an active, independent; student centred and tutor facilitated engagement which enables communication with other students and tutors which may not always be enabled within the traditional classroom setting.

But one must point out that, the critical success factors in an e-learning environment are different to those in a traditional learning environment. As institutions incorporate elements of online learning into degree courses, many are looking in hindsight at the factors that affect the performance of students who enrolled. The findings of such studies are valuable to those institutions planning e-learning strategies. A common theme in the findings of such studies was that students who have prior experience of using information technology will generally be more successful in a virtual learning environment than those who do not (Volery & Lord, 2000). Shabha (2000) extended this line of reasoning by noting that students over the next ten years will

come from a wider age range and background and will have a greater variety of education experience. As such, as the rate of technological progress gathers momentum the skill gap widens and the level of training needed to catch up becomes deeper, creating an instant hurdle for those lacking the necessary skills and expertise. For new e-learning providers it is important then to accommodate students with little prior experience by offering help. This could be in the form of an initial face- to- face session teaching students how to access and use courseware and other electronic resources, and could be supplemented with additional help such as 'pop up' boxes in the electronic course material providing students with direction and advice.

Volery and Lord (2000) also report that the success of the technological infrastructure also has implications for the success of virtual learning, as malfunctioning hardware, software configuration, slow or down servers, busy signals and lack of access are all barriers which can cause frustration for students and ultimately affect the learning process. This issue is difficult to overcome as problems with technology can arise at any time. This challenge is best met by ensuring the functionality of the technological infrastructure before e-learning is implemented. Also the lecturer or a course facilitator should be trained as a 'trouble shooter' at a basic level, and be able to resolve elementary hardware and software issues this is because the instructor is also a major factor contributing to the success of e-learning. According to Webster and Hackley (1997) there are three characteristics of instructors that influence student performance: attitude towards technology; teaching style; and control of the technology. Each of these factors should be taken into account in the identification of suitable lecturers for e-learning programs (Volery & Lord, 2000).

Impact of e-learning on Faculty Members.

It is worth noting that, in the implementation of e-learning programmes, higher educational institutions are demanding a change in the role of faculty members. Traditional teaching and learning skills need to change in order to get maximum benefit from virtual learning (McFadzean, 2001 cited by O'Neill, 2004); hence faculty members are challenged with the task of developing a new model of effective teaching. Many researchers have attempted to lay down the criteria for successful online teaching, although findings are mixed. McFadzean (2001) concentrates on the psychological aspect of learning, suggesting a need to shift from behavioural and cognitive approaches (whereby the lecturer controls the learning) to a constructivist approach, where learners can take control of their own learning. Consequently the role of the lecturer shifts from information provider to supporter – encouraging students to feed their own curiosity. The key message here is that students are not spoon fed, but rather shown the way.

O'Neill, Singh, and O'Donoghue (2004) citing Moore (2001) extends this basic outline by proposing tactics to get learners to successfully take control. This theory involves splitting distance teaching into three phases of activities: preparation, presentation, and participation and cites examples such as, "attend to student motivation and the affective dimension of being a student but do not intervene too much. Establish the culture of independent learning and peer participation". This student focussed approach is not supported across the board. Research carried out by Learning Peaks (2001) implies that in an online environment the role of a lecturer focuses more on administration than teaching. The Learning Peaks study proposes that the four core competencies of an online lecturer are administrator, facilitator, technical support and evaluator. The need to over-come barriers to successful learning, such as technology, time and place, shifts the core focus away from the needs of the student, towards simply making sure that the course operates smoothly.

According to O'Neill, et al; (2004), whilst it is clear that administrative factors require consideration and action, it seems inappropriate and inadvisable to take the focus away from students, particularly during a period of significant change. The implications of e-learning for lecturers are significant and should not be overlooked by institutions implementing such programmes. Lecturers must be provided with sufficient time and resources to ensure that online courses are suitably developed and implemented to meet the needs of students. Alongside this, the transition into new teaching styles must be managed effectively to ensure that lecturers are supported through and beyond the evolutionary period. Extensive discourse over the changing role of lecturers has led to concern about the associated changes in workload. Moore (2000) stresses the importance of this pedagogical and political issue and points out that as more lecturers are required to teach in a virtual environment the question of workload climbs ever closer to the top of the distance education agenda. At its simplest, the answer to the workload question might depend on the propensity of the institution to employ online teaching and moreover, how well the delivery is organised. However, going further it is clear that numerous factors contribute to the workload of a distance teacher, from the amount of time spent authoring the material, to the level of interaction between student and lecturer. Moore (2000) points out that the issue of workload is directly underpinned by the issue of quality, design time to contact time, as well as significant interaction between student and lecturer. This, he argues, will "pay off handsomely in the quality of the learning experience and ultimately the success of the program" (cited by O'Neill et al; 2004)

Empirical research into the workload question presents mixed findings and any comparisons must be made carefully due to differences between the various cases that have been studied. Two studies, carried out in 2000 analysed the time taken to teach a course online

compared with teaching it in a traditional classroom (Moore, 2000). The findings of the two studies were contradictory. The first reported that distance lecturers experienced a reduced workload: 2.7 hours per student compared to 3.2 hours in a conventional setting, whilst according to the second study, lecturers needed nearly twice as much time to teach an online course compared with a traditional course. This contradiction can be explained by the many differences between the studies, including the subject, student's educational backgrounds and the mix of technologies, thus limiting the generalizability of the comparison, except to highlight that many factors contribute to the workload issue. That is not to say that the studies themselves are not of value. It is very important to analyse cases on an individual basis to identify those variables which contribute to the workload, but also those which contribute to the success of the course. This in turn will allow e-learning providers to ensure that adequate resources are not only being provided, but that they are also being used effectively (O'Neill, Singh, and O'Donoghue, 2004).

Thus, if the provision of e-learning is to become a key element of university education, institutions will need to provide a major programme of staff development and training (Copeland, 2001). Training and support is required to ensure that technology can be integrated into daily routines and that its use will be efficient and effective (Wilson, 2001). However, this too will add to workload pressure, particularly for those requiring significant training due to a lack of experience. This pressure is augmented by the continual need for retraining as lecturers struggle to keep up to date with technological progress and since familiarity with technology has a direct impact on the success of online courses, the importance of training cannot be overstressed.

7. E-LEARNING AND INTERNATIONAL KNOWLEDGE TRANSFER

Review of Cultural and Pedagogical Issues.

The various concerns with respect to global e-learning are discussed in a range of recent articles and meetings and reveal a number of controversies which can be summarized as follows:

First; Access and equity- The promise that ICT provides opportunities for better education to more people including those in developing countries in a more cost-effective way is opposed by the warnings concerning the increase of the digital divide (Gladieux & Swail, 1999). Internet access is extremely unevenly spread over countries and regions (US over 50% of households against only 3% in the world at large). And even as it is expected to reach 75% in all advanced countries in five years, only then the real problem arises, because educational ability and cultural capital are extremely unequally distributed and this inequality is amplified by the Internet (Castells, 2001).

Second; Higher education: a trade commodity or a public good - whereas some see e-learning as the next great growth opportunity on the market (Drucker, 2000), others consider

higher education primarily as a public good and responsibility. Moreover, many questions are raised with respect to how commercial courseware can be developed and exploited in ways that are consistent with faculty ownership of the curriculum and how universities could get into the mass market for courseware within the constraints of their own values and structures (Trow, 1997).

Third; unbundling the functions of the university- observations are made that three basic types of universities are emerging: "brick universities,", "click universities", and "brick and click" universities, which are believed to become the most competitive and attractive institutions. Related to this is the fear that the traditional functions of the university, that is, teaching, research, and service could become unbundled, since teaching is the only function that is usually thought of as profitable (Levine, 2000).

Fourth; Quality and quality assurance- It seems inevitable that international virtual provision will be of mixed quality (Twigg, 2001). Consequently, the question is asked whether students should be protected from some potentially poor quality overseas virtual provision, or relies on the market to solve the issue (CVCP, 2000). In addition, it is often emphasised that governments should take their responsibility in quality assurance, accreditation and in consumer protection, especially programs that are delivered from non-accredited institutions from abroad (Collis & van der Wende, 1999). Heterick and Twigg (1997) state that although market forces should be stimulated by deregulation of higher education, at the same time, accountability to the public and to student consumers needs to be established.

Fifth; Cultural and pedagogical issues- While geographical barriers to access are alleviated by ICTs, other barriers to access may be created. International online education should not be restricted to a range of narrowly commercially motivated courses that are targeted to the global elite. And in order to be able to be attractive to students anywhere in the world, there is a need to develop pedagogy that is able to transcend geographical dispersal, cultural and linguistic barriers (Ziguras, 1999).

CHAPTER-3
METHODOLOGY

Aims of Study

This study seeks to explore into the current trends in terms of e-learning technologies and its application as well as the future trends (next 5 years) across Germany, the UK and USA. In that vein, the following objectives were considered:

a) Explore the extent of differences or similarities between the three countries with respect to the available e-learning technologies?
b) Developing an understanding of how e-learning technologies are currently being used or applied to support learning and instruction across the three countries.
c) Explore the technical, managerial and infrastructural factors impeding effective e-learning delivery across the three countries.
d) Explore the impact/ extent to which e-learning has improved higher education (HE) capacity across the three countries.
e) Explore the pedagogical implications for intercultural knowledge transfer, e-learning delivery and improvements for higher educational institutions across the three countries.

Research Design

This study is an explorative one which seeks a descriptive comparison of the three countries. As the aims of this study focused on addressing issues in an emerging field, it was deemed appropriate to use an explorative research design. Explorative research design is a method often used when the problem is unclear or new to researchers. It is best suited for formulating problems, hypotheses or to give a better understanding of a given area. Explorative research design forms the basis of subsequent, conclusive research design methodologies – namely descriptive or causal design (Selnes, 1997 cited by Bekkestua, 2003).While explorative designs do have their strengths, its main weakness lies in its inability to specify relationships between variables. This owes to the lack of theory and insight into the nature of the problem. The strength is high internal validity and "the researcher is the primary instrument for data collection and analysis". It is said that since the researcher is able to adapt and respond to external input, the human instrument is the ideal instrument for collecting and analyzing data (Merriam and Simpson, 1995, p. 98 cited by Bekkestua, 2003).

Research Procedure

The procedure for this study involved the use of both qualitative and quantitative procedures. Yin (1994) described a qualitative research approach as being characterized by its descriptive nature that takes the form of text, in-depth interviews or the use of focus groups. Quantitative studies, on the other hand, involve the extensive use of statistical data and tools. Both methods have been used to provide more precision when interpreting the data collected. By triangulating across data sources, it ensures that the weaknesses of one method were compensated for by the strengths of the other (Halvorsen, 1997). Thus the study employed the following phases of activities in data gathering:

First phase- involved, filtering out quantitative data from secondary sources such as country and international reports, surveys, case studies, reviews and other documents which detail out the activities of e-learning across the three countries covering the period between 2000-2005. Review of such reports was centred on the main indicators of the study which were policy and strategy, e-learning technologies, its applications, didactical approaches, impact, limiting factors and future trends.

Second phase- involved the use of expert interviews to seek further explanations and insights into the state of affairs as portrayed in the reports. The semi-structured interview questions were formulated based on the key issues that emerged from the reports which required further expert explanations and clarifications. The main objective behind this procedure was to identify possible reasons behind the current scenarios that reflect the state of affairs in the three countries and how the situation will look like in the next 5 years. This is because data or information derived from the reports was not elaborate and difficult to read meanings into.

Before proceeding with the expert interviews; a **request for participation letter was sent via e-mail** to several educational technology experts across the three countries after searching through the homepages of several universities across the three countries and reviewing the profiles of experts to ensure that they had sufficient background in the field under discussion. Afterwards, experts who expressed interest (ten from each country) in participating in the research were sent background information of the study, giving the status of information available after the review of reports and the leading questions for the interview. This was followed by fixing of appointments and subsequent conduction of the interview. The interviews (lasted 20-45 minutes) were recorded after seeking permission from the experts. Afterwards they were transcribed for further analysis.

Third phase- involved the process of sorting, categorization of expert opinions and explanations and extraction of conceptual knowledge using the software Maxqda2. It is a powerful tool for Qualitative Data Analysis (QDA) by helping one to systematically evaluate and

interpret texts. It contains functions for searching and retrieving text that has already been coded. This allows a rich set of comparisons to be made. It is also a powerful tool for developing theories as well as testing theoretical conclusions of your analysis. Quantitative outputs entail a list of codes including frequencies, list of coded segments, and variable matrix. Maxqda2 facilitates objective coding, sorting and extraction of texts by enabling team work. For instance, a team member can code a particular text or part of a text which can be transferred to other team members. In terms of working with variables, it enables then to be assigned to documents and is managed as an Excel style table. Search output can be displayed on screen or saved as rich text file.

This procedure was adopted on the background that a number of writers have commented on the depth of substantive research within the field of e-learning, and point to the expansion of its research agenda as a means of strengthening the discipline. Waetjen, in his call for good research in technology education, states that "the plea is to use experimental type research as much as possible" (1992, p. 30 cited by Hoepfl, 1997). More recently, others have called for an expansion in the types of research methods used. Of the 220 reports included in Zuga's review of technology education-related research (1994), only 16 are identified as having used qualitative methods. Johnson (1995) suggests that technology educators "engage in research that probes for deeper understanding rather than examining surface features." He notes that qualitative methodologies are powerful tools for enhancing our understanding of teaching and learning, and that they have "gained increasing acceptance in recent years" (p. 4, ibid). According to Strauss and Corbin (1990), Qualitative analysis results in a different type of knowledge than does quantitative inquiry. All knowledge, including that gained through quantitative research, is referenced in qualities, and that there are many ways to represent our understanding of the world (Eisner, 1991, pp30-31).

Hypothesis

Based on the theoretical frameworks of the Social Construction of Technology (SCOT) and the Social Shaping of Technology (SST) proposed by Pinch and Bijker (1984); Kline (1992), MacKenzie and Wajcman (1985) respectively which assumes that:

i. Technology does not determine human action, but that human action shapes technology,
ii. That technological artefacts are culturally constructed and interpreted which means that not only that there is flexibility in how people think of or interpret artefacts but also that there is flexibility in how artefacts are designed,
iii. That relevant social groups share a particular set of meanings about an artefact,

iv. That in the wider context the socio-cultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to a technological artefact

Therefore the following set of hypotheses was considered in this study:

1) There will be differences in the pedagogical philosophies (concept), strategy and tactics (procedural) between the three countries.
2) There will be differences in the educational models/content/didactics of e-learning products in higher educational institutions across the three countries.
3) There will be differences in the types of e-learning technologies used across the three countries.
4) There will be significant differences in the applications of e-learning technologies across the three countries.
5) There will be differences in terms of the limiting factors and the impact of e-learning across the three countries.
6) Different future scenarios (next 5 years) are likely to emerge in terms of e-learning technologies, its applications and implications for international knowledge transfer.

Sample

Ten (10) educational technology or e-learning experts were interviewed for each country. Thus the total number of expert interviews conducted was thirty (30). For the purpose of dealing with a homogeneous set of experts they were purposively selected from the higher education sector. For a detailed list of the experts please see **attached appendix I.** The experts for the purpose of this study covered individuals who have a comparable education, training, intense occupational experience through practice and research in the field of e-learning. A further criterion was that they were widely recognized as being a reliable source of knowledge, technique, or skill whose judgment is accorded authority and status by the public or their peers.

Commenting on sampling strategies for qualitative research, Patton (1990) argued that purposeful sampling is the dominant strategy in qualitative research. Purposeful sampling seeks information-rich cases which can be studied in depth (cited by Hoepfl, 1997). Patton (1990 pp. 169-183) identifies and describes several types of purposeful sampling including maximum variation sampling, politically important case sampling and convenience sampling. According to Lincoln and Guba (1985), the most useful strategy for the naturalistic approach is maximum variation sampling. This strategy aims at capturing and describing the central themes or principal outcomes that cut across a great deal of participants. It is based on the logic that any common

patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared aspects or impacts of a program (Patton, 1990, p.172).

Expert Interviews- Instrument

A self-developed Semi-Structured interview questionnaire was used to tap expert opinions or ideas. The main indicators and questions asked bothered on the following:

- **Policy and Strategy:** Questions asked covered the conceptualization of e-learning, the forms that e-learning products take, the content of current e-learning programs, orientation of e-learning programs to local and/or international markets, the main philosophy or strategy behind e-learning and the current emerging trends.
- **E-learning Technologies:** Questions asked entailed the prevalent e-learning technologies and the technologies anticipated in the next 5 years.
- **Applications of E-learning Technologies:** Questions addressed the specific ways that the prevalent technologies are applied and the tendency that there will be a change in the trend of applications.
- **Pedagogical Approaches:** Questions focused on whether the existing e-learning products make use of a uniform pedagogical approach(s), the approaches being employed and whether such pedagogical approaches fitted into the educational philosophies of other countries.
- **Impact of E-learning:** Questions focused on the extent to which e- learning has become part off and improved higher education capacity in your country in the last 5 years in the context of the delivery of higher education nationally and internationally, impacting on the role of faculty members and improving student learning outcomes. Further anticipations in the next 5 years were also sought.
- **Limiting Factors:** Questions looked at the factors currently hindering the effective use of e-learning by higher educational institutions to meet national and international educational needs as well as the strategic options for overcoming itemized obstacles in the next 5 years.
- **Future Trends/Scenarios:** Questions examined the future trends (next 5 years) of e-learning technologies and its applications and the implications for international knowledge transfer.

Qualitative Data Extraction and Analysis

Bogdan and Biklen define qualitative data analysis as "working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is

important and what is to be learned, and deciding what you will tell others" (1982, p.145). Qualitative researchers tend to use inductive analysis of data, meaning that the critical themes emerge out of the data (Patton, 1990).

Grounded Theory

The phrase "grounded theory" refers to theory that is developed inductively from a corpus of data. If done well, this means that the resulting theory at least fits one dataset perfectly. This contrasts with theory derived deductively from grand theory, without the help of data, and which could therefore turn out to fit no data at all (Steve Borgatti, n: d). In their classic text Discovery of Grounded Theory, Glaser and Strauss (1967) describe what they believe to be the primary goal of qualitative research, "the generation of theory, rather than theory testing or mere description". They claim that one of the requisite properties of grounded theory is that it be "sufficiently general to be applicable to a multitude of diverse situations within the substantive area" (p. 237). This approach represents a somewhat extreme form of naturalistic inquiry. It is not necessary to insist that the product of qualitative inquiry be a theory that will apply to a "multitude of diverse situations." In terms of goals and perspective Grounded theory approaches are becoming increasingly common in the research literature because the method is extremely useful in developing context-based, process-oriented descriptions and explanations of the phenomenon (see, for example, Orlikowski, 1993). Grounded theory takes a case rather than variable perspective, although the distinction is nearly impossible to draw. This means in part that the researcher takes different cases to be wholes, in which the variables interact as a unit to produce certain outcomes. A case-oriented perspective tends to assume that variables interact in complex ways. Part and parcel of the case-orientation is a comparative orientation. Cases similar on many variables but with different outcomes are compared to see where the key causal differences may lie. Similarly, cases that have the same outcome are examined to see which conditions they all have in common, thereby revealing necessary causes.

Grounded Theory and Coding Methods

All grounded theory studies use a data coding scheme. Qualitative methods use codes to categorize data rather than to quantify it. Therefore, the number of times an individual comment is categorized is less relevant. Different methods of coding are effective in different contexts (Calloway and Knapp, n: d). The main types include: a) Open coding- is the part of the analysis concerned with identifying, naming, categorizing and describing phenomena found in the text. Each line, sentence, paragraph etc. is read in search of the answer to the question? b) Axial Coding- is the process of relating categories and properties to each other, via a combination of inductive and deductive thinking. To simplify this process, rather than look for any and all kind of relations, grounded theorists emphasize causal relationships, and fit things into a basic frame

of generic relationships. c) Selective Coding- is the process of choosing one category to be the core category, and relating all other categories to that category.

Strauss and Corbin (1990) consider that paying attention to processes is vital. This entails appropriately describing and coding everything that is dynamic; changing, moving, or occurring over time in the research setting. Consequently this study employed a combination of open, axial and selective coding approaches based on Maxqda's hierarchical coding structure to categorize and sort texts of key ideas and relationships in line with the main indicators of the study.

Validation of Qualitative Results

To ensure the validity as well as the overall reliability of the process of categorizing, sorting and extraction of conceptual knowledge using Maxqda2, the following processes were adapted. I) I worked through a coding schema alone and then together with a colleague (Owusu Boateng), a graduate student to ensure that the categories clearly reflect all issues raised across the interviews. II) I held further discussions with another colleague (Joel Schmidt) on the extracts of major categories of repeating ideas relating to each theme as well as the interpretations of texts to enhance objectivity and reduce the effect of researcher bias. Find sample screenshots are below:

Figure 5: Sample screen shot of structure of work in Maxqda2.

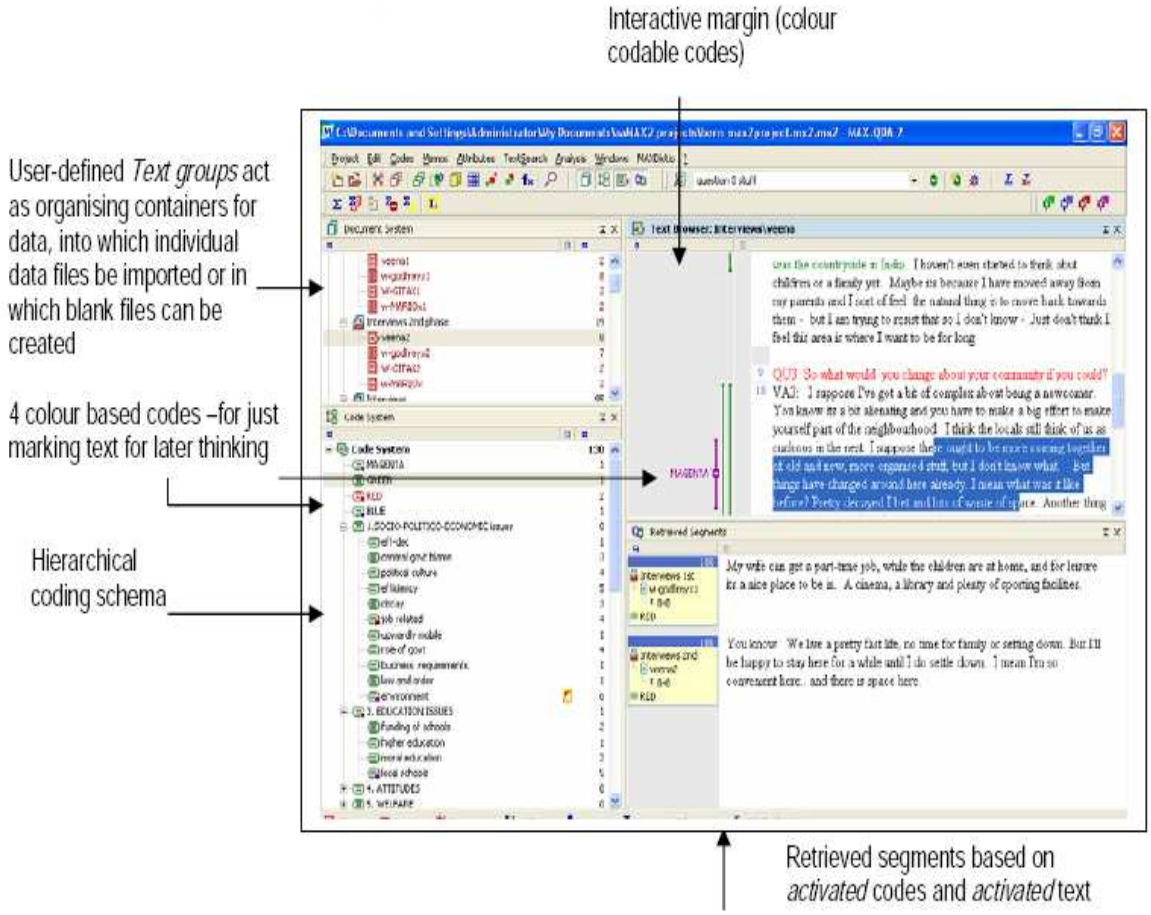
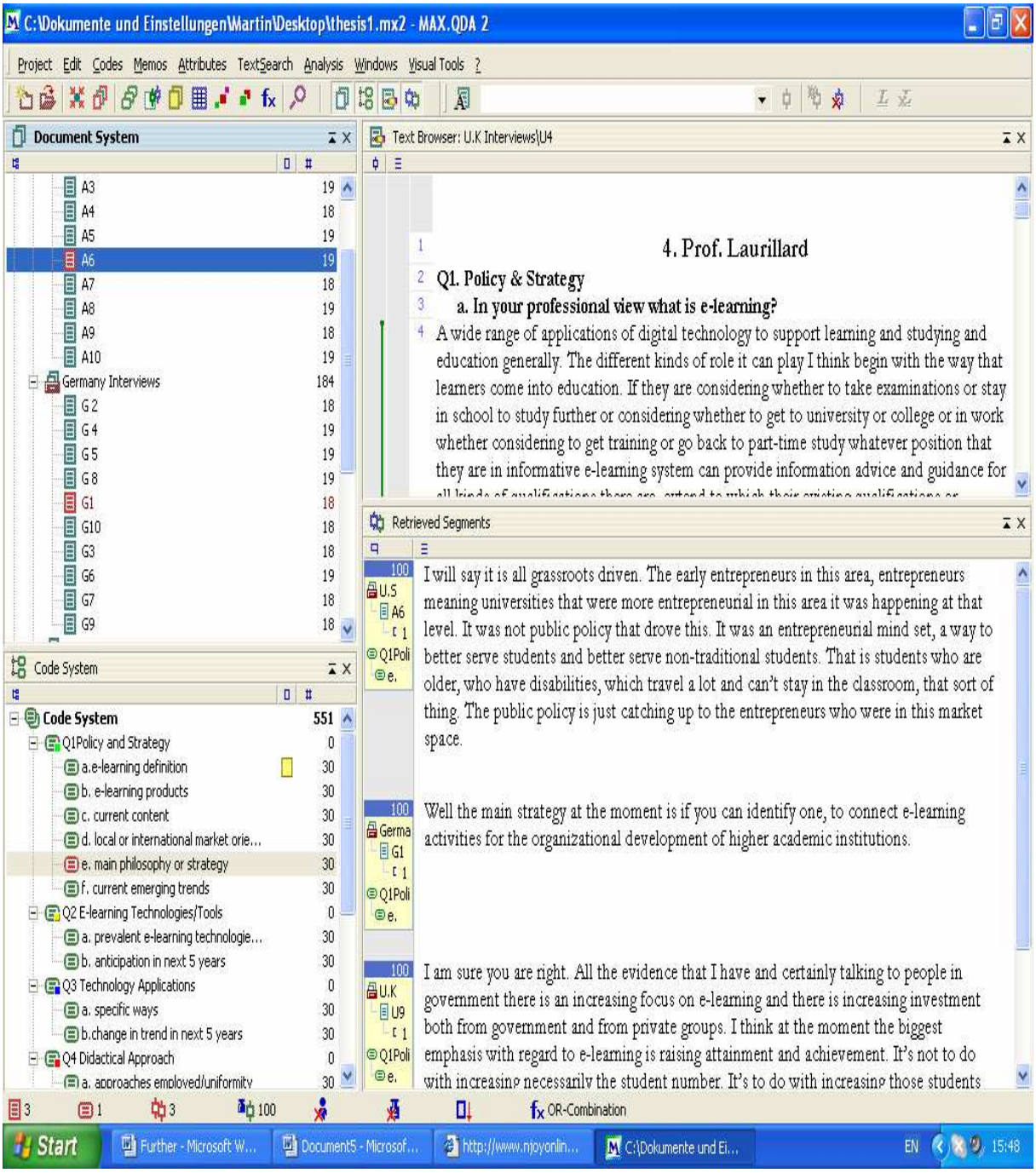


Figure 6: Sample screenshot of Qualitative Analysis



CHAPTER 4
ANALYSIS AND RESULTS

REVIEW OF QUANTITATIVE REPORTS-UK

SURVEY 1:
SURVEY INTO INFORMATION AND LEARNING TECHNOLOGY PROVISION, ACCESS AND POLICY IN EXTERNAL INSTITUTIONS A REPORT TO THE LEARNING AND SKILLS COUNCIL (BECTA, 2001).

This survey conducted in March, 2001 by the British Educational Communications and Technology Agency (BECTA) was to make an assessment of the current state of ILT provision within the sector. External institutions within this context are heterogeneous, multi-funded organisations primarily addressing an adult, often educationally disadvantaged, part-time clientele. The study is based on a questionnaire sent to all External Institutions that had received FEFC funding in 2000/2001, to which 69 institutions (around 34%) responded in time for inclusion in the analysis out of 204 nationally. Over 1 million students attend these institutions across the country, for around 40 million learning hours which makes it a significant sector.

A: POLICY & STRATEGY

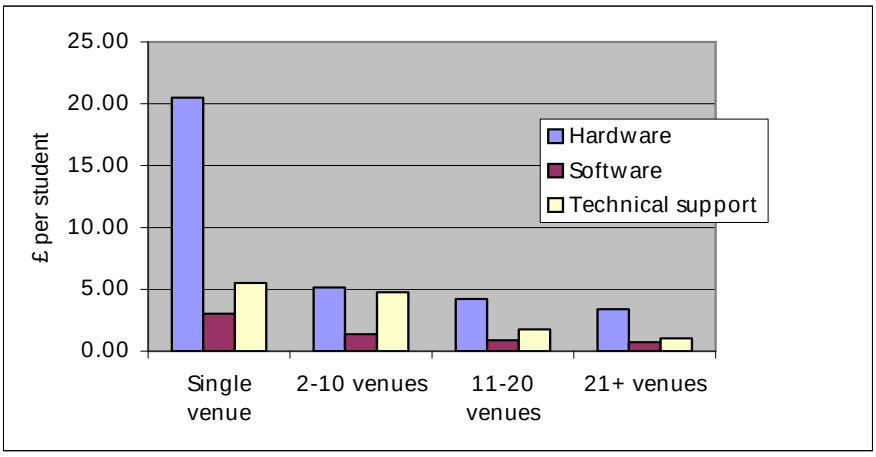
According to the survey, just over one third of institutions have a written ICT policy, though that proportion drops to less than one fifth who has a formal policy for ILT. A number of respondents noted in the margin that responsibility for the technology they used fell outside the institution and lies for instance with a Local Education Authority (LEA) or other institutions, and therefore they had no say in technology policy. Five respondents felt that a senior management commitment was an important enabler of ILT development.

ICT Expenditure

In terms of ICT expenditure which is driven by policy and strategic approaches of government funding councils and institutional strategy, the report indicates that, the total spend on ICT for survey sample amounts to £1,370,000 on hardware, £300,000 on software, £590,000 on technical support, and £160,000 on staff development. This extrapolates to £4m on hardware, £1m on software, £2m on technical support, and £0.5m on staff development. This particular question elicited a response from only 80% of institutions (60% in the case of staff development expenditure). However, a lower response to these particular questions and the wide variation of

expenditure and the diversity of work carried out by the institutions, these extrapolated figures should be taken as a broad indicator only.

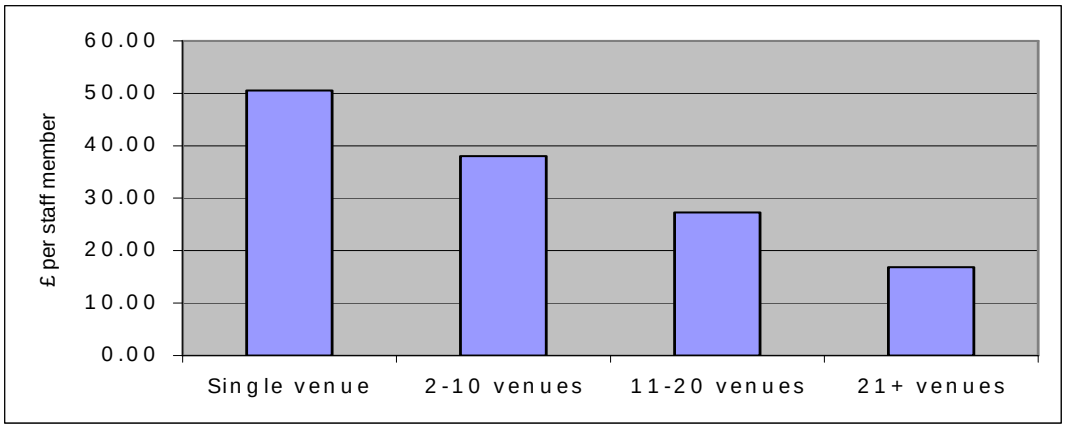
Figure 4: ICT expenditure per student



Source Becta, 2001

As depicted above, one can notice that there is a dramatic fall in the level of ICT expenditure per student as the size of institution increases. This indicates that larger institutions can spread the use of ICT (and its associated costs) across a larger student body.

Figure 5: Staff Development Expenditure per member of teaching staff



Source: Becta, 2001.

Staff development expenditure per individual teaching staff member also falls as the size of institution increases. The larger institutions may be in a better position to run in-house programmes for groups of staff, whereas smaller institutions will have to make use of commercially available courses. However, it must be pointed out that Expenditure on staff development was only given by 60% of respondents. It is impossible therefore to ascertain the level of expenditure of the remaining 40%.

B: E-LEARNING TECHNOLOGIES AND APPLICATIONS

In terms of the types of technologies employed, **Table 3** below gives the details:

Table 3: E-learning technologies

ICT	Currently used	Plan to buy	High priority
Electronic whiteboards	14%	58%	16%
Video conferencing	6%	42%	4%
Digital TVs	1%	33%	7%
Digital/data projectors	48%	55%	23%
Email	80%	45%	32%

Base = No of respondents

(Source: Becta, 2001)

According to the figures above, Email is very widely used and more than the remainder have high priority plans to buy. Just under half use data projectors and over half plan to buy. One institution in seven uses electronic whiteboards and a similar number regard them as high priority purchases to be made. Small numbers of institutions use digital TVs and video conferencing, and though large numbers plan to buy, it is not a priority for them. Some other technologies used include digital cameras being the most popular, used by 4% of institutions.

Types and Nature of Programs

Table 4: Average number of course types offered per institution

	Single venue	2-10 venues	11-20 venues	21+ venues
Course types offered	6.2	9.6	12.8	14.1
Course types using ILT	1.8	4.2	4.4	5.6
% to use ILT	29%	43%	35%	40%

Source, BECTA, 2001

From the table above one can see that larger institutions offer a larger range of courses, and a larger range of courses that make use of ILT. This increased number and range of course offering probably enables the larger institutions to spread the cost of higher specification computers and justify the purchase of more sophisticated software.

In terms of specific subject areas Table 5, shows the details according to the survey:

Table 5: ILT use for Non-Schedule 2 courses

Course type	Deliver this	Use ILT	% to use ILT
Office/business	49	43	88%
Languages	48	18	38%
Humanities	47	9	19%

Physical Education/sport/fitness	50	0	0%
Practical skills/crafts	53	7	13%
Role education (not independent living)	28	5	18%
Independent living and communication	42	25	60%
All other NS 2	37	8	22%

Base = No of respondents

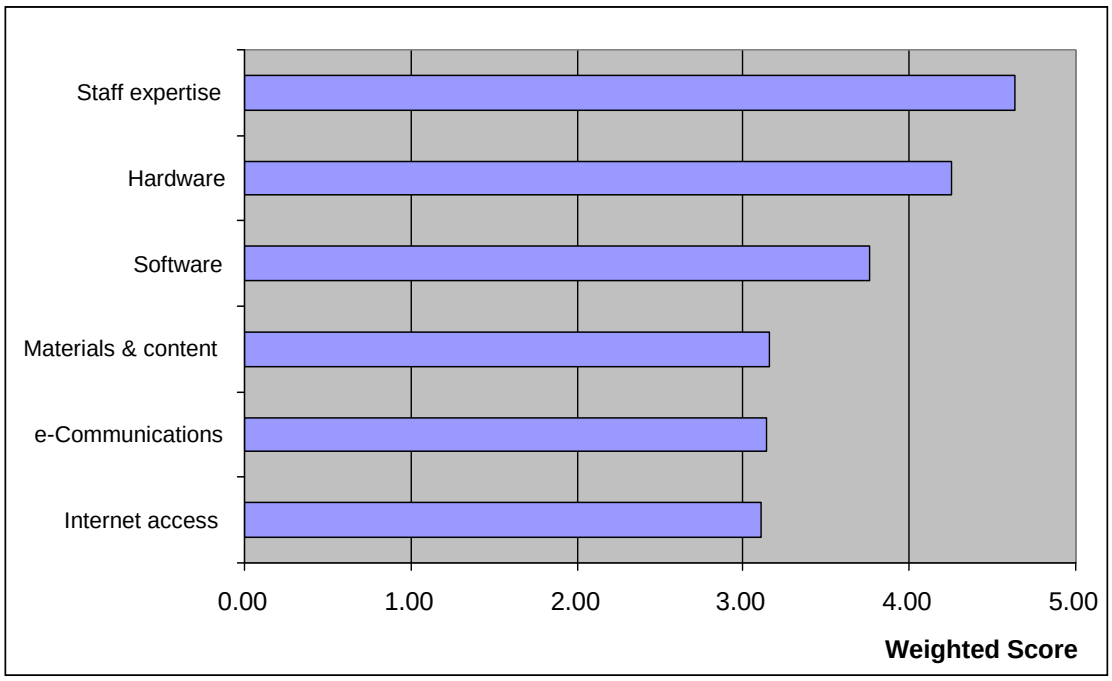
(Source, BECTA, 2001)

From the table above one can see that Business and office skills courses and Basic Education are the most common users of ILT, with nearly 90% of institutions who provide these types of courses. Independent living and communication skills courses also commonly use some ILT, over 70% of providers making some use of ILT. Physical education courses make least use of ILT, with none of the 50 providers of these courses using ILT.

C: FUTURE DEVELOPMENT/TRENDS

In terms of intended future developments of e-learning in this sector the following details are extracted from the report. Figure 6 below gives details of resources in most need of development.

Figure 6: Resources in most need of development



Source: Becta, June 2001

Thus as highlighted above: a) Staff expertise is the aspect of ILT most in need of development. This is because it is seen as the key enabler for both teaching and administrative staff. b) Hardware is the second most important area for development, especially for learning delivery. Software is also important for both delivery of learning and for administration. c) Access to computers and their availability for community use is an issue for delivery of learning.

In effect, according to the report these priorities indicate that the external institutions are at a relatively early stage of ICT development, requiring a robust infrastructure to be put in place before higher-level applications can be developed.

Enablers and Barriers to ICT Development and Integration into Learning

According to the survey the following factors come up:

Table 6: Enablers and barriers to ICT development.

	Delivery of learning		Administration	
Issues	Enabler of ICT	Barrier to ICT	Enabler of ICT	Barrier to ICT
Physical infrastructure issues				
Access and availability	17%	19%	1%	0%
Buildings and accommodation	3%	13%	4%	20%
Use of school facilities	4%	10%	0%	0%
Capacity problems	0%	13%	0%	0%
Demand from students	3%	0%	0%	0%
Technology infrastructure issues				
Hardware	30%	22%	14%	12%
Software	20%	16%	19%	22%
Networks	13%	7%	20%	19%
MIS	0%	0%	13%	12%
Staffing issues				
Staff expertise and attitudes	10%	30%	30%	30%
Part-time staffing issues	3%	12%	0%	1%
Motivation of staff	16%	7%	6%	0%
Staff time	3%	0%	6%	17%
Staff training	46%	23%	38%	22%
Management commitment	6%	0%	7%	0%
Support issues				

Technical support	9%	17%	9%	12%
Student issues				
Student perceptions/technophobia	0%	3%	0%	0%

(Source: Becta, 2001)

From the data above, Staff expertise and attitudes are seen as important for both teaching and administration staff. Issues concerning the high numbers of part-time staff in the sector and staff motivation are especially important for the delivery of learning, and issues of staff time are important for administration. Staff training and development is seen as the major enabler for both teaching and administrative staff (and the lack of training a significant barrier). Course materials and content are not seen as priority areas for ICT development.

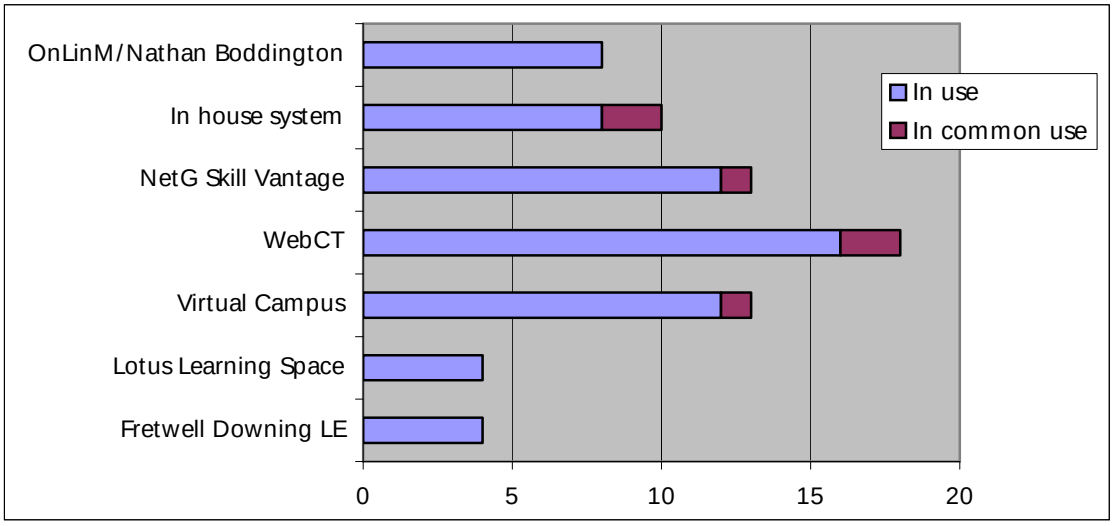
SURVEY 2

FURTHER EDUCATION IN TRANSITION REPORT TO THE FURTHER EDUCATION ILT COMMITTEE OF A SURVEY INTO INFORMATION AND LEARNING TECHNOLOGY PROVISION, ACCESS AND POLICY IN FE COLLEGES IN ENGLAND (BECTA, SEPT, 2000).

This study by the BECTA in Sept, 2000, seeks to provide further insights into the kinds of e-learning technologies employed by the further education sector in England. The survey covered 274 Colleges (65% of the Sector) who submitted completed questionnaires in time for inclusion in the analysis. 110 colleges (40% of the analysed data set) submitted their replies electronically using the web- based version of the questionnaire. 111 of the respondents further contributed to a supplementary telephone survey. This high response rate and the large sample obtained closely reflect the larger population and afford a high degree of reliability to the conclusions drawn in the report.

A specific aspect of the report filtered relates to the **e-learning technologies** employed in this sector. The e-learning technologies reflected specifically in this report cover the use of Virtual Learning Environments (VLEs). VLEs are referred to in this study as software packages that constitute an environment in which to deliver online learning. The survey suggests that whilst VLEs are not as widely used as tracking software, they are becoming increasingly widespread. Nearly 30% of respondents stated that such systems are already used to deliver on-line learning. Of these colleges, a significant minority use more than one type of software (78 colleges shared 111 instances of VLEs being used). 8 cases of common use were reported in seven colleges, one college reporting common use of two systems. The following chart shows the main VLEs in use in colleges.

Figure 7: Virtual Learning Environments: market leaders



Base = No of respondents

(Source: Becta, 2000)

As reflected in the Figure above, WebCT is the most common amongst this sample, with Virtual Campus and NetG Skill Vantage also well used. It is worth noting that the numbers here are relatively small, WebCT being cited by 18 respondents, with Virtual Campus and NetG Skill Vantage each cited by 13. 10 respondents use in-house systems and 8 uses the North Yorkshire and Humberside colleges' OnLinM system. Again 27 other systems were mentioned, none of which were used by more than 4 colleges. Learndirect was included by 4 colleges.

SURVEY 3

THE STATE OF ILT IN FE COLLEGES: REPORT TO THE NATIONAL LEARNING NETWORK PROGRAMME BOARD OF A SURVEY INTO INFORMATION AND LEARNING TECHNOLOGY PROVISION, ACCESS AND POLICY IN FE COLLEGES IN ENGLAND WITH ADDITIONAL INFORMATION DRAWN FROM UPDATED COLLEGE ILT STRATEGIES (BECTA, NOV, 2001).

A: POLICY AND STRATEGY

Colleges within the sector were asked to submit an update of their ILT strategy, noting any significant changes over the intervening period and identifying any particular achievements or problems. This section looks to use the themes and messages that emerged from the whole body of strategy update information as qualitative data to supplement and illuminate the quantitative responses to the survey.

In terms of vision for ILT few colleges revisited their vision statements. A small minority of colleges articulated a clear vision of the impact of ILT on the student experience and learning

outcomes. There is continuing confusion, moreover, about the concepts of IT, ICT and ILT and the differences between these. The notion that ILT must be embedded into a whole college teaching and learning strategy is, however, beginning to have an impact on colleges, particularly those with active Champions working to a clear brief from senior management. Many colleges see ILT as a tool for improving retention and achievement, but lack a coherent model of how this might be brought about. An increasing number recognize that ILT can contribute to the achievement of some mission-critical goals, such as widening participation. There is, however, little evidence of systematic evaluation of the impact of ILT on learning, or indeed on any other college outputs or processes.

In terms of managing the Strategy nearly all colleges have a cross-college management / steering group for ILT. Regardless of hierarchy and reporting arrangements, ILT Champions are mentioned as central to the management of the ILT strategy and in the majority of colleges have an input into the strategic process, which is seen as strength. An increasing number of colleges mention the role of Governors and Corporation involvement in ILT and managing the strategy; this however is often limited to finance and/or policy issues. According to the survey ILT Champions are now to be found in 92% of sector colleges. 48% of colleges also have a Senior Management ILT Champion. The median number of Champions in a college is 3, with the Interquartile range (the middle 50% of colleges) stretching from 2 to 7, whilst the top 10% have more than 12, with 40 the maximum number recorded.

The Table below shows the reporting arrangements and organizational boundaries of Champions.

Table 7: Management of Champions

Report to		**Operate**	
Principal	4	Within departments	30
Vice Principal	27	Cross college	14
Department Heads	20	Both	53
IT/ ILT Manager	27	Other	3
Staff Development	6		
Other	16		

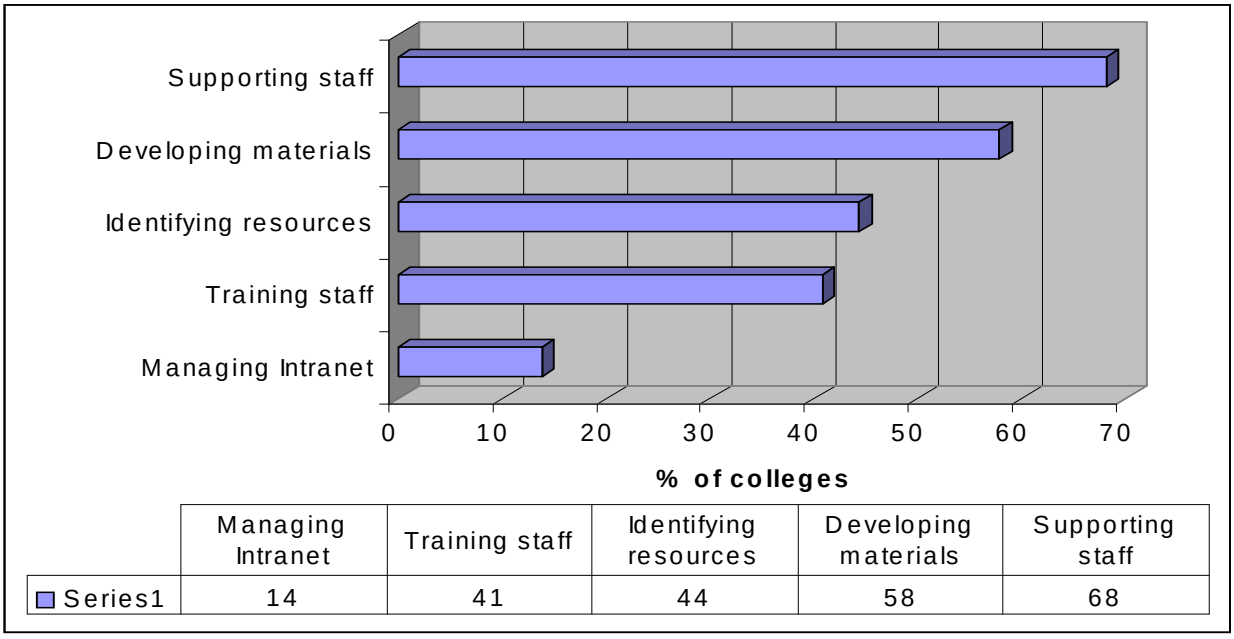
Data = % of colleges with Champions

(Source, BECTA, 2001)

From the data above, in 4% of the colleges the Champion reports directly to the Principal. In general the wide range of reporting arrangements reflects the variety of organisational structure

within the sector. Over half of the colleges look to their Champions to have a brief which extends beyond their own Department, with only 1 in 7 making it an explicitly cross-college function without Departmental ties. The Figure below shows the major functions that Champions perform.

Figure 8: The key tasks of ILT Champions



	Managing Intranet	Training staff	Identifying resources	Developing materials	Supporting staff
Series1	14	41	44	58	68

(Source: Becta, Nov 2001)

From the Figure above one can see that there was considerable variation in the nature and number of functions undertaken by Champions. The most frequently cited functions are support of staff, development of materials and identification of resources. Support of staff is reported as part of the Champions role by two out of three colleges. Materials production (58%) and discovery (44%) emerge as significant roles. 32 colleges have Champions whose sole function is one or other of these learning content development roles. Contributing to the training of staff is the other key function, carried out by Champions in 41% of colleges. The most common key tasks see the Champions combine either materials development or materials discovery with training and other support for staff (20% of colleges) or both materials development and discovery with staff support (23%). It seems reasonable to infer that the most pressing current issue for Champions in the majority of colleges is helping to find suitable content and to support staff in its use. It seems equally plausible to suggest a causal connection between this focus of Champion activity and the increased funding for in-house materials development.

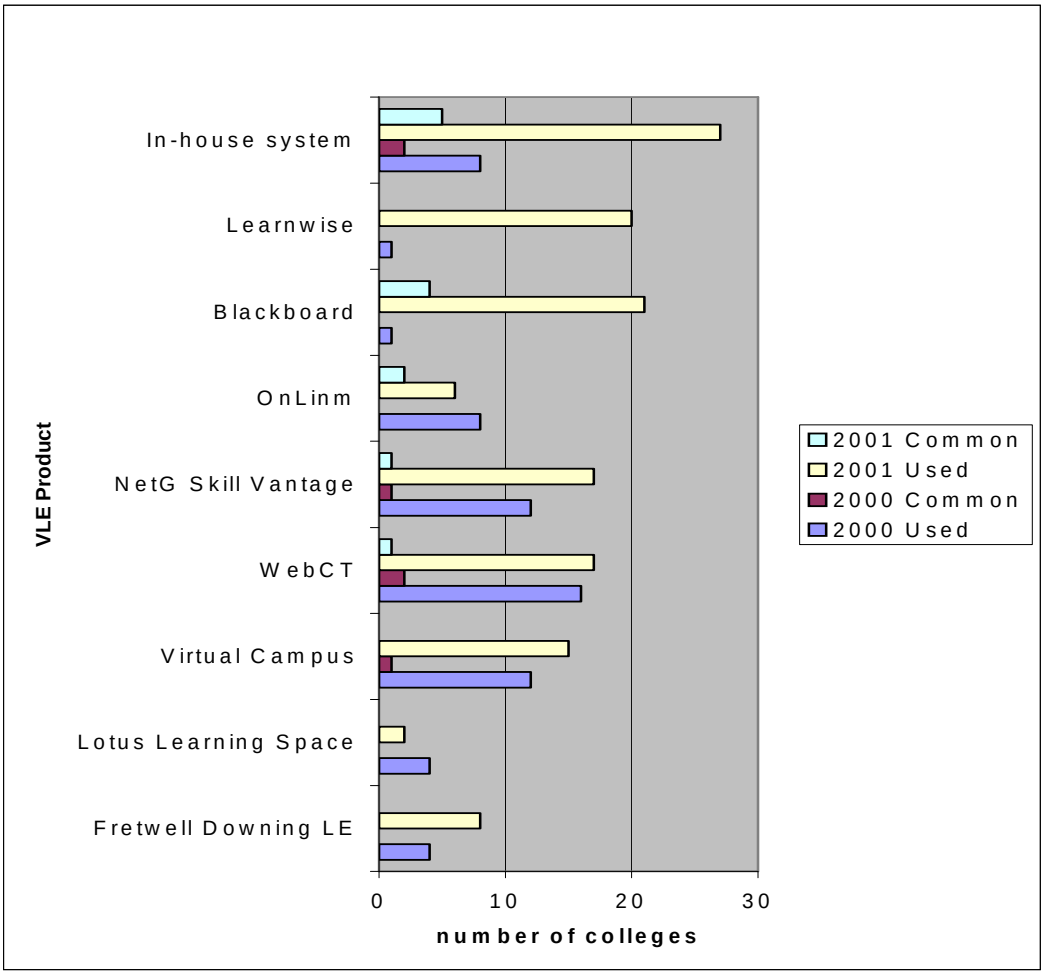
B: E-LEARNING TECHNOLOGIES

Virtual Learning Environments

The survey used the term Virtual Learning Environments (VLE) as the sector's preferred term for software packages that constitute an environment in which to deliver online learning. 51

% of respondents stated that they currently use a VLE, a substantial increase on the 30% who were using them last year, though only 13 colleges describe their use as common practice. Colleges that use a VLE often have more than one: last year 78 colleges accounted for 111 VLEs. In 2001, 121 colleges shared 180 between them. However a striking difference emerged between different types of college in their adoption of VLEs. The Figure below lists the most commonly cited VLEs in use in colleges.

Figure 9: Most commonly cited VLEs in use



(Source: becta, 2001)

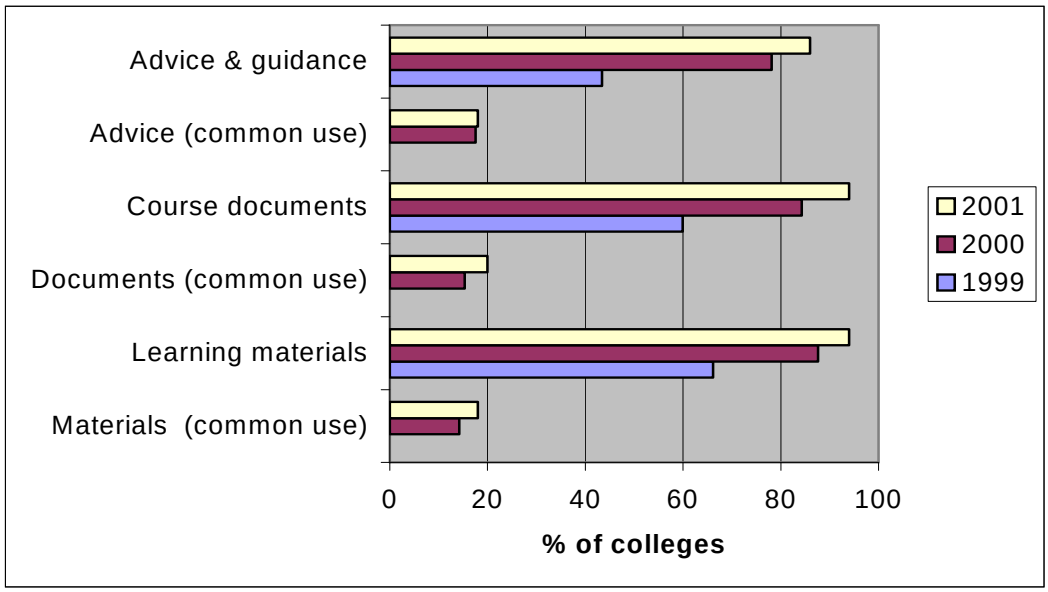
From the Figure above the most commonly cited commercial systems were Blackboard with 14% and Learnwise with 11%, both building from relatively small market share in 2000. WebCT, Virtual Campus and NetG Skill Vantage continued to be well used in 2001, each accounting for between 8% and 10% of the systems in use. The development and use of in house systems has increased, with 32 colleges accounting for just over 17% of the total systems reported, compared with only 10 in-house developments noted in 2000. 16% of the in-house developments were reported to be in common use, with Blackboard accounting for the same percentage. The OnLinM community, based around Nathan Boddington's system developed at

Leeds University, boasts the highest proportion of common usage at 25%, with 2 of the reported 8 systems so described by their colleges.

B: APPLICATION OF E-LEARNING TECHNOLOGIES

The survey asked respondents to distinguish whether particular applications were *in use* (intermittent, occasional, and small in scale) or whether they could be described as common practice within the institution. Use by staff of the college LAN for email and Internet access is now virtually universal, both being reported by 99% of sector colleges. Staff accessing the Internet is described as common practice in 90% of colleges, a rise from 75% in 2000, whilst staff use of email is common in 82% of colleges (*2000 =61%*). Equally significant, though smaller in scale, are increases reported in the use being made of networked applications to directly support learning and teaching, through storage and delivery of learning materials, advice and guidance and as a repository of course documentation.

Figure 10: Teaching and Learning uses of LAN



(Source: BECTA, 2001)

The Table below also shows the dramatic increase in use of the LAN for these three areas of activity since 1999. The number of colleges in which staff makes use of the LAN for advice and guidance has exactly doubled over the period, going from 43% to 86%. A total of 94% of colleges now make some use of the LAN for both learning materials and course document storage and access (*1999 = 66%, 60% respectively*). The extent of common use is less, but the data suggest that staffs in nearly 20% of colleges are engaging in online delivery and support of learning as a regular part of professional practice.

Table 8: Uses of the LAN/ Intranet by Staff

	2001		2000		1999	
	Used	Common	Used	Common	Used	Common
Email	**99**	**82**	98	61	91	
Learning materials	**94**	**18**	88	14	66	
Course documents	**94**	**20**	84	15	60	
Advice & guidance	**86**	**17**	78	18	43	
Internet access	**99**	**90**	99	76	89	
Videoconferencing	**33**	**1**	36	0	19	

(Source: Becta, 2001)

From the Table above, videoconferencing is in evidence in one-third of colleges (19% in 1999), a slight fall on last year, but has only been taken into common practice by 1%. College strategy documents suggest that where videoconferencing is used, it is typically to facilitate meetings between staff rather than to support learners.

SURVEY 4

ILT IN FURTHER EDUCATION: LAYING THE FOUNDATIONS FOR E-LEARNING: A REPORT TO THE JOINT IMPLEMENTATION GROUP OF THE NATIONAL LEARNING NETWORK (BECTA, JULY 2003).

This study was carried out from February through to June 2003 on behalf of the *Learning and Skills Council (LSC).* It sought to assess progress in the provision of ILT within the Further Education sector along with the extent to which this provision is integrated into the teaching and learning process. Three previous studies, undertaken in February 1999, September 2000 and September 2001, provide comparative data to judge the impact of the deployment National Learning Network NLN monies for the development of ILT infrastructure in the sector.

In all 256 colleges (64% of the sector) responded to the ILT monitoring survey and 197 colleges (49% of the sector responded to the ILT expenditure survey). A further 13 colleges responded to the ILT monitoring survey and 9 to the expenditure survey, but were too late to be included in this analysis. The report also identifies a new set of challenges for college management. Firstly, the large investment in colleges' technology infrastructure since 1999 has been slow to have a widespread impact on teaching and learning practice. The survey identified a number of examples: the use of virtual learning environments (VLEs) or of electronic learning materials with students' remains at low levels. But on the whole this report shows that there is a

robust ILT infrastructure across the Further Education sector. The details of the findings are as follows:

A: POLICY AND STRATEGY

Expenditure on Information and Learning Technologies

Colleges found the expenditure survey difficult. For most colleges, once funding has been received it is subsumed within the overall budget and unless tracking back is a specific requirement, it can prove to be very difficult. As a result several colleges identified all expenditure as emanating from college funds. Funding from external sources may therefore be slightly understated. The total expenditure figure of £206m calculated in the Table below compares with £177m reported in an unpublished study in 1999, therefore representing a 17% increase in ILT expenditure since that time. Stripping out the staff related costs, the 2003 figure for hardware, software and systems is £141m compared to £171m in 1999, a 17% decrease in expenditure over the four years.

TABLE 9: ILT Expenditure for the FE sector 2001/2002 (£millions)

Source of Funding	**NLN Monies**	**College Funds**	**Standards Fund**	**Other Sources**	**Totals**	*% of Total*
Major Information Systems						
Student records	0.40	11.40	0.31	0.00	12.11	
Human resources	0.07	2.20	0.20	0.06	2.53	
Finance	0.04	4.51	0.22	0.00	4.77	
Other	0.55	4.06	0.54	0.77	5.92	
Totals for Info. Systems	**1.06**	**22.18**	**1.27**	**0.82**	**25.33**	*12%*
% of Info Systems spend	*4%*	*88%*	*5%*	*3%*		
General ILT Expenditure						
Hardware						
Classroom equipment	5.51	37.95	5.06	5.82	54.34	
LRC equipment	1.32	6.48	0.44	0.98	9.21	
Other	3.42	16.69	1.82	1.66	23.59	
Totals for Hardware	**10.25**	**61.11**	**7.32**	**8.46**	**87.13**	*42%*
% of Hardware spend	*12%*	*70%*	*8%*	*10%*		
Software						
Externally produced learning materials	0.27	1.52	0.39	0.24	2.42	

Internally produced learning materials	1.24	2.90	0.90	1.36	6.39	
Leaning management software	1.32	3.44	0.41	0.22	5.39	
LRC software and licenses	0.18	2.24	0.30	0.06	2.77	
Other software and licenses	0.65	11.54	0.14	0.41	12.74	
Totals for Software	**3.67**	**21.65**	**2.13**	**2.28**	**29.72**	*14%*
% of Software spend	*12%*	*73%*	*7%*	*8%*		
ILT Staff Costs						
Learning resources support	0.06	15.38	0.43	0.14	16.01	
Business support	0.05	11.95	0.15	0.02	12.18	
ILT Champions	0.21	3.17	0.88	0.02	4.27	
Management of ILT	0.04	8.34	0.31	0.15	8.85	
Other ILT related staff costs	0.10	9.13	0.24	0.04	9.50	
Totals for ILT Staffing	**0.46**	**47.97**	**2.01**	**0.37**	**50.82**	*25%*
% of ILT Staffing spend	*1%*	*94%*	*4%*	*1%*		
Technical Support Staff Training						
Technician training	0.24	0.73	0.61	0.03	1.62	
Externally -provided training	0.11	0.90	0.51	0.01	1.53	
Training staff costs	0.07	0.91	0.49	0.04	1.51	
Totals for TS Training	**0.42**	**2.54**	**1.61**	**0.09**	**4.66**	*2%*
% of TS Training spend	*9%*	*55%*	*35%*	*2%*		
ILT Staff Training						
Externally -provided training	0.03	1.64	1.13	0.02	2.82	
Training staff costs	0.03	3.58	1.98	0.07	5.66	
Totals for ILT Training	**0.06**	**5.22**	**3.10**	**0.10**	**8.48**	*4%*
% of ILT Training spend	*1%*	*62%*	*37%*	*1%*		
Total Expenditure	**15.91**	**160.67**	**17.44**	**12.12**	**206.14**	*100%*
% of Total Expenditure	8%	78%	8%	6%		

Source: Becta, 2003

According to the report over three quarters of ILT expenditure comes out of the general college budget, with NLN, Standards Fund and funding from external sources accounting for the rest at around 7-8% each. The "other" funding, mainly from EU and Lottery sources, is often

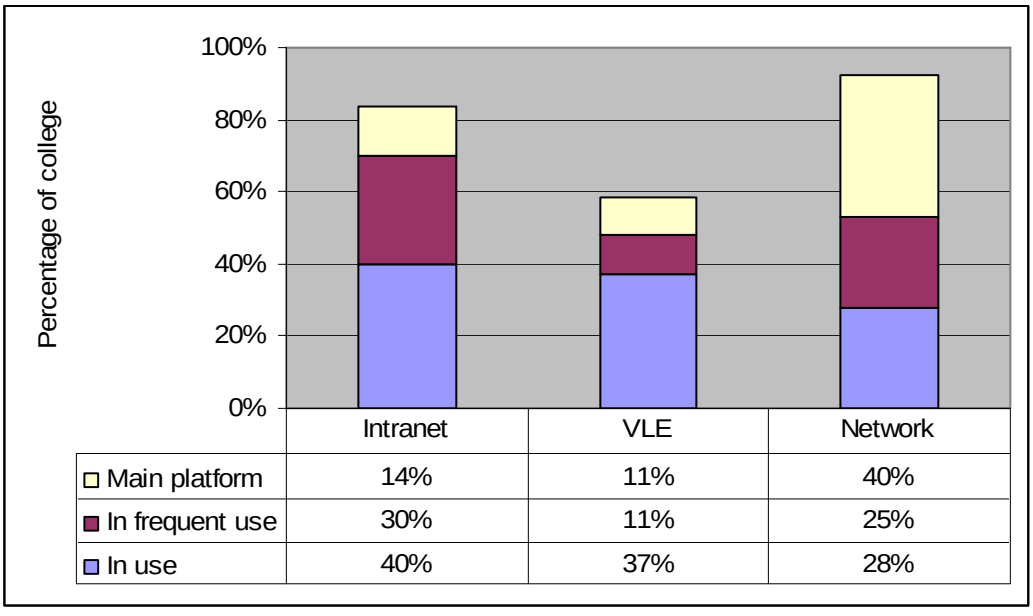
tied to capital projects, therefore accounting for 10% of expenditure on hardware. The NLN funding, being technology-oriented, again accounts for 12% of the expenditure on both hardware and software. The Standards Fund, on the other hand, is shown to be an extremely important source of funding for training, accounting for over one third of expenditure on both technician and staff training in ILT. Staffing costs, being a recurrent expense, are overwhelmingly funded out of the general college budget and, as several respondents found it difficult to disentangle "ILT-related" staff costs from staff costs generally, the 94% figure stated here is probably an under-statement.

B: E-LEARNING TECHNOLOGIES

Learning platforms

Colleges were asked to indicate the types of learning platform in use at their college. These could be the college intranet, a commercially-produced VLE, or the general college network. The figure below shows that colleges continue to make heaviest use of their networks, 93% using the network as a learning platform and as the main platform in 40% of cases. As the newest technology, VLEs are far less widely used, 59% of colleges having them and only 11% using them as their main platform. The three types of learning platform are heavily used as repositories for course documents.

Figure 11: College learning platforms

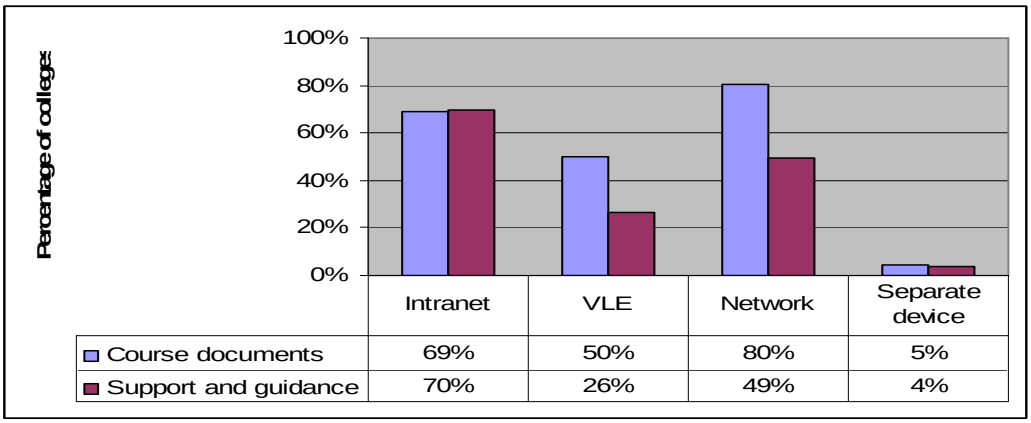


	Intranet	VLE	Network
Main platform	14%	11%	40%
In frequent use	30%	11%	25%
In use	40%	37%	28%

Data = percentage of respondents (Source: Becta, 2003)

The Figure below indicates that colleges use their networks and VLEs to a far lesser extent for learner support and guidance. College intranets, on the other hand are used for learner support equally as frequently as for course documentation.

Figure 12: Use of college learning platforms



	Intranet	VLE	Network	Separate device
Course documents	69%	50%	80%	5%
Support and guidance	70%	26%	49%	4%

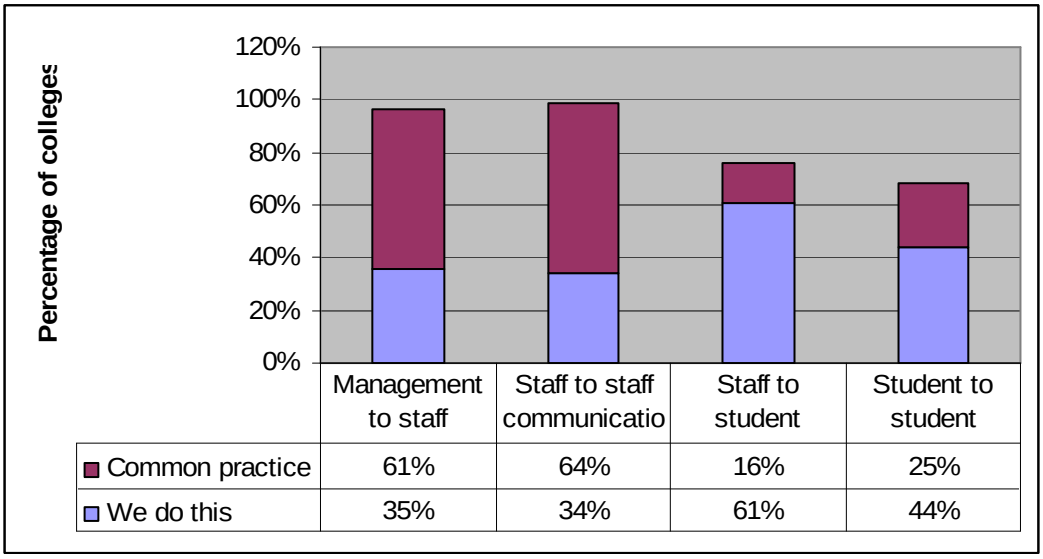
(Source, Becta 2003)

C: APPLICATION OF E-LEARNING TECHNOLOGIES

Electronic communications

The figure below indicates that the use of email for staff communication is well embedded in almost all colleges and is common practice in nearly two thirds of the sector. Electronic communication both with and between students is less extensive and is less likely to be commonly used in any college.

Figure 13: The use of electronic communications



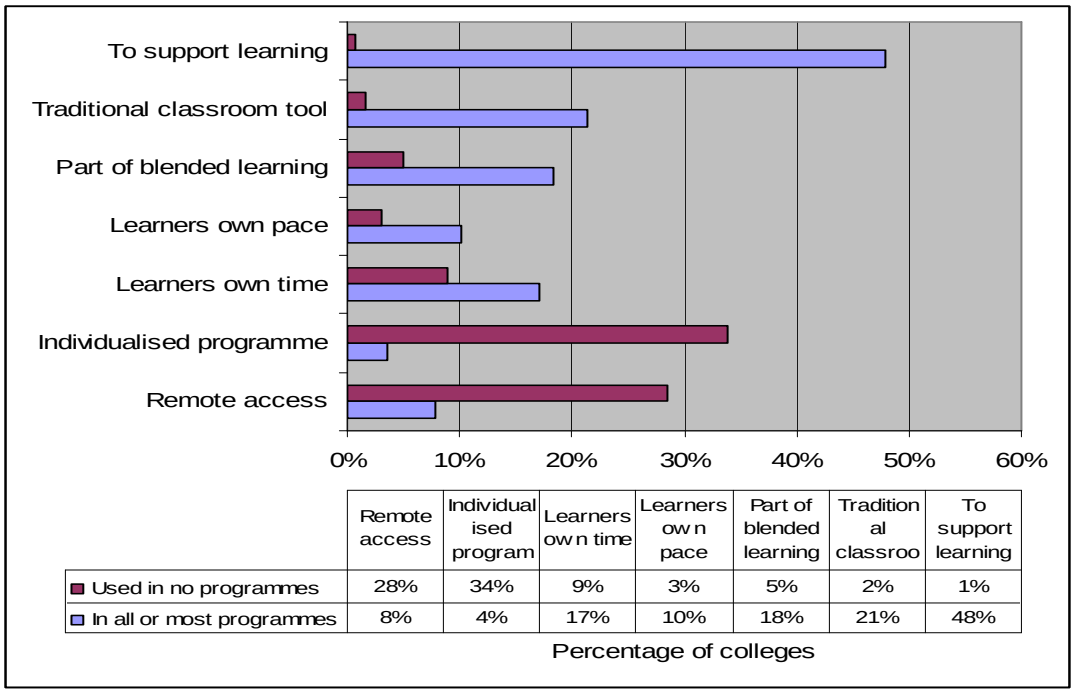
	Management to staff	Staff to staff communicatio	Staff to student	Student to student
Common practice	61%	64%	16%	25%
We do this	35%	34%	61%	44%

(Source: BECTA, 2003)

Application in mainstream programmes

Colleges were asked to identify the extent to which ILT was used in mainstream college programmes. The results are shown in the figure below:

Figure 14: Application of ILT in mainstream programmes



	Remote access	Individualised program	Learners own time	Learners own pace	Part of blended learning	Traditional classroo	To support learning
Used in no programmes	28%	34%	9%	3%	5%	2%	1%
In all or most programmes	8%	4%	17%	10%	18%	21%	48%

(Source: Becta, 2003)

By far the most frequent use of ILT is to support learning, being used in all or most programmes in 48% of colleges. The kind of ILT use envisioned here includes using the Internet for research, exercises for revision or practice. ILT is widespread as a traditional classroom tool in 21% of colleges. This category includes the use of display screen technologies. Using ILT with traditional learning resources to produce blended learning is seen as widespread in some 18% of colleges. 17% of colleges also report the use of ILT to enable learners to access some or their entire programme at a time convenient to them. The use of ILT to produce an individualised programme of study are the least common uses of e-learning in colleges; 34% of colleges make no use of ILT to enable individualised study, and 28% do not use ILT for remote learning.

SURVEY 5

ICT AND E-LEARNING IN FURTHER EDUCATION: EMBEDDED TECHNOLOGY; EVOLVING PRACTICE-A REPORT TO THE LEARNING AND SKILLS COUNCIL (BECTA, AUG/SEPT 2004).

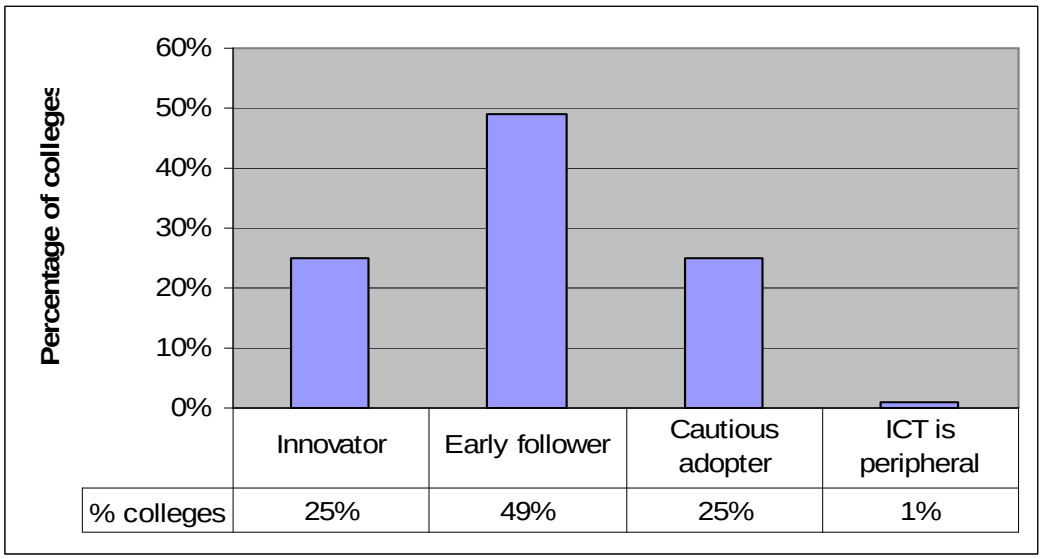
This study was carried out in Jan/Feb 2004 on behalf of the *Learning and Skills Council.* The survey seeks to assess progress in the provision of ILT within the sector along with the extent to which this provision is integrated into the teaching and learning processes. Four previous studies, undertaken in Feb. 1999, Sept. 2000, Sept. 2001 and Feb. 2003 provide comparative data to judge the impact of the deployment NLN monies for the development of ICT infrastructure and e-learning in the sector. The Study took the form of a survey by

questionnaire of all 395 Further Education colleges in England. The questionnaire explored quantitative issues relating to infrastructure, management and practice. 202 colleges (51% of the sector) submitted completed questionnaires in time to be included in the analysis. All tables and charts are based upon the percentage of respondents to the survey unless otherwise stated.

A: POLICY AND STRATEGY

In summer 2000 the then FEFC required colleges to submit an ILT strategy for monitoring, and the following year colleges were required to revise their strategies. Currently 58% of colleges continue to review these strategies annually, a further 23% revise their strategies every two years and 15% every three. The remaining colleges comprise 3 (1.5%) who revise their strategies less often and 4 (2%) who report they will revise their strategies when the LSC asks to see them. Typically colleges use multiple channels to communicate their strategies for ICT and e-learning internally. Electronic copies are made available to all staff in 80% of colleges. Hard copies are made available for inspection in 47% of colleges, are distributed to all managers in 32% of colleges and to all staff in 2%. Alternative channels used by colleges consist of face-to-face briefings, meetings and consultation groups (6%) and 1% of colleges distribute it as a section of the wider college strategy. 19% of colleges distribute their strategy for ICT and e-learning on a need-to-know basis. In 20% of colleges' staff work objectives are derived from the strategy. 32% of colleges have set formal targets for the use of ICT and e-learning across all programmes. A further 44% set targets where they feel they are appropriate and 22% do not set targets for ICT and e-learning at all. 76% of colleges have a vision and/or mission statement. The results are shown in the figure below:

Figure 15: College approach to ICT



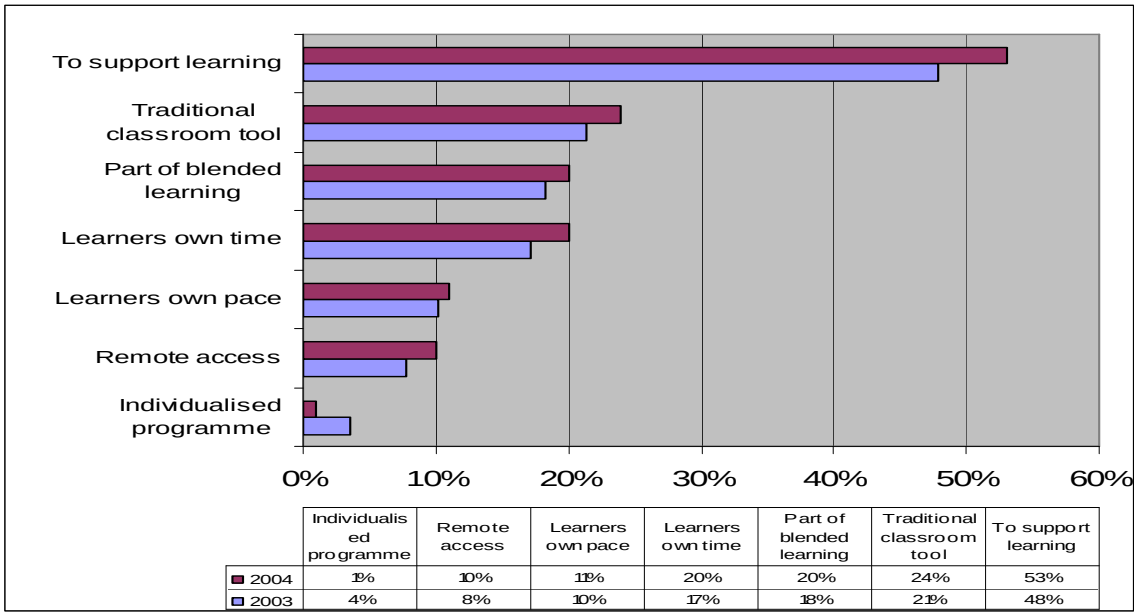
(Source: Becta, 2004)

According to the report clearly, in a strictly technical sense, three quarters of the sector cannot be innovators and early adopters, as early adoption would imply being ahead of the crowd. There may be some "innovation inflation" here, with colleges tending to think of themselves as more innovative than they perhaps are. However, far fewer of the largest colleges regard themselves as cautious with regard to ICT. Only 20% of cautious adopters have more than 3000 student FTEs, whereas well over 40% of innovators and early adopters have more than 3000 FTEs. Innovators are also more likely to have a vision for ICT and e-learning. 86% have such a statement as opposed to 46% of cautious adopters.

Forms of e-learning Products

Colleges were asked to identify the extent to which e-learning was used in mainstream college programmes. The Chart below shows the numbers of colleges that use these approaches to e-learning in all or most of their programmes. All approaches show a small increase on last year except using ICT for individualised learning, which shows a slight fall.

Figure 16: Use of ICT in all or most mainstream college programmes



	Individualised programme	Remote access	Learners own pace	Learners own time	Part of blended learning	Traditional classroom tool	To support learning
2004	1%	10%	11%	20%	20%	24%	53%
2003	4%	8%	10%	17%	18%	21%	48%

(Source: BECTA, 2004)

According to the report the most frequent use of ICT is to support learning, being used in all or most programmes in 54% of colleges, (48% last year). They include using the Internet for research, technology-based exercises for revision or practice. ICT is widespread as a traditional classroom tool in 24% of colleges. This category includes the use of display screen technologies. Using e-learning with traditional learning resources to produce blended learning is seen as widespread in some 20% of colleges. 20% of colleges also report the use of ICT to enable learners to access some or their entire programme at a time convenient to them.

The use of ICT to produce an individualised programme of study are the least common uses of e-learning in colleges; 24% of colleges make no use of ICT to enable individualised study, and 18% do not use ICT for remote learning. However, these percentages decreased from 34% and 28% in 2003, indicating that more colleges are experimenting with the uses of e-learning.

B: E-LEARNING TECHNOLOGIES

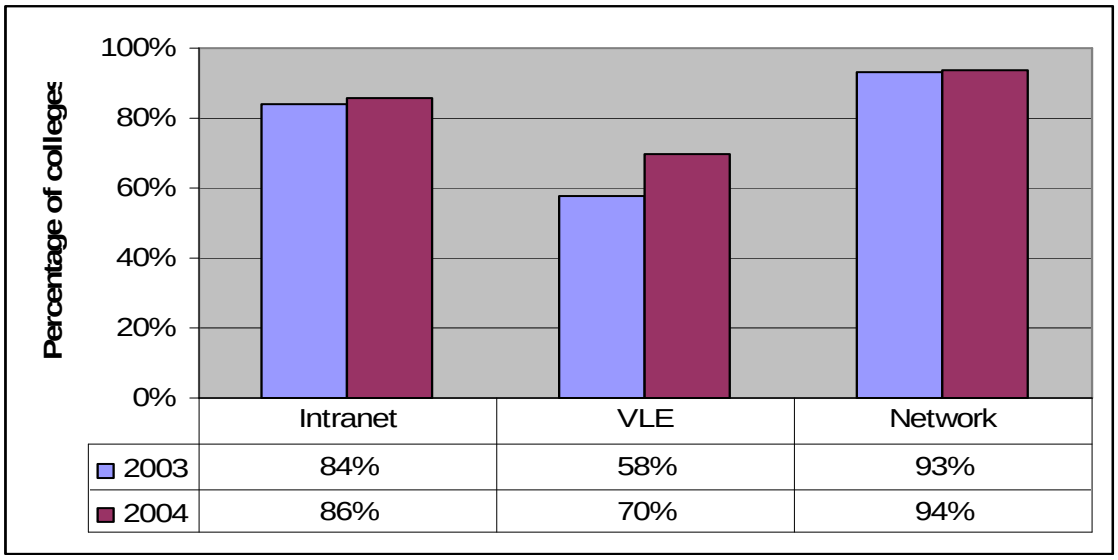
Display screen technologies

Display screen technologies have made significant inroads into teaching practice. 98% of colleges use data projectors, of whom 66% describe their use as frequent, the situation hardly changed from last year. 91% of colleges now use electronic whiteboards, an increase from 81% last year. Of these, 31% say they are used frequently, changed from 21% last year.

Learning platforms

Colleges were asked to indicate the types of learning platform in use at their college. These could be the college intranet, a commercially-produced VLE, or the general college network. They were also asked to indicate whether this usage could be described as frequent, and also, if frequent, whether the particular learning platform could be described as the college's main platform. The figure below shows the change in use of the different platforms over the last year.

Figure 17: College learning platforms



(Source: BECTA, 2004)

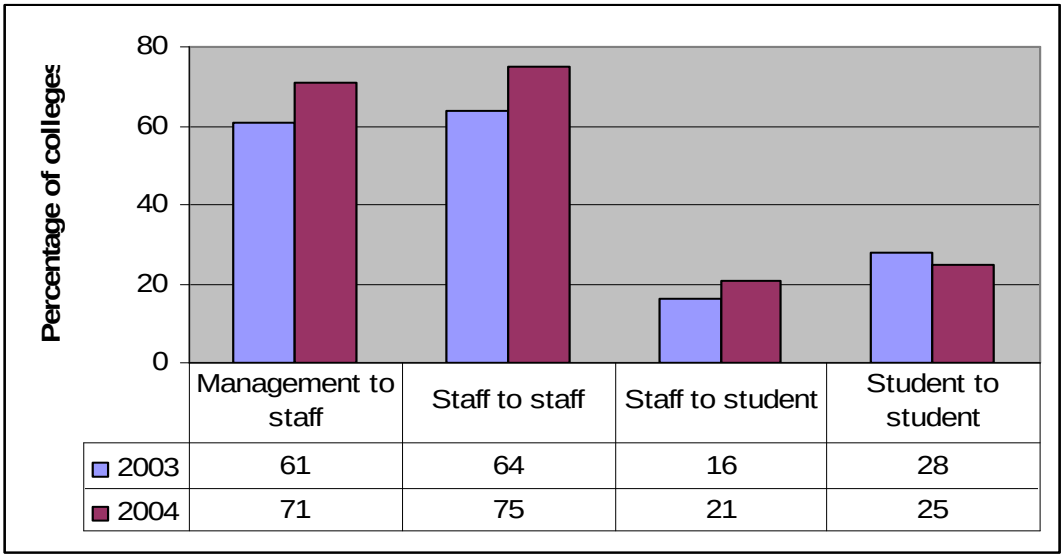
The use of college intranets and networks remain as extensively used as last year. VLEs remain less widely used, but are now used in 70% of colleges compared to 58% 12 months ago.

Electronic communications

The use of email and other electronic communication tools are well embedded in almost all colleges. 99% use email for communication with and between staff and 92% use it for

communicating with students. In contrast, only 76% of colleges said that email was used for student-to-student communication. This reflects the greater control exercised by colleges over student use of college networks, and also the difficulty of estimating the extent of students' use of other networks (e.g. Hotmail). The figure below gives details:

Figure 18: Email and other e-communications described as "common practice"



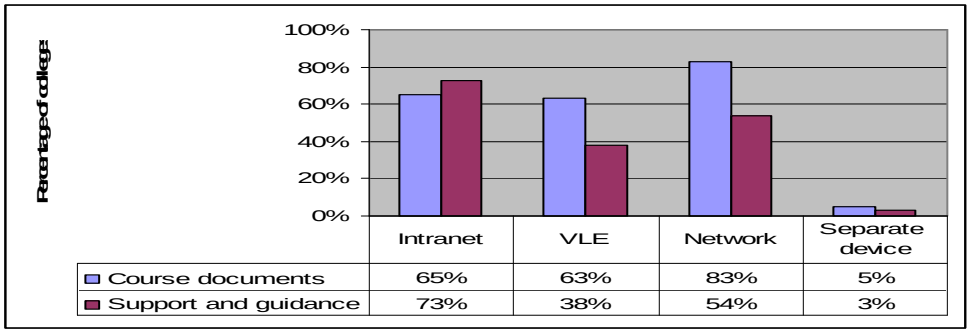
(Source: BECTA, 2004)

This implies that Email as a tool for staff communication is becoming increasingly prevalent; however, the use of this technology to communicate with students remains at a low level within the majority of colleges.

C: APPLICATIONS OF TECHNOLOGIES

The three types of learning platform are heavily used as repositories for course documentation. The Chart below indicates that colleges use their networks and VLEs (63% use a VLE for course documentation and 38% for learner support, compared to 50% and 26% last year).College intranets, on the other hand are used for learner support more frequently than for course documentation.

Figure 19: Use of college learning platforms

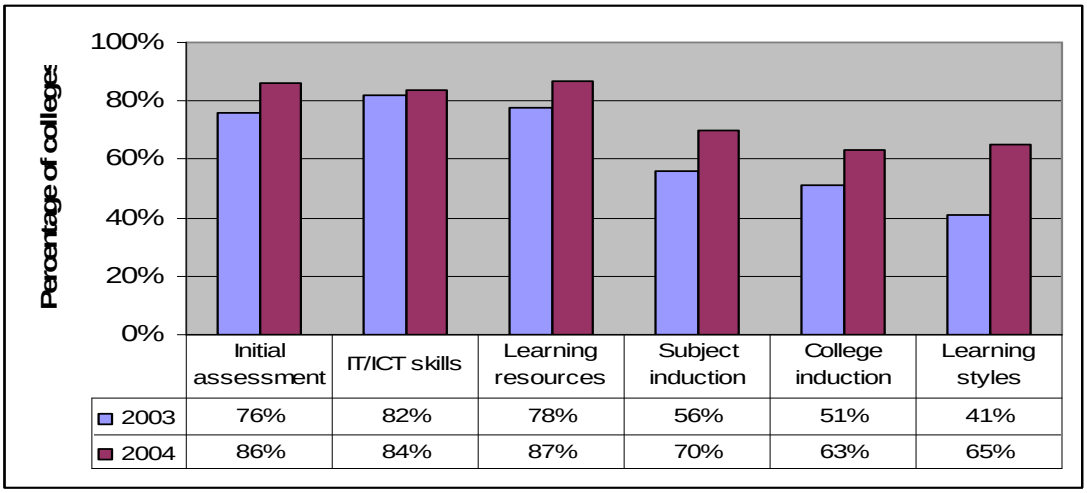


(Source: BECTA, 2004)

In student induction

The Chart below shows the extent to which ICT is used in the student induction process in colleges. Two of the three most frequently cited activities, learning resources and ICT skills, are areas that have an intrinsic technology element. Details are given below:

Figure 20: Total use of ICT in student induction



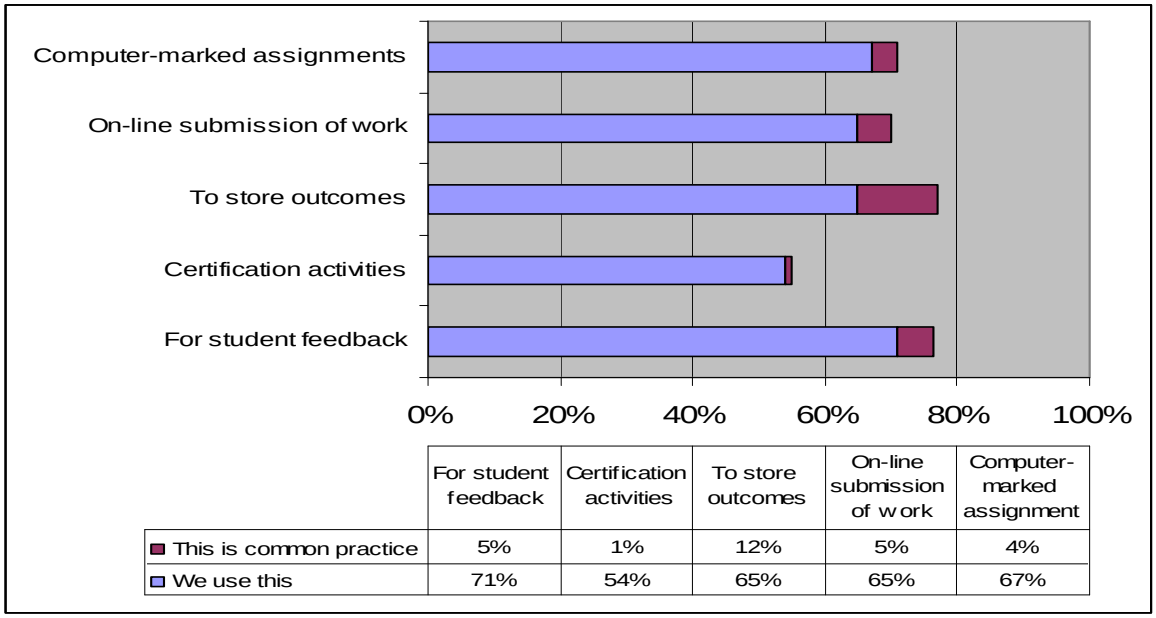
	Initial assessment	IT/ICT skills	Learning resources	Subject induction	College induction	Learning styles
2003	76%	82%	78%	56%	51%	41%
2004	86%	84%	87%	70%	63%	65%

(Source: BECTA, 2004)

ICT and online assessment

Online assessment, taken in the context of each college's whole programme is seen as limited to individual enthusiasts in 50% of the colleges surveyed. It is seen as a widespread activity in only 2% of colleges. These figures remain unchanged from last year. This low level of use is reflected in the extent to which the assessment activities are seen as common practice in the figure below.

Figure 21: Online assessment activities



	For student feedback	Certification activities	To store outcomes	On-line submission of work	Computer-marked assignment
This is common practice	5%	1%	12%	5%	4%
We use this	71%	54%	65%	65%	67%

(Source: BECTA, 2004)

A summary from the report indicates that the FE sector has a robust ICT infrastructure capable of delivering a wide range of electronically mediated learning experiences. Demand for this technology is clearly widespread and may continue to grow and consume any future increase in capacity. The use of VLEs as a learning platform is increasing in colleges, and those that use VLEs find them easier to use than other platforms. There is some evidence of ICT being used in traditional teaching, and some blended learning is taking place. However ICT and e-learning are still largely peripheral to classroom teaching and are most extensively used for additional support activities, to extend independent learning.

SURVEY 6

THE STATE OF ICT IN SCOTTISH FE COLLEGES: REPORT OF A SURVEY INTO INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) PROVISION, ACCESS AND POLICY IN FURTHER EDUCATION (FE) COLLEGES IN SCOTLAND (BECTA, SEPT 2002).

This study was carried out by Becta in Nov. 2001 on behalf of the Scottish Further Education Funding Council in order to make an assessment of the current state of ICT provision in Scottish colleges. The study follows a similar survey carried out in November 1999, and a series of surveys of English colleges carried out between February 1999 and September 2001. Comparisons are drawn between the outcomes of the earlier surveys. The study took the form of a survey by questionnaire of all 47 SFEFC-funded institutions in Scotland, exploring quantitative issues relating to infrastructure and practice. 35 colleges (74% of the sector) submitted completed questionnaires in time for inclusion in the analysis – slightly down from the 85% response rate of the earlier survey. This is, nonetheless, a high response rate, both in absolute terms and by comparison, for example, with the 57% response to the latest English survey in September 2001. It leads to an expectation of extremely high levels of reliability in the data.

A: E-LEARNING TECHNOLOGIES

Virtual learning environments (VLE)

The survey used the term VLE as the sector's preferred term for a software package that constitutes an environment in which to deliver on-line learning. 49% of respondents stated that they currently use a VLE, a decline on the 60% who reported using such packages in 1999. The percentage of colleges reporting a VLE in place in 2001 is identical to the proportion of English colleges citing VLE use, suggesting exactly parallel development in this area. The **Table** below lists all the cited VLEs in use in colleges.

Table 10: VLEs in use

VLE product	2001 Total use	Common use
Blackboard	9	2
WebCT	7	0
In-house system	4	0
Lotus Learning Space	3	1
Learnwise	2	0
Fretwell Downing LE	2	0
Top Class	2	0
First Class	1	0
Pioneer	1	0
Solstra	1	0
Doddle	1	0
CISCO system	1	0

Base = percentage of respondents

(Source: BECTA, SEPT 2002).

The most commonly cited commercial systems were Blackboard (9 colleges) and WebCT (7 colleges). Pioneer was cited much more widely in 1999 with 6 colleges using the system, but its use has now declined to one college. In 1999, First Class was cited by 12 Scottish colleges, with two saying it was in common use, but by 2001 this had fallen to a single college. Similarly, Lotus Notes was well used in 1999, though users of this package may have migrated to Learning Space. One interesting difference between Scotland and England is that the biggest single group of VLEs in English colleges (20%) was made up of in-house systems.

B: APPLICATION OF E-LEARNING TECHNOLOGIES

Referring to the extent and type of use, colleges indicated that there are pockets of highly skilled use of ICT in teaching and learning among some teachers not only in curriculum areas driven by ICT, but also in others. Six of the colleges visited said that their use of ICT is targeted in particular programme areas, namely: business and management studies (two colleges), textile and design, IT, care, forestry, music technology, engineering and fashion. Only two colleges said that ICT is used 'everywhere'. The remaining four qualified their responses with statements such as 'Some use in all sections', 'Patchy use, mainly in IT courses', 'Not 100% across the curriculum', 'Pockets across the curriculum'. On the whole, teachers are mostly using ICT in teaching and learning for word processing assignments, assessments and handouts, Presentation software, Spreadsheets and databases and for Sourcing information on the Internet.

Teaching staff at eleven of the colleges visited said that they use ICT in their teaching ranging from simply using a data projector with presentation software in the classroom to using the Internet, learning resources on the intranet, a VLE, CD-ROMs and video conferencing.

SURVEY 7

STUDY OF ENVIRONMENTS TO SUPPORT ELEARNING IN UK FURTHER AND HIGHER EDUCATION: A SUPPORTING STUDY FOR THE JOINT INFORMATION SYSTEMS COMMITTEE (JISC), JULY 2005.

This Study was commissioned by the JISC in autumn 2004 from a consortium of research organisations comprising Education for Change (EfC), The Research Partnership and the Social Informatics Research Unit (SIRU) at the University of Brighton. The Study intends to update the picture of issues of integration of business processes, services and systems in support of learning and teaching within UK Further and Higher Education institutions.

The survey work was completed in April 2005. This report documents a re-usable dataset of survey results suitable for further analysis. The work built on the previous 2003 study commissioned by the JISC and UCISA. The survey results have been produced in a spreadsheet as percentages and absolute numbers (counts) where applicable, and presenting 2005 and 2003 returns side by side. As in the earlier (2003) study, the universe was defined as "all HE and FE institutions in the UK". The end result was an up to date list of 751 unique FE and HE institutions across the UK. The total divided into 539 FE and 212 HE institutions. 6 of each type were found to have closed or merged, thus the number of institutions in the survey universe reduced to 739 – 533 FE and 206 HE. From the universe of 739 institutions contacted, a total of 235 completed questionnaires were received, a response rate of 32%. The response rate among HE institutions was noticeably higher at 41% compared with 28% for FE.

A: FUTURE DEVELOPMENT OF PROCESSES TO SUPPORT E-LEARNING - POLICY/STRATEGY

Table 11: Nature of plans for future development of processes to support e-learning

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	234	358	168	256	32	45	21	39	14	18	66	102
Have strategy in place for future development	*71%*	45%	*74%*	43%	56%	51%	67%	59%	*64%*	39%	61%	52%
Development planned but no strategy	*27%*	46%	*23%*	47%	38%	42%	33%	38%	*36%*	56%	36%	43%
Unsure about further development	2%	6%	2%	7%	3%	0%	0%	3%	0%	6%	2%	2%
Do not envisage any further development	0%	1%	1%	0%	0%	4%	0%	0%	0%	0%	0%	2%
Not answered	0%	2%	0%	3%	3%	2%	0%	0%	0%	0%	2%	1%

(Source: JISC, JULY 2005)

From the Table above the percentage of respondents with a strategy in place has increased (71%, up from 45%), with all sectors showing an increase. The largest changes are in FE (from 43% to 74%) and HE colleges (from 39% to 64%).The number of institutions planning developments but without a strategy has decreased (27% overall, down from 46%). The largest changes are in FE (23%, down from 47%) and HE colleges (36%, down from 56%).

Table 12: Institutional strategies informing e-learning development

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	235	358	169	256	32	45	21	39	13	18	66	102
Teaching and Learning strategy	*84%*	44%	*79%*	37%	*94%*	69%	*95%*	62%	*92%*	56%	*95%*	64%
Library/Learning Resources strategy	*68%*	40%	*66%*	37%	*72%*	51%	*76%*	54%	*69%*	28%	*74%*	48%
Corporate strategy (2005 only)	46%		44%		38%		67%		69%		53%	
Estates strategy (2005 only)	28%		28%		16%		38%		23%		24%	
Marketing strategy (2005 only)	25%		25%		16%		29%		23%		23%	
Access/Widening Participation strategy (2005 only)	43%		41%		50%		43%		62%		50%	
Quality Enhancement strategy (2005 only)	37%		36%		47%		48%		15%		41%	
Information and Learning Technology (ILT) strategy	73%	67%	86%	81%	*47%*	31%	38%	36%	15%	28%	38%	32%
E-learning strategy	*45%*	32%	41%	29%	*53%*	33%	57%	46%	*62%*	28%	*55%*	37%
E-strategy (2005 only)	7%		6%		13%		5%		8%		8%	
Information and Communication Technology (ICT) strategy	51%	40%	49%	38%	*59%*	33%	57%	56%	38%	50%	56%	45%
Information strategy	23%	25%	12%	17%	41%	38%	*71%*	51%	46%	56%	52%	46%
Communications strategy	18%	13%	22%	13%	6%	16%	14%	15%	0%	6%	8%	14%
HR/staff development (2005 only)	1%		1%		0%		10%		0%		3%	
Other institutional strategy	5%	12%	5%	11%	3%	11%	10%	13%	*8%*	33%	6%	16%
Not answered	1%	2%	1%	2%	3%	4%	0%	3%	8%	0%	3%	3%

(Source: JISC, JULY 2005)

From the table above Teaching and Learning strategies (84%) and Library/Learning Resources strategies (68%) are cited frequently. E-learning strategies are mentioned more often, particularly in pre-92 universities (53%, up from 33%) and HE colleges (62%, up from 28%), compared to 2003.

External strategies informing e-learning development

In terms of external strategies informing e-learning development, the **Table below** gives further details. From the table below: The HEFCE e-learning strategy / consultation drafts (50%) and Strategies from professional bodies or agencies (65%) are often mentioned.

Table 13: External strategies informing e-learning development

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	235		169		32		21		13		66	
None	1%		1%		0%		0%		0%		0%	
DfES e-learning strategy / consultation drafts	17%		20%		13%		10%		15%		12%	
HEFCE e-learning strategy / consultation drafts	50%		49%		53%		48%		46%		50%	
Other HEFCE strategy documents	32%		18%		63%		76%		69%		68%	
Joint Scottish Funding Councils e-learning Report	11%		4%		28%		24%		31%		27%	
JISC strategies	29%		31%		22%		24%		31%		24%	
Strategies from professional bodies or agencies	65%		62%		72%		81%		69%		73%	
Learning & skills council	26%		30%		16%		14%		15%		15%	
E-learning strategy	2%		3%		0%		0%		0%		0%	
Other external strategy	8%		9%		9%		0%		8%		6%	
Not answered	4%		4%		6%		5%		8%		5%	

(Source: JISC, JULY 2005)

Table 14: Modules/units of study in VLE(s) characteristics (mean scores of percentages)

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
mean % web supplemented	63%	57%	67%	57%	61%	55%	41%	55%	55%	75%	54%	57%
mean % web dependant / interaction participation	15%	15%	14%	15%	13%	10%	23%	16%	15%	15%	16%	13%
mean % web dependant / communication participation	8%	9%	7%	8%	9%	9%	13%	12%	9%	7%	10%	10%
mean % web dependant / communication & interaction participation	9%	11%	7%	9%	10%	17%	15%	11%	18%	3%	13%	13%
mean % fully online	4%	5%	4%	5%	5%	6%	9%	6%	3%	1%	6%	5%

(Source: JISC, JULY 2005)

From the data above, on the average 63% of modules/units in VLE(s) are characterised by respondents as web-supplemented (67% for FE, 54% for HE).

CURRENT TRENDS/DRIVING FACTORS

Table 15: Driving factors for environments and processes that support e-learning (average scores, ranked by Total 2005)

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
general enhancement learning & teaching quality	4.70	4.67	4.74	4.69	4.46	4.56	4.79	4.71	4.65	4.65	4.60	4.63
student expectations	3.79	3.57	3.72	3.56	4.03	3.67	3.96	3.68	3.75	3.35	3.95	3.61
widening participation/inclusiveness	3.73	3.77	3.85	3.80	3.11	3.46	3.58	3.84	3.94	4.00	3.44	3.70
improving access to learning for students off campus	3.72	3.82	3.63	3.70	3.78	3.85	4.21	4.35	4.00	4.00	3.96	4.06
improved administrative processes	3.42	3.07	3.36	2.95	3.49	3.17	3.54	3.35	3.88	3.71	3.58	3.33
improving access to learning for part-time students	3.37	3.51	3.32	3.40	3.19	3.46	3.88	4.13	3.59	3.71	3.49	3.74
help to standardise across institution	3.26	3.32	3.28	3.34	3.30	3.34	3.33	3.29	2.88	3.06	3.22	3.27
creating or improving competitive advantage	3.18	3.16	3.07	3.02	3.51	3.44	3.46	3.48	3.29	3.41	3.45	3.45
Special Educational Needs & Disability Act 2001	2.99	2.47	3.08	2.48	2.65	2.42	2.96	2.29	2.71	2.88	2.76	2.46
keeping abreast of educational developments	2.85	2.69	2.79	2.68	3.00	2.61	3.00	3.10	3.00	2.35	3.00	2.73
attracting home students	2.81	2.86	2.69	2.79	3.03	2.79	3.29	3.19	2.94	3.29	3.09	3.02
formation of partnerships with other institutions/organisations	2.57	2.50	2.67	2.54	2.14	2.45	2.71	2.52	2.13	2.06	2.31	2.40
attracting new markets	2.48	3.01	2.21	2.89	3.22	3.10	3.25	3.42	2.94	3.35	3.17	3.26
achieving cost/efficiency savings	2.45	2.53	2.48	2.50	2.70	2.60	2.08	2.71	2.00	2.29	2.36	2.58
developing regional role of institution	2.32	2.23	2.30	2.25	1.89	2.02	2.83	2.42	2.76	2.06	2.36	2.17
help to standardise institution with others	2.01	2.17	2.12	2.20	1.59	2.34	2.04	1.97	1.63	1.71	1.74	2.09
attracting EU students	1.49	2.06	1.07	1.61	2.62	2.95	2.88	3.10	1.88	2.82	2.55	2.98
attracting overseas (outside EU) students	1.48		0.96		2.95		3.21		2.00		2.83	
improving access to learning for overseas students	1.48	1.97	0.99	1.48	2.62	3.07	3.33	3.03	2.13	2.65	2.74	2.98

(Source: JISC, JULY 2005)

This table shows average scores for answer options, not percentages of respondents. There are clear differences in score between HE and FE for some drivers (e.g. attracting overseas students; improving access to learning for overseas students, and to a lesser extent attracting new markets). Trends over time are suggested for the Special Educational Needs & Disability Act 2001 (importance up) and attracting new markets (down, in particular for HE).

B: E-LEARNING TECHNOLOGIES

Table 16: Whether virtual learning environments are used

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	235	358	169	256	32	45	21	39	13	18	66	102
Yes	89%	83%	86%	82%	97%	84%	90%	97%	*92%*	67%	95%	86%
No	11%	17%	14%	18%	3%	16%	10%	3%	*8%*	33%	5%	14%

(Source: JISC, JULY 2005)

From the Table above the picture for 2005 and 2003 is similar with one exception. A higher percentage of HE colleges report a VLE (92%, up from 67%), but this is based on only 13 respondents in 2005 and 18 in 2003.

Table 17: What VLE(s) are used?

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	209	297	146	209	31	38	19	38	12	12	63	88
Blackboard	34%	32%	30%	27%	42%	39%	58%	55%	25%	17%	43%	43%
Colloquia	0%	0%	0%	0%	3%	3%	0%	0%	0%	0%	2%	1%
FD Learning's le®	4%	5%	5%	6%	0%	3%	0%	0%	0%	0%	0%	1%
FirstClass	4%	7%	1%	2%	16%	26%	*0%*	13%	8%	17%	8%	19%
Lotus Domino	2%	2%	1%	0%	6%	11%	0%	5%	8%	0%	5%	7%
Lotus Learning Space	1%	1%	0%	0%	6%	8%	5%	3%	0%	0%	3%	5%
Merlin	0%	1%	0%	0%	3%	3%	0%	0%	0%	0%	2%	1%
TekniCal Virtual Cam	8%	10%	11%	15%	0%	0%	0%	0%	0%	0%	0%	0%
Top Class	0%	1%	0%	1%	3%	0%	0%	0%	0%	0%	2%	0%
WebCT	26%	20%	22%	14%	39%	47%	21%	21%	*50%*	33%	37%	34%
Granada Learnwise (2003 only)		0%		0%		0%		0%		0%		0%
Other commercial VLE (2005 only)	1%		2%		6%		0%		0%		0%	
Commercial intranet based product	0%	3%	1%	2%	0%	5%	0%	5%	0%	0%	0%	5%
Bodington	4%	3%	2%	3%	13%	5%	0%	0%	17%	8%	8%	3%
COSE	1%	2%	1%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Moodle (2005 only)	18%		22%		13%		5%		8%		8%	
Other VLE - developed in-house	18%	14%	10%	11%	*52%*	21%	26%	26%	*33%*	17%	*38%*	23%
Other intranet based - developed in-house	*18%*	32%	*18%*	34%	19%	29%	16%	24%	17%	25%	17%	26%
Other - listed	3%	11%	3%	9%	*6%*	26%	5%	11%	*0%*	17%	*3%*	18%
Not answered	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%

(Source: JISC, JULY 2005)

Table 18: Mobile technologies to connect to VLE

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	209		146		31		19		12		63	
Not using	52%		51%		52%		42%		83%		54%	
Using - details list	2%		1%		3%		11%		0%		5%	
Wireless network / access	16%		17%		16%		26%		0%		14%	
Laptop PCs	10%		12%		6%		11%		0%		5%	
Mobile phones/SMS technology	4%		1%		6%		21%		0%		8%	
PDAs	4%		3%		6%		5%		8%		5%	
Not answered	23%		27%		16%		11%		17%		14%	

(Source: JISC, JULY 2005)

On the whole according to the report 52% of respondents state that they don't use mobile technologies to connect to VLEs (51% FE, 54% HE). 16% state that they use wireless technologies (17% FE, 14% HE) and 10% laptop PCs (12% FE, 5% HE).

C: APPLICATION OF E-LEARNING TECHNOLOGIES

Table 19: Uses made of VLE(s)

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	209		146		31		19		12		63	
e-assessment	57%		53%		68%		79%		42%		65%	
e-Portfolio	21%		18%		29%		32%		17%		27%	
Peer support	57%		51%		61%		84%		75%		70%	
Problem Based Learning	38%		32%		58%		68%		25%		54%	
Collaborative working	61%		53%		74%		95%		83%		81%	
Online student presentations (individual and group)	37%		29%		52%		74%		50%		57%	
Assignment submission	64%		60%		77%		79%		75%		75%	
Formative assessment	62%		56%		74%		95%		50%		75%	
Access to course material	99%		99%		97%		100%		100%		98%	
Access to multimedia resources, including simulations and games	67%		71%		65%		58%		42%		57%	
Access to web based resources	92%		92%		90%		95%		100%		90%	
Learning Design	11%		7%		29%		16%		17%		21%	
Other - listed	4%		4%		6%		0%		8%		5%	
Not answered	1%		1%		3%		0%		0%		2%	

(Source: JISC, JULY 2005)

According to the table above access to course material (99%) and access to web based resources (92%) are mentioned most. Also Learning Design (11%), e-Portfolio (21%), online student presentations (37%) and Problem Based Learning (38%) are mentioned least.

Table 20: Subject areas/departments using VLE(s)

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
N =	209		146		31		19		12		63	
Art, Design and Media (including Dance and Drama)	63%		63%		48%		79%		75%		62%	
Bioscience	37%		30%		68%		53%		17%		52%	
Business Management, Accountancy, Economics, Law	82%		83%		84%		89%		67%		79%	
Education	58%		53%		61%		84%		83%		71%	
Engineering & Materials	55%		56%		55%		74%		17%		52%	
Humanities (English, History, Philosophical and Religious Studies)	59%		55%		74%		63%		75%		68%	
Geography, Earth and Environmental Sciences	47%		41%		68%		63%		42%		60%	
Health Sciences and Practice, Social Policy and Social Work	60%		58%		61%		84%		58%		67%	
Hospitality, Leisure, Sport and Tourism	62%		69%		29%		68%		58%		46%	
Information and Computer Sciences	80%		86%		65%		84%		50%		67%	
Languages, Linguistics and Area Studies	51%		49%		71%		58%		33%		57%	
Maths, Stats & OR Network	58%		60%		61%		58%		33%		54%	
Medicine, Dentistry and Veterinary Medicine	16%		7%		58%		16%		17%		37%	
Physical Sciences	39%		38%		52%		42%		8%		40%	
Psychology, Sociology, Anthropology and Politics	57%		51%		74%		68%		67%		68%	
Other - listed	7%		8%		3%		0%		8%		3%	
Not answered	1%		0%		3%		11%		0%		3%	

(Source: JISC, JULY 2005)

Table 21: Barriers to development of processes to support e-learning (average, 2005)

	Total		FE		HE - Pre '92		HE - Post '92		HE college		HE all	
	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005	2003
lack of time	3.73	3.55	3.77	3.66	3.77	3.2	3.28	3.36	3.79	3.38	3.62	3.29
lack of money	3.56	3.45	3.59	3.41	3.69	3.35	3.24	3.54	3.29	4.06	3.47	3.55
lack of academic staff knowledge	2.99	2.99	3.07	3.11	2.95	2.6	2.60	2.78	2.79	2.88	2.81	2.72
lack of academic staff development	2.84	2.92	2.84	2.98	2.95	2.63	2.52	2.78	3.07	3.25	2.83	2.80
lack of support staff	2.70	2.81	2.52	2.91	3.41	2.85	2.96	2.39	2.71	2.43	3.14	2.59
institutional culture (2005 only)	2.69		2.67		2.95		2.64		2.36		2.74	
lack of incentives	2.68	2.22	2.61	2.36	3.10	1.88	2.48	2.12	2.86	1.43	2.86	1.90
lack of recognition for career development (2005 only)	2.40		2.20		3.38		2.54		2.00		2.87	
technical problems	2.09	2.32	2.20	2.51	1.68	1.64	1.60	2.16	2.57	1.94	1.82	1.90
changing administrative processes (2005 only)	1.99		1.90		2.24		2.21		2.14		2.21	
Too many/diverse standards & guidelines	1.88	2.39	2.01	2.43	1.49	2.18	1.42	2.40	2.00	2.36	1.55	2.30
current organisational structure	1.80	2.05	1.76	2.04	2.19	1.87	1.60	2.27	1.71	2.06	1.91	2.06
lack of strategy and leadership (2005 only)	1.69		1.58		2.23		1.76		1.57		1.96	
inappropriate policies and procedures (2005 only)	1.50		1.42		1.70		1.63		1.71		1.68	
lack of student engagement (2005 only)	1.37		1.41		1.18		1.08		1.86		1.27	
too few standards & guidelines	1.16	1.73	1.16	1.85	1.11	1.16	1.13	1.97	1.46	1.00	1.18	1.48

(Source: JISC, JULY 2005)

This table shows average scores for answer options, not percentages of respondents. A number of answer options were added for the 2005 survey, indicated in the table with '(2005 only)'. The number of respondents (N) for each option follows in a separate table. *Lack of time* remains the most important barrier to development. *Lack of m*oney remains a close second. The *Institutional culture* barrier, added for the 2005 survey, is seen as fairly important.

REVIEW OF QUANTITATIVE REPORTS- USA

SURVEY 1

THE STATE OF E-LEARNING IN THE STATES: NATIONAL GOVERNORS ASSOCIATION (NGA) CENTER FOR BEST PRACTICES' E-LEARNING SURVEY OF STATES CONDUCTED IN APRIL 2000.

The survey sought information on what measures and programs states are planning and implementing with regard to postsecondary and adult work-related e-learning. The survey results are illustrative rather than statistically representative.

A: CURRENT TRENDS IN USE OF E-LEARNING ACROSS THE STATES

The survey citing from the following four studies mentioned the following key current trends: 1) Gregory Capelli, Scott Wilson, and Michael Husman, March, 2000, *E-Learning: Power for the Knowledge Economy Report 2*) Trace A. Urdan and Cornelia C. Weggen, March 2000, *Corporate E-Learning: Exploring a New Frontier Report 3)* F. McCrea, R. Gay, and R. Bacon, 2000 "Riding the Big Waves: A White Paper on the B2B e-Learning Industry" Report. 4) M. Moe, K. Bailey, and R. Lau, April 9, 1999 **"**The Book of Knowledge: Investing in the Growing Education and Training Industry," Report.

- The total dollar value of all e-learning products and services was estimated at $7.1 billion for 2000. Although this amount was less than 1 percent of the $740 billion spent on education and training of all types in the United States, e-learning is one of the fastest-growing sectors of that market, and the total dollar value of all e-learning products and services is projected to reach $40.2 billion by 2005.
- The U.S. Department of Education found that 58 percent of all two- and four-year colleges offered distance learning courses in 1998; 84 percent of all colleges expect to do so by 2002.
- Within e-learning, the market for "soft-skills" training in workplace readiness, behaviour, and problem solving is growing twice as fast as that for formal information technology course training.
- Customers are shifting away from stand-alone courses. Instead they are demanding one-stop shopping for integrated e-learning solutions, including value-added services such as

needs assessment, customized curriculum design, online mentoring, and performance support.

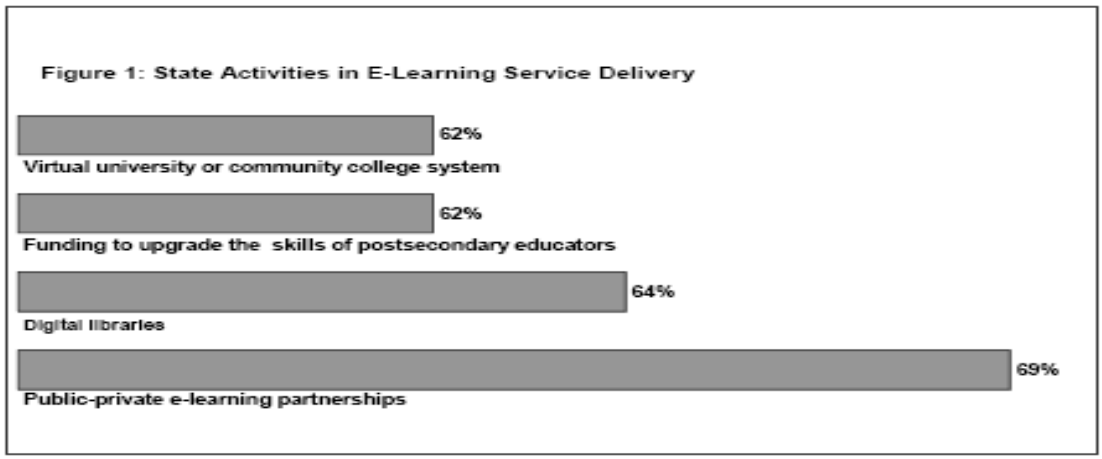
- Of the three main elements of e-learning—content, technology, and know-how—content is becoming predominant, with spending on content now overshadowing expenditures on technology by 5:1.

B: POLICY/STRATEGY

- States Are Developing Delivery Systems For E-Learning.

State e-learning delivery systems include ***virtual universities and colleges***, and their supporting ***digital libraries***, along with instructor upgrades to be able to deliver learning effectively using the new technologies. The prevalence of these measures as found in the survey of states is shown in the Figure below.

Figure 22: Prevalence of Measures



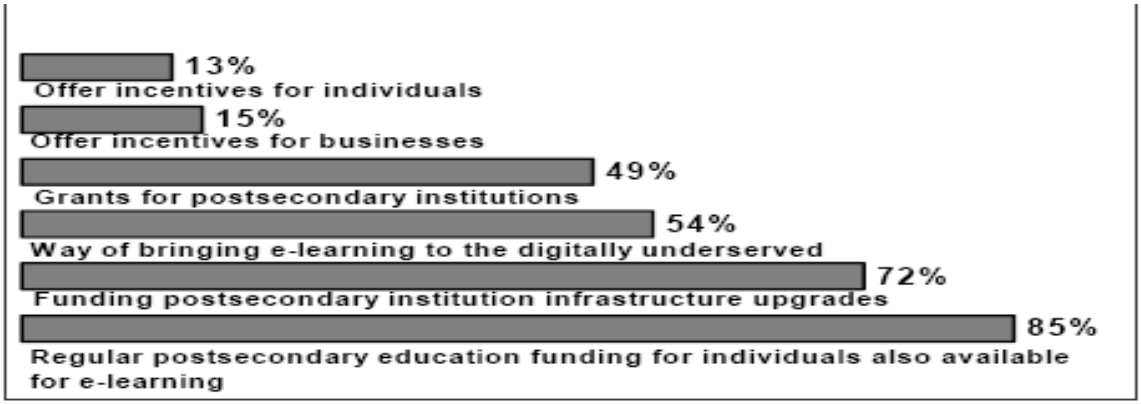
Source: NGA, April 2000

According to the survey and as depicted by the figure above: i) Virtual university and college models are emerging within and across states. Of the 39 states, almost two thirds report they have a virtual university or virtual community college system to deliver e-learning. ii) Many states are establishing digital library models to support e-learners' quest for information. Two thirds of the survey states report having a digital library of e-learning course materials, background reading, and reference documents.

- States are promoting access to e-learning through infrastructure investments and financial incentives.

Access is also a question of the user's abilities to take advantage of the infrastructure and the services delivered through it, and this may require enabling *incentives* or specific measures to reach the digitally underserved. The prevalence of access measures is shown in the Figure below.

Figure 23: State Activities to Promote Access



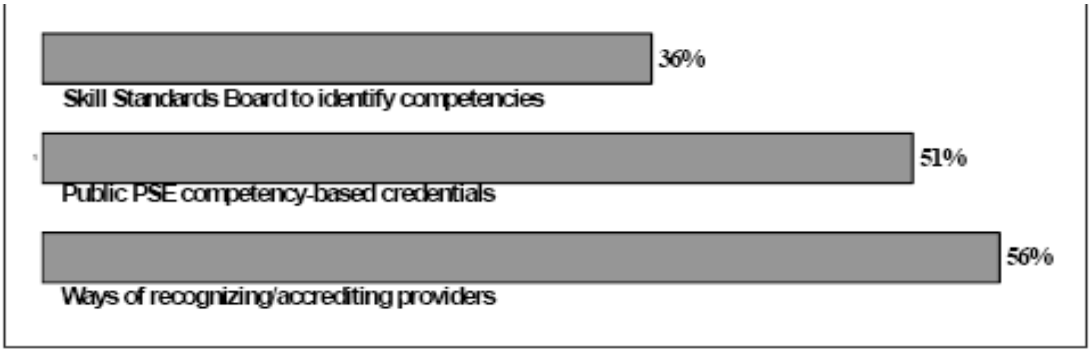
Source: NGA, April 2000

According to the survey and as depicted by the figure above: A) States are building the virtual highways for e-learning. Almost three quarters of the survey states report they are funding postsecondary education institution infrastructure upgrades beyond general formula assistance. B) States are using incentives and financial support to modernize existing postsecondary education institutions. About half of the survey states report offering incentives and financial support beyond general or formula-based assistance. C) States are creating public-private partnerships to leverage and extend resources for building e-learning capacity. More than two thirds of the survey states have public-private partnerships related to e-learning. D) Some states are providing incentives for businesses and individuals to participate in e-learning. Six of the survey states offer tax deductions and grants to encourage businesses to take advantage of e-learning opportunities for their workforces. To promote access, five of the survey states offer specific e-learning incentives for individuals, while almost all of them report their regular postsecondary education grants, loans, and scholarships are also available to pay for distance education and e-learning courses. E) States are reaching across the "digital divide" to reduce barriers and provide e-learning opportunities for the underserved and those with low incomes. Consequently, more than half of the survey states report having specific ways of bringing e-learning tools and services to the digitally underserved.

- States are assuring the *quality* of e-learning content, programs, and learner achievement.

The quality and performance of e-learning providers, programs, and learners are important, but they are not well captured using traditional institution-based approaches to credentialing individuals for completion of classes and programs of study in accredited institutions. States are trying new strategies including competency-based credentialing systems. The prevalence of quality assurance measures found in the survey is shown in the Figure below:

Figure 24. State Activities to Promote Quality



Source: NGA, April 2000

From the figure above, some states are using competency-based credentials as a new currency of learning that recognizes prior experience. About half the survey states report they have public postsecondary institutions that award competency-based credentials not tied to specific course participation. Some states are forming skill standards boards to promote performance based and assessment-based learning. About one third of the survey states report having a skill standards board that identifies competencies. Emerging principles of best practice give states potential tools for quality assurance in e-learning programs. Of the 39 states responding to the survey, about half report their higher education governing board or regulatory agency has ways of recognizing and accrediting e-learning institutions and online education and training providers. About half also report they have examined interstate issues related to accreditation and regulation of e-learning providers.

SURVEY 2

U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS. *DISTANCE EDUCATION AT DEGREE- GRANTING POSTSECONDARY INSTITUTIONS: 2000–2001,* NCES 2003-017, BY TIFFANY WAITS AND LAURIE LEWIS. PROJECT OFFICER: BERNARD GREENE. WASHINGTON, DC: 2003.

This report presents data from a nationally representative survey on distance education at degree granting postsecondary institutions undertaken by the National Center for Education Statistics (NCES) through the Postsecondary Education Quick Information System (PEQIS). The PEQIS survey conducted in spring of 2002 provides national estimates for the 2000–2001 academic years on the number and proportion of institutions offering distance education courses, distance education enrolments and course offerings, degree and certificate programs, distance education technologies, participation in distance education consortia and factors institutions identify as keeping them from starting or expanding distance education offerings. All specific

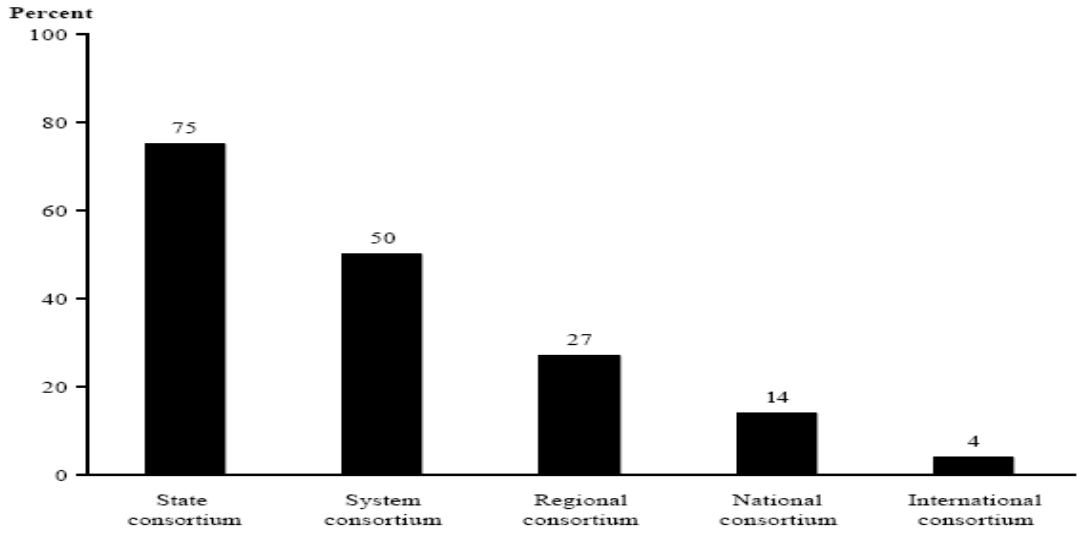
statements of comparisons made in this report have been tested for statistical significance using t-tests adjusted for multiple comparisons and are significant at the 95 percent confidence level or better.

POLICY AND STRATEGY

Participation in Distance Education Consortia

Institutions indicated whether they participated in any type of distance education consortia, and if so, the types of consortia in which they participated: system state regional national, and international. Sixty percent of 2- and 4-year institutions that offered distance education courses in 2000–2001 reported participating in some type of distance education consortium in 2002 (See Figure below).

Figure 25. Percent of 2-year and 4-year Title IV degree-granting institutions offering distance education courses in 2000–2001 that participate in various types of distance education consortia, by type of consortium: 2002



NOTE: Percents are based on the 60 percent of institutions that participated in any distance education consortia. This question was asked in the present tense rather than referring to 2000–2001, and thus the estimates reflect the responses of the institutions at the time the data were collected in spring 2002.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

According to the report:

a) Public 2-year institutions were more likely than public 4-year institutions, which in turn were more likely than private 4-year institutions to participate in a distance education consortium (83 percent, 68 percent, and 25 percent, respectively).

b) Participation in various types of consortia differed by institutional type. Participation in a system consortium was reported more often by public 4-year (62 percent) than by public 2-year (49 percent) or private 4-year institutions (30 percent), and more often by public 2-year than by private 4-year institutions (table 13). Participation in a state consortium was reported more often by public 2-year (87 percent) than by public 4-year (67 percent) or private 4-year (56 percent)

institutions, and by public 4-year more often than private 4-year institutions. Public 4- year institutions were more likely than public 2-year institutions to participate in regional consortia and international consortia (30 vs. 23 percent, and 9 vs. 2 percent, respectively). Participation in a national consortium was most likely to be reported by private 4-year institutions (37 percent) compared with public 4-year (20 percent) and public 2-year institutions (6 percent) and least likely to be reported by public 2-year institutions.

c) The size of the institution was related to participation in distance education consortia. Large institutions were more likely to participate in distance education consortia than medium to small institutions (78 percent, 67 percent, and 48 percent, respectively). Large institutions were more likely than medium institutions to participate in regional consortia (33 percent compared with 25 percent), and more likely to participate in national consortia (21 percent compared with 12 and 13 percent, respectively) or international consortia (9 percent compared with 3 and 3 percent, respectively).

Table 22. Percent of 2-year and 4-year Title IV degree-granting institutions offering distance education courses in 2000–2001 that participate in any distance education consortia.

Institutional type and size	Participated in any distance education consortia	Type of consortium[1]				
		System	State	Regional	National	International
All institutions	60	50	75	27	14	4
Institutional type[2]						
Public 2-year	83	49	87	23	6	2
Public 4-year	68	62	67	30	20	9
Private 4-year	25	30	56	36	37	7
Size of institution						
Less than 3,000	48	49	70	26	13	3
3,000 to 9,999	67	54	78	25	12	3
10,000 or more	78	46	77	33	21	9

[1]Based on institutions that participated in any distance education consortia.

[2]Data for private 2-year institutions are not reported in a separate category because too few private 2-year institutions in the sample offered distance education courses in 2000–2001 to make reliable estimates. Data for private 2-year institutions are included in the totals and in analyses by other institutional characteristics.

NOTE: This question was asked in the present tense rather than referring to 2000–2001, and thus the estimates reflect the responses of the institutions at the time the data were collected in spring 2002.

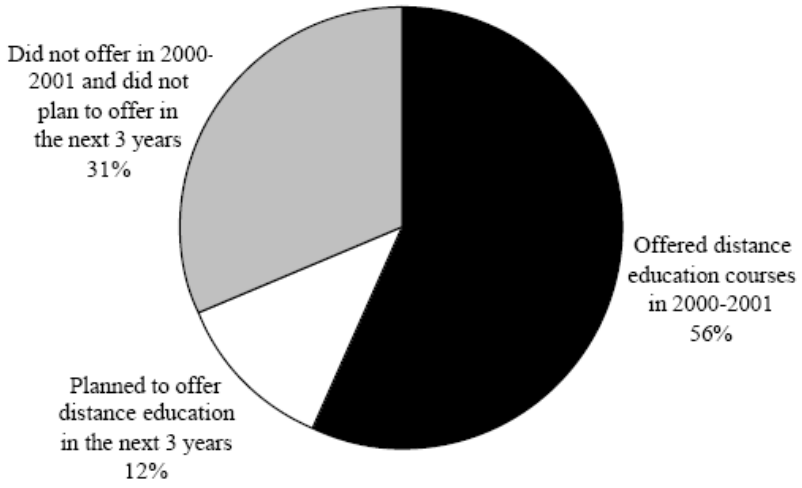
SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Institutions Offering Distance Education Courses

Institutions indicated whether they offered any distance education courses during the 12-month 2000–2001 academic year. Institutions that did not offer distance education indicated whether they planned to offer distance education in the next 3 years (2001–02 through 2003–04), and whether they had offered any distance education in the previous 5 years (1995–2000). In addition, all institutions indicated whether they offered any distance education courses during the 2001–02 academic years. From the survey the results pointed to the following:

- Fifty-six percent of all 2-year and 4-year Title IV-eligible, degree-granting institutions offered distance education courses in 2000–2001, representing an estimated 2,320 institutions (see figure below). Twelve percent of all institutions indicated that they planned to start offering distance education courses in the next 3 years, and 31 percent of the institutions did not offer distance education courses in 2000–2001 and did not plan to offer these types of courses in the next 3 years.
- Public institutions were more likely than private institutions to offer distance education courses in 2000–2001 (Table Below). Ninety percent of public 2-year and 89 percent of public 4-year institutions offered distance education courses, compared with 16 percent of private 2-year and 40 percent of private 4-year institutions.
- Among private institutions, 23 percent of private 2-year and 16 percent of private 4-year institutions planned to start offering distance education in the next 3 years; 62 percent of private 2-year and 44 percent of private 4-year institutions reported that they do not plan to start offering distance education courses in the next 3 years (Table below).
- Large and medium-sized institutions were more likely than small institutions to offer distance education courses (95 and 88 percent vs. 41 percent, respectively) (Table Below). Forty-three percent of small institutions reported that they did not offer distance education courses in 2000–2001 and did not have plans to start offering distance education courses in the next 3 years.
- Fifty-nine percent of all the institutions indicated that they offered distance education courses in the 2001–02 academic year (i.e., the year of the survey administration) (Table Below), an increase of 3 percentage points from the previous year. Five percent of institutions that did not offer distance education courses in 2000–2001 indicated that they had offered these courses within the previous 5 years (1995–2000).

Figure 26. Percentage distribution of 2-year and 4-year Title IV degree-granting institutions, by distance education program status: 2000–2001.



NOTE: Percentages are based on the estimated 4,130 2-year and 4-year Title IV-eligible, degree-granting institutions in the nation. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Table 23. Number and percentage distribution of 2-year and 4-year Title IV degree-granting institutions, by distance education program status and institutional type and size: 2000–2001.

Institutional type and size	Total number of institutions	Distance education program status					
		Offered distance education in 2000–2001		Planned to offer distance education in the next 3 years		Did not offer in 2000–2001 and did not plan to offer in the next 3 years	
		Number	Percent	Number	Percent	Number	Percent
All institutions	4,130	2,320	56	510	12	1,290	31
Institutional type							
Public 2-year	1,070	960	90	50	5	50	5
Private 2-year	640	100	16	150	23	400	62
Public 4-year	620	550	89	20	3	50	8
Private 4-year	1,800	710	40	290	16	790	44
Size of institution							
Less than 3,000	2,840	1,160	41	460	16	1,220	43
3,000 to 9,999	870	770	88	50	5	60	7
10,000 or more	420	400	95	10	2	10	2

NOTE: Percentages are based on the estimated 4,130 2-year and 4-year Title IV-eligible, degree-granting institutions in the nation. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Type and Level of Distance Education Offerings

Institutions indicated what type of distance education courses they offered and at what level these courses were offered in 2000–2001. College-level, credit-granting courses include only courses designed for college students at the undergraduate or graduate/first-professional level,4 and for which college credits are awarded for completion.

- Among all 2- and 4-year institutions, 56 percent offered distance education courses for any level or audience. Distance education courses for any level or audience were offered by 57 percent of institutions with undergraduate programs, and by 63 percent of institutions with graduate programs.
- Institutions that offered distance education courses for any level also tended to offer college-level, credit-granting distance education courses. Thus, 55 percent of all 2- and 4-year institutions offered college-level, credit-granting distance education courses at either the undergraduate or graduate/first-professional level. College-level, credit-granting distance education courses at either level were offered by 57 percent of institutions that had any undergraduate programs, and by 62 percent of institutions that had any graduate/first professional programs. College-level, credit-granting distance education courses were offered at the undergraduate level by 48 percent of all institutions, by 52 percent of the institutions that had undergraduate programs, and by 44 percent of the institutions that had graduate/first-professional programs.
- College-level, credit-granting distance education courses were offered at the graduate/first professional level by 22 percent of all institutions. Courses at this level were offered by 20 percent of institutions that had undergraduate programs, and by 52 percent of institutions that had graduate/first-professional programs.

Table 24. Total number of 2-year and 4-year Title IV degree-granting institutions, and the number and percent of institutions that offered distance education courses, by level of institutional offerings: 2000–2001.

Level of institutional offerings	Total number of institutions	Offered any distance education courses		Offered college-level, credit-granting distance education courses					
				Courses at either level		Undergraduate courses		Graduate/first-professional courses	
		Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]
All institutions	4,130	2,320	56	2,280	55	1,980	48	890	22
Institutions with undergraduate programs	3,810	2,170	57	2,150	57	1,980	52	760	20
Institutions with graduate/first-professional programs	1,700	1,080	63	1,050	62	750	44	880	52

[1]Percentages are based on the total number of institutions in that row.

NOTE: The numbers of institutions with undergraduate or graduate/first-professional programs do not sum to all institutions since many institutions have both levels of offerings. Information about whether an institution has undergraduate or graduate/first-professional programs (either on campus or distance education) is based on the 2000 Integrated Postsecondary Education Data System "Institutional Characteristics" file.

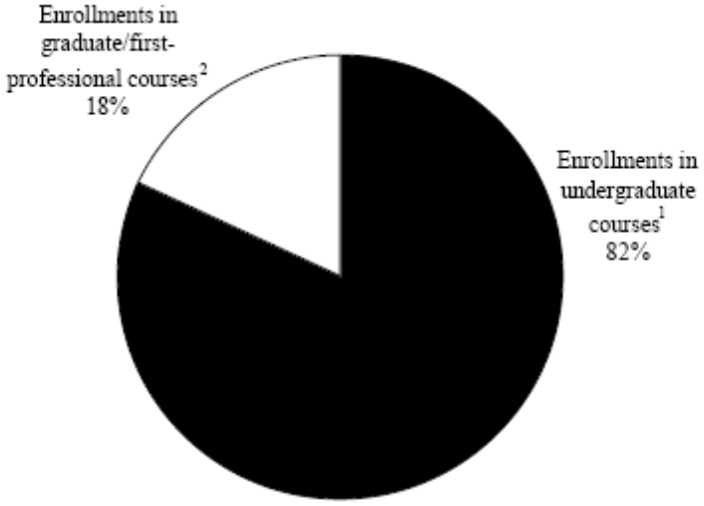
SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Enrolment in Distance Education Courses

Institutions reported the total enrolment in all distance education courses and the enrolment in college-level, credit-granting distance education courses, both overall and by course level (i.e., undergraduate or graduate/first-professional). If a student was enrolled in multiple courses, institutions were instructed to count the student for each course in which he or she was enrolled. Thus, enrolments may include duplicated counts of students.

- In the 12-month 2000–2001 academic year, there were an estimated 3,077,000 enrolments in all distance education courses offered by 2- and 4-year institutions (table 48).6 There were an estimated 2,876,000 enrolments in college-level, credit-granting distance education courses, with 82 percent of these at the undergraduate level (See Figure and Table below).

Figure 27. Percentage distribution of enrolment in college -level, credit-granting distance education courses in 2-year and 4-year Title IV degree-granting institutions, by level of course offerings: 2000–2001.



[1]Percent based on the 2,350,000 enrollments in undergraduate distance education courses out of 2,876,000 total enrollments in college-level, credit-granting distance education courses.

[2]Percent based on the 510,000 enrollments in graduate/first-professional distance education courses out of 2,876,000 total enrollments in college-level, credit-granting distance education courses.

NOTE: Enrollments may include duplicated counts of students, since institutions were instructed to count a student enrolled in multiple courses for each course in which he or she was enrolled. Figure derived from data in table 4. Enrollments in undergraduate and graduate/first-professional distance education courses do not sum to the total enrollment because of rounding and missing data. (See appendix A for details.)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Table 25. Number of 2-year and 4-year Title IV degree-granting institutions that offered distance education courses, total enrolment in all distance education courses by institutional type and size: 2000–2001.

Institutional type and size	Total number of institutions	Number of institutions that offered distance education courses	Total number of enrollments in all distance education courses	Number of enrollments in college-level, credit-granting distance education courses		
				Enrollment in courses at both levels	Enrollments in undergraduate courses	Enrollments in graduate/ first-professional courses
All institutions	4,130	2,320	3,077,000	2,876,000	2,350,000	510,000
Institutional type[1]						
Public 2-year	1,070	960	1,472,000	1,436,000	1,435,000	‡[2]
Public 4-year	620	550	945,000	888,000	566,000	308,000
Private 4-year	1,800	710	589,000	480,000	278,000	202,000
Size of institution						
Less than 3,000	2,840	1,160	486,000	460,000	368,000	91,000
3,000 to 9,999	870	770	1,171,000	1,132,000	932,000	197,000
10,000 or more	420	400	1,420,000	1,284,000	1,049,000	222,000

‡Reporting standards not met.

[1]Data for private 2-year institutions are not reported in a separate category because too few private 2-year institutions in the sample offered distance education courses in 2000–2001 to make reliable estimates. Data for private 2-year institutions are included in the totals and in analyses by other institutional characteristics.

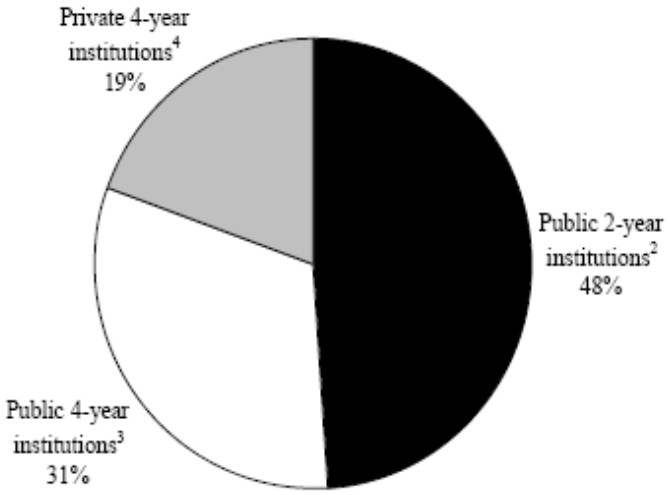
[2]Two-year branches of public 4-year institutions occasionally offer graduate/first-professional level courses.

NOTE: Enrollments may include duplicated counts of students, since institutions were instructed to count a student enrolled in multiple courses for each course in which he or she was enrolled. Detail may not sum to totals because of rounding, missing data, or because too few cases were reported for a reliable estimate for private 2-year institutions. (See appendix A for details.)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Consistent with the distributions of institutions that offered distance education courses, most of the enrolments were in public 2-year and public 4-year institutions. Public 2-year institutions had the greatest number of enrolments in distance education courses, with 48 percent of the total enrolments in distance education. Public 4- year institutions had 31 percent of the total, and private 4-year institutions had 19 percent of the total. This distribution by institutional type was similar for the number of distance education course enrolments in all college-level, credit-granting courses, and for distance education course enrolments at the undergraduate level. At the graduate/first-professional level, public 4-year institutions had a larger number of enrolments than did private 4-year institutions (60 percent compared with 40 percent). The results are depicted in the figure below:

Figure 28. Percentage distribution of enrolment in all distance education courses in 2-year and 4-year Title IV degree-granting institutions, by institutional type: 2000–2001



[1]Data for private 2-year institutions are not reported in a separate category because too few private 2-year institutions in the sample offered distance education courses in 2000–2001 to make reliable estimates.

[2]Percent based on the 1,472,000 enrollments in distance education courses in public 2-year institutions, out of 3,077,000 total enrollments in all distance education courses.

[3]Percent based on the 945,000 enrollments in distance education courses in public 4-year institutions, out of 3,077,000 total enrollments in all distance education courses.

[4]Percent based on the 589,000 enrollments in distance education courses in private 4-year institutions, out of 3,077,000 total enrollments in all distance education courses.

NOTE: Enrollments may include duplicated counts of students, since institutions were instructed to count a student enrolled in multiple courses for each course in which he or she was enrolled. Figure derived from data in table 4. Detail may not sum to totals because of rounding, missing data, or because too few cases were reported for a reliable estimate for private 2-year institutions. (See appendix A for details.)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information Sy stem, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Number of Distance Education Courses

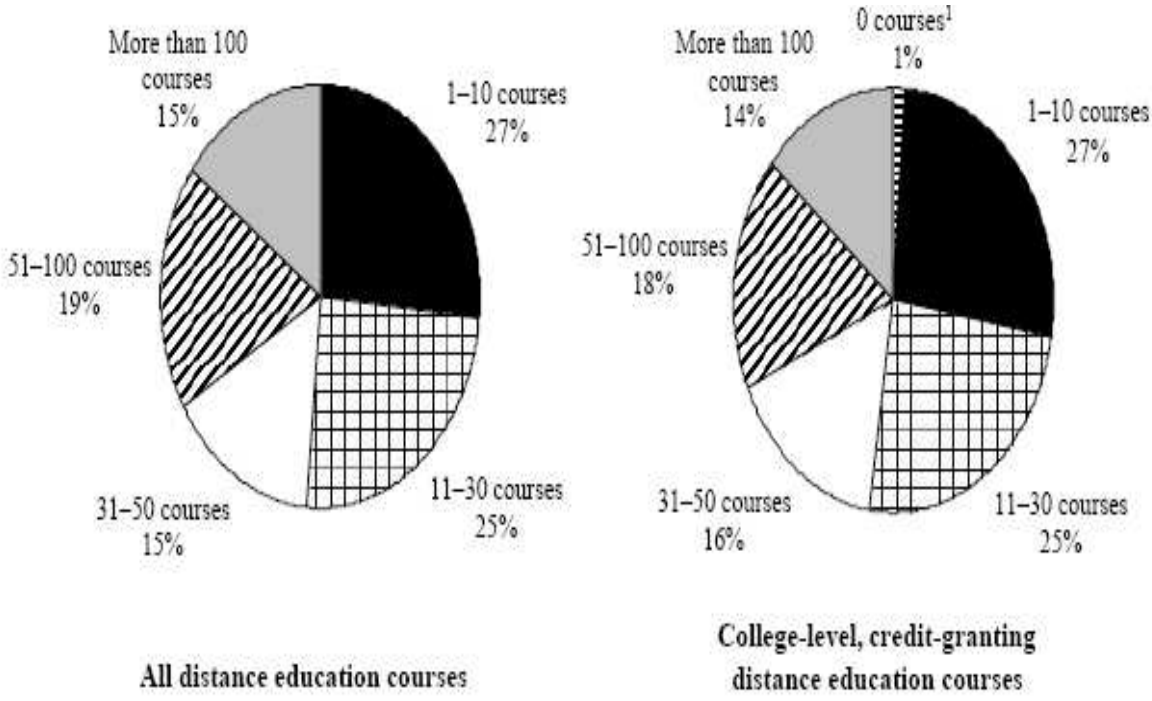
Institutions reported the total number of different distance education courses and the total number of different college-level, credit-granting distance education courses, both overall and by course level (i.e., undergraduate or graduate/first-professional). If a course had multiple sections or was offered multiple times during the academic year, institutions were instructed to count it as only one course.

- An estimated 127,400 different distance education courses for any level or audience were offered by 2- and 4-year institutions during the 12-month 2000–2001 academic year (See figure below). An estimated 118,100 different college-level, credit-granting distance education courses were offered, with most (76 percent) at the undergraduate level.
- Consistent with the distributions of institutions that offered distance education courses and the enrolments in these courses, most of the distance education courses were offered by public 2- and 4-year institutions. Public 2-year institutions offered the greatest number of distance education courses, with 55,900 out of 127,400 courses, or 44 percent of the total number of distance education courses. Public 4-year institutions offered 43,100 courses (34 percent of the total), and private 4-year institutions offered 26,500 courses (21 percent of the total).This pattern of variation by institutional type was also similar for

all college-level, credit-granting distance education courses and for courses at the undergraduate level. Public 4- year institutions offered more different distance education courses at the graduate/first professional level than did private 4-year institutions (17,600 compared with 9,800).

- About half of the institutions that offered distance education courses in the 2000–2001 academic years offered 30 or fewer distance education courses; 27 percent offered 10 or fewer courses, and 25 percent offered 11 to 30 courses. The distribution is similar for the number of college-level, credit-granting courses.

Figure 29. Percentage distribution of 2-year and 4-year Title IV degree-granting institutions offering distance education courses, by the number of distance education courses offered and type of distance education course: 2000–2001.



[1]One percent of the institutions that offered any distance education courses did not offer college-level, credit-granting distance education courses.

NOTE: Percentages are based on the estimated 2,320 institutions that offered any distance education courses in 2000–2001. If a course had multiple sections or was offered multiple times during the academic year, institutions were instructed to count it as only one course. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Table 26. Number of 2-year and 4-year Title IV degree-granting institutions that offered distance education courses, total number of different distance education courses, and the number of different college-level, credit-granting distance education courses, by institutional type and size: 2000–2001

Institutional type and size	Total number of institutions	Number of institutions that offered distance education courses	Total number of different distance education courses	Number of different college-level, credit-granting distance education courses offered		
				Courses at both levels	Undergraduate courses	Graduate/first-professional courses
All institutions	4,130	2,320	127,400	118,100	89,600	27,500
Institutional type[1]						
Public 2-year	1,070	960	55,900	51,000	50,900	100[2]
Public 4-year	620	550	43,100	40,700	22,000	17,600
Private 4-year	1,800	710	26,500	24,700	14,900	9,800
Size of institution						
Less than 3,000	2,840	1,160	34,600	33,200	26,800	6,500
3,000 to 9,999	870	770	52,300	47,200	37,300	9,300
10,000 or more	420	400	40,500	37,800	25,600	11,800

[1]Data for private 2-year institutions are not reported in a separate category because too few private 2-year institutions in the sample offered distance education courses in 2000–2001 to make reliable estimates. Data for private 2-year institutions are included in the totals and in analyses by other institutional characteristics.

[2]Two-year branches of public 4-year institutions occasionally offer graduate/first-professional level courses.

NOTE: Detail may not sum to totals because of rounding, missing data, or because too few cases were reported for a reliable estimate for private 2-year institutions. (See appendix A for details.)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Table 27. Percentage distribution of 2-year and 4-year Title IV degree-granting institutions offering distance education courses, by the number of distance education courses offered and type of course: 2000–2001

Number of distance education courses	Percentage distribution of institutions by type of courses offered	
	All distance education courses	College-level, credit-granting distance education courses
0[1]	†	1
1–10	27	27
11–30	25	25
31–50	15	16
51–100	19	18
More than 100	15	14

† Not applicable.

[1]One percent of the institutions that offered distance education courses did not offer college-level, credit-granting distance education courses.

NOTE: Percentages are based on the estimated 2,320 institutions that offered any distance education courses in 2000–2001. If a course had multiple sections or was offered multiple times during the academic year, institutions were instructed to count it as only one course. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Distance Education Technologies

Institutions indicated the types of technology that were used as a primary mode of instructional delivery in the 12-month 2000–2001 academic year. The institutions also reported their plans for the next 3 years concerning the number of distance education courses expected to be offered using various technologies as the primary mode of instructional delivery.

Technologies used between 2000-2001.

- Among 2- and 4-year institutions offering distance education courses in 2000–2001, the Internet and two of the video technologies were most often used as primary modes of instructional delivery for distance education courses. The majority of these institutions (90 percent) reported that they offered Internet courses using asynchronous computer-based instruction as a primary mode of instructional delivery (table 10). In addition, 51 percent reported using two-way video with two-way audio, 43 percent offered Internet courses using synchronous computer-based instruction, and 41 percent used one-way pre-recorded video as a primary mode of instructional delivery for distance education courses.
- Twenty-nine percent of institutions offering distance education courses used CD-ROM as a primary mode of instructional delivery, and 19 percent of institutions used multi-mode packages (table 10). The remaining technologies were used as a primary mode of instructional delivery by 3 to 11 percent of these institutions.
- Use of the various technologies as a primary mode of instructional delivery for distance education courses showed some variation by institutional type (See Table below). Two-way video with two-way audio was used as a primary mode of instructional delivery more often by public 4-year (80 percent) than public 2-year (60 percent) or private 4-year institutions (22 percent), and by public 2-year more often than private 4-year institutions. Use of multimode packages followed this same pattern of differences. One-way pre-recorded video showed a somewhat different pattern by institutional type. Public 2-year institutions were more likely to use one-way pre-recorded video than were either public or private 4-year institutions (57 percent compared with 40 percent and 24 percent), and public 4-year institutions were more likely to use this mode of delivery than were private 4-year institutions. Internet courses using synchronous computer-based instruction were more likely to be used as a primary mode of instructional delivery by public 4-year (55 percent) than by public 2-year (40 percent) or private 4-year institutions (35 percent), while Internet courses using asynchronous computer based instruction were more likely to be used as a primary mode of delivery by public 2-year (95 percent) than by public 4-year (87 percent) or private 4-year institutions (86 percent).

Table 28. Percent of 2-year and 4-year Title IV degree-granting institutions offering any distance education courses, by primary technology for instructional delivery for distance education courses, and by institutional type and size: 2000–2001

Institutional type and size	Primary technology for instructional delivery										
	Two-way video with two-way audio[1]	One-way video with two-way audio	One-way live video	One-way pre-recorded video	Two-way audio trans-mission	One-way audio trans-mission	Syn-chronous Internet courses[2]	Asyn-chronous Internet courses[3]	CD-ROM	Multi-mode packages	Other tech-nologies
All institutions.....	51	11	8	41	9	11	43	90	29	19	3
Institutional type[4]											
Public 2-year.....	60	13	9	57	7	11	40	95	30	21	2
Public 4-year.....	80	15	13	40	11	10	55	87	29	29	5
Private 4-year.....	22	6	4	24	11	12	35	86	23	11	3
Size of institution											
Less than 3,000.....	39	6	4	29	8	9	36	87	22	11	2
3,000 to 9,999.....	57	10	10	49	10	10	46	92	31	22	3
10,000 or more.....	70	26	17	61	12	18	56	95	43	36	5

[1]The wording in the questionnaire was "Two-way video with two-way audio (i.e., two-way interactive video)."

[2]The wording in the questionnaire was "Internet cour ses using synchronous (i.e., simultaneous or "real time") computer-based instruction."

[3]The wording in the questionnaire was "Internet courses using asynchronous (i.e., not simultaneous) computer-based instruction."

[4]Data for private 2-year institutions are not reported in a separate category because too few private 2-year institutions in the sample offered distance education courses in 2000–2001 to make reliable estimates. Data for private 2-year institutions are included in the totals and in analyses by other institutional characteristics.

NOTE: Percentages are based on the estimated 2,320 institutions that offered any distance education courses in 2000–2001. Percentages sum to more than 100 because institutions could use differenttypes of technologies as primary modes of instructional delivery for different distance education courses.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Plans for Use of Technologies

Institutions that offered distance education in 2000–2001 or that planned to offer distance education in the next 3 years indicated their plans concerning the number of distance education courses that would be offered using the various technologies as a primary mode of instructional delivery.

- Eighty-eight percent of the institutions indicated plans to start using or increase the number of Internet courses using asynchronous computer-based instruction as a primary mode of instructional delivery for distance education courses. Sixty-two percent of institutions planned to start using or increase the use of synchronous computer-based instruction, 40 percent planned to start using or increase using two-way video with two-way audio, 39 percent planned to start using or increase using CD-ROMs, and 31 percent planned to start using or increase using multi-mode packages. About a quarter (23 percent) planned to start using or increase using one-way pre-recorded video. From 5 to 13 percent of institutions had plans to start using or increase using the other listed technologies.
- Thirteen percent of institutions indicated that they planned to keep the same number of courses using two-way video with two-way audio, while 4 percent reported plans to reduce the number of courses with this technology. For one-way pre-recorded video, a

similar pattern was observed. Fifteen percent of institutions indicated that they planned to keep the same number of courses using one-way pre-recorded video, and 6 percent planned to reduce the number of courses using this technology.

- Institutions that offered distance education in 2000–2001 were more likely than institutions that planned to start offering distance education in the next 3 years to indicate that they planned to start using or increase using two-way video with two-way audio (43 percent compared to 26 percent) and multi-mode packages (35 compared to 14 percent)

Table 29. Percentage distribution of 2-year and 4-year Title IV degree-granting institutions that offered distance education courses in 2000–2001 or planned to offer distance education in the next 3 years, by the planned level of distance education course offerings over the next 3 years, and by the planned primary technology for instructional delivery: 2002

Primary technology for instructional delivery	Planned level of distance education course offerings			
	Reduce the number	Keep the same number	Start or increase the number	No plans to use the technology
Two-way video with two-way audio (two-way interactive video)	4	13	40	43
One-way video with two-way audio	2	4	12	82
One-way live video	1	4	11	84
One-way prerecorded video	6	15	23	56
Two-way audio transmission	1	4	9	86
One-way audio transmission	1	5	13	81
Internet courses using synchronous computer-based instruction	1	4	62	33
Internet courses using asynchronous computer-based instruction	1	6	88	6
CD-ROM	1	8	39	53
Multi-mode packages	‡	2	31	67
Other technologies	#	#	5	94

Rounds to zero.

‡ Reporting standards not met.

NOTE: This question was asked in the present tense rather than referring to 2000–2001, and thus the estimates reflect the responses of the institutions at the time the data were collected in spring 2002. Percentages are based on the estimated 2,580 institutions that either offered distance education courses in 2000–2001 (2,320 institutions), or that planned to offer distance education courses in the next 3 years and could report about their technology plans (490 institutions). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

Table 30. Percent of 2-year and 4-year Title IV degree-granting institutions that planned to start or increase their use of various technologies as the primary mode of instructional delivery during the next 3 years, by distance education program status and type of technology: 2002.

Primary technology for instructional delivery	Distance education program status	
	Institutions that offered distance education in 2000–2001[1]	Institutions that planned to offer distance education in the next 3 years[2]
Two-way video with two-way audio (two-way interactive video)	43	26
One-way video with two-way audio	12	12
One-way live video	11	14
One-way prerecorded video	22	28
Two-way audio transmission	9	9
One-way audio transmission	12	14
Internet courses using synchronous computer-based instruction	64	52
Internet courses using asynchronous computer-based instruction	88	86
CD-ROM	39	39
Multi-mode packages	35	14
Other technologies	5	3

[1]Percentages are based on the estimated 2,320 institutions that offered distance education courses in 2000–2001.

[2]Percentages are based on the estimated 490 institutions that planned to offer distance education courses in the next 3 years and could report about their technology plans.

NOTE: This question was asked in the present tense rather than referring to 2000–2001, and thus the estimates reflect the responses of the institutions at the time the data were collected in spring 2002.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Postsecondary Education Quick Information System, "Survey on Distance Education at Higher Education Institutions, 2000–2001," 2002.

SURVEY 3

ALLEN, I.E. AND SEAMAN, J. SIZING THE OPPORTUNITY: THE QUALITY AND EXTENT OF ONLINE EDUCATION IN THE UNITED STATES, 2002 AND 2003, HTTP://WWW.SLOAN-C.ORG/PUBLICATIONS/SURVEY/INDEX.ASP, NEEDHAM, MA: SLOAN-C, 2003.

The 2003 Sloan Survey of Online Learning was supported by a grant from the Sloan Foundation with the collaboration of the Sloan Consortium and the Sloan Center for On-Line Education (SCOLE). An e-mail with a link to a web-based survey form was sent to Chief Academic Officers at degree granting institutions in the USA. Of 3,033 surveys sent, 994 responses were received, representing a 32.8% response rate. All institutional descriptive data for the analysis came from IPEDS. After the data were compiled from the surveys and linked to the IPEDS database, the responders and no responders were compared to create weights, to ensure that the survey results reflected the characteristics of the entire population of schools. The survey analysis is based on a comprehensive nation sample of primary campuses for all active USA postsecondary degree granting institutions that are open to the public.

Strategy of Online Learning

Two-thirds of all schools believe that online learning is critical to their long term strategy and a majority believe that the learning outcomes in online education are the same or somewhat superior to face-to-face education. Overall, fewer than 20% of all schools surveyed believe online

education is NOT part of their long-term strategy. However, when examined by type of school, it is the schools in the Public sector that believe most strongly that online education is a critical strategy, while Private, non-profit and for-profit schools are quite similar in their degree of agreement with this statement. For details see table below:

Table 31: Online education is critical to long-term strategy

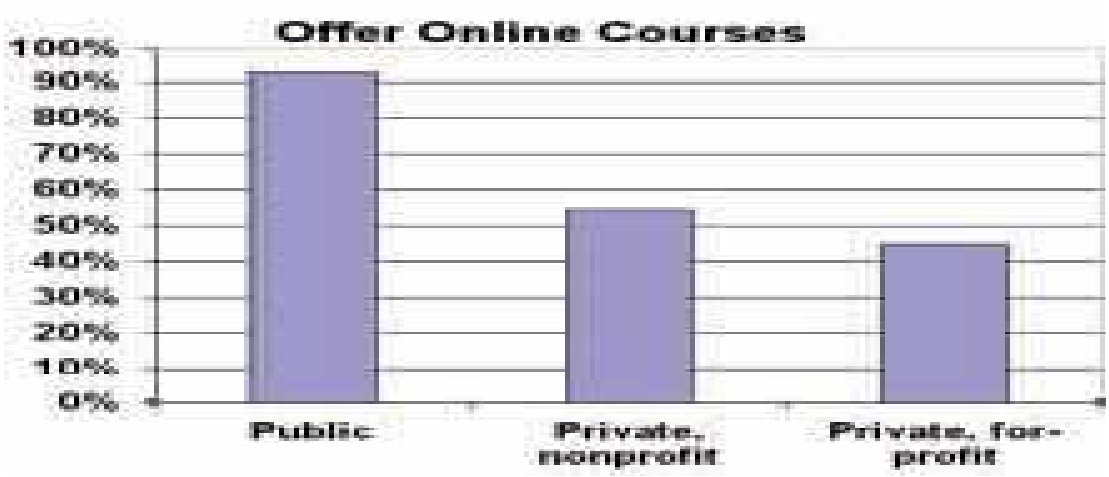
	Public	Private, nonprofit	Private, for-profit	Total
Agree	85.7%	52.9%	54.6%	66.8%
Neutral	6.6%	18.0%	16.1%	12.7%
Disagree	7.7%	29.0%	29.3%	19.5%

Source: Sloan Survey, 2002, 2003

Who Offers Courses Online?

Public institutions have a large lead over private institutions in offering both online courses and online degree programs.

Figure 30: Institutions that offer online courses



Source: Sloan Survey, 2002, 2003

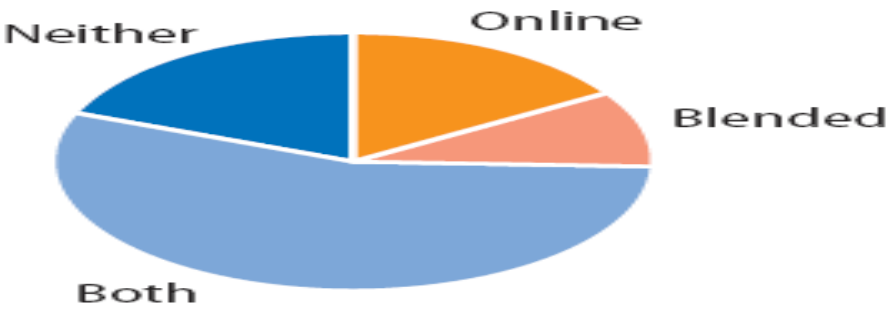
Table 32: Does your School Offer Online Programs for a Degree?

	Public	Private, nonprofit	Private, for-profit	Total
Yes	48.9%	22.1%	20.2%	34.5%
No	51.1%	77.9%	79.8%	65.5%

Source: Sloan Survey, 2002, 2003

From the data above, the Public sector offers the majority of all online courses, with over 90% of all institutions offering at least one online course. This is in contrast to Private institutions, about half of which offer at least one online course. Among the Private institutions, the nonprofits are slightly ahead of the for-profit schools, with 54.5% offering at least one online course as compared to 44.9% of the for-profit institutions. The difference between Public and Private Institutions is even more dramatic when online degree programs are examined (i.e., where a student can take at least 80% of their courses for a degree program online). More than twice as many Public schools as Private offer online degrees. Almost half of all schools in the Public sector offer an online degree (48.9%) as compared to slightly more than one-fifth in the Private sector:

Figure 31: Types of Offerings- All Schools



Source: Sloan Survey, 2002, 2003

Table 33: What Types of Courses are offered?

	Public	Private, nonprofit	Private, for-profit	Total
Both Online and Blended	80.2%	36.7%	21.2%	55.6%
Online Only	12.5%	17.8%	23.7%	16.0%
Blended Only	3.8%	17.1%	6.6%	9.6%
Neither	3.4%	28.4%	48.5%	18.8%

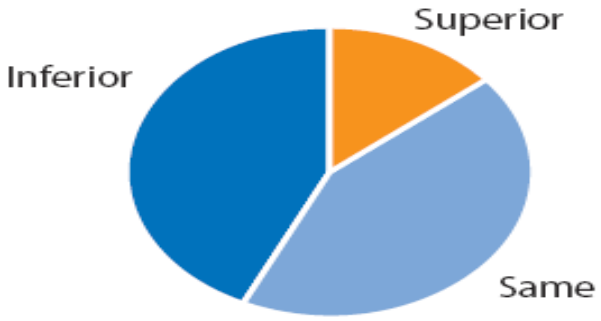
Source: Sloan Survey, 2002, 2003

From the data above, all schools are more likely to offer a variety of learning paradigms rather than offering only online courses. Instead of offering only online courses or only blended courses, over 80% of Public institutions offer both online and blended courses. This compares to 12.5% offering only online courses and 3.8% offering only blended courses. This pattern is true for Private, non-profit schools as well. However, Private, for-profit schools are equally likely to offer only online courses and a combination of both online and blended courses.

It may be the case that Public and Private non-profit institutions offered blended courses as an initial first step prior to offering online courses while Private for-profit institutions are moving directly into online courses.

Learning Outcomes

Figure 32: Learning Outcomes Online Education Today



Source: Sloan Survey, 2002, 2003

Table 34: Comparing Learning Outcomes of Face-To-Face and Online Education.

	Public	Private, nonprofit	Private, for-profit	Total
Superior	17.4%	7.0%	12.0%	12.3%
Same	57.6%	32.8%	39.6%	44.9%
Inferior	24.9%	60.3%	48.5%	42.8%

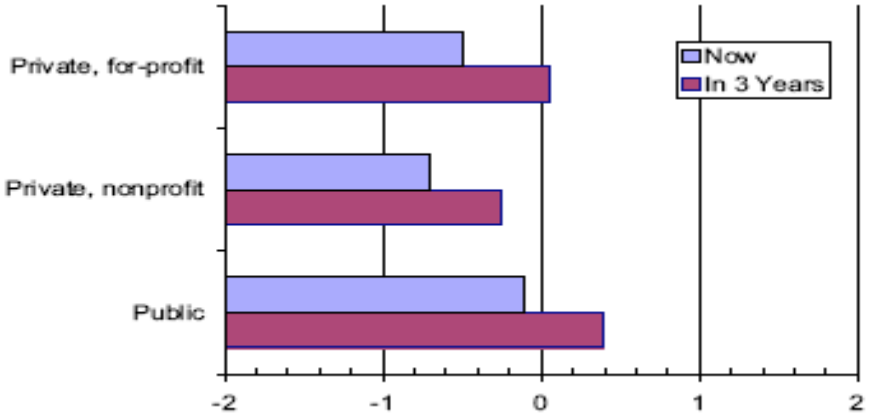
Source: Sloan Survey, 2002, 2003

From the data above, a majority of academic leaders at institutions in the Public sector rank learning outcomes for online courses very close to those in face-to-face courses while a majority of leaders at all institutions agree that online learning outcomes will equal or surpass those of face-to face courses within three years. Leaders at the Private, non-profit schools expect a dramatic change over the next three years, moving from less than 40 percent ranking online learning outcomes as the same as or superior to face-to-face to over 60 percent of these schools ranking online learning outcomes as the same as or superior to face-to-face learning outcomes.

To look more deeply at this perception, the five-point scale used for ranking was converted to a numeric scale ranging from -2 (Inferior) to +2 (Superior, with zero equivalent to a ranking of "The Same"), and an average (mean) was calculated for each group within our study. An average value greater than zero (positive) for a particular group on this scale indicates that the respondents rated, on average, learning outcomes for online as superior to those for face-to-face,

and correspondingly, a value below zero (negative) indicates that online was viewed as inferior to face-to-face. The analysis examines the respondent assessment of the comparison of learning outcomes for online education with those of face-to-face instruction.

Figure 33: Learning Outcomes



Source: Sloan Survey, 2002, 2003

From the data above every group, even Public institutions where over 80% are offering online courses, rate the current learning outcomes of online courses, on average, as somewhat inferior to those of face-to-face instruction. However, given the amount of discussion about perceived lower quality of online offerings, these results are not as negative as might have been expected.

Future Trends

Growth Forecasts in Online Learning

Using each institution's current online enrolment and their own projection of the change in that enrolment, enrolment for the Fall of 2003 is expected to exceed 1.9 million students, or a one-year enrolment growth rate of close to 20%. No previous surveys of strictly online learners (as apart from distance learners) exist for direct comparison. The Table below gives details.

Table 35: Students Taking at Least One Online Course: Fall 2002 and projected Fall 2003

	Total Students Fall 2002	Projected Students Fall 2003	Percentage Growth
Total	1,602,970	1,920,734	19.8%

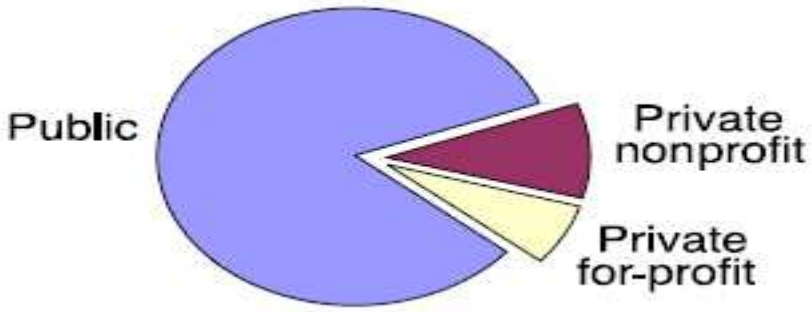
Source: Sloan Survey, 2002, 2003

SURVEY 4

ALLEN, I.E. AND SEAMAN, J. ENTERING THE MAINSTREAM: THE QUALITY AND EXTENT OF ONLINE EDUCATION IN THE UNITED STATES, 2003 AND 2004, HTTP://WWW.SLOAN-C.ORG/PUBLICATIONS/SURVEY/INDEX.ASP, NEEDHAM, MA: SLOAN-C, 2004.

This survey represents the second annual study on the state of online education in U.S. Higher Education. The survey is based on responses from over 1,170 colleges and universities across the United States. Of 3,068 surveys sent, 1,170 responses were received, representing a 38.1% response rate. The response rate among regionally-accredited schools was 43.0%. Key findings extracted from the report are presented below:

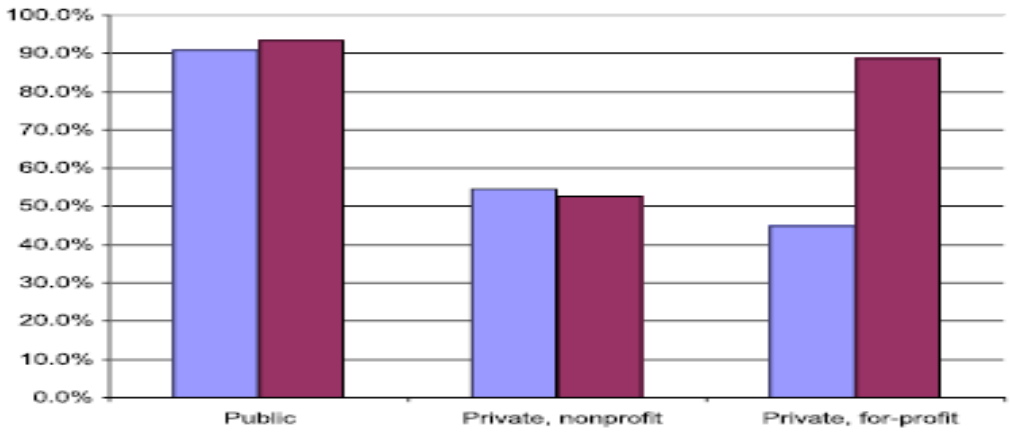
Figure 34: Strategy of Online Learning: Number of Online Students Fall 2003



Source: Sloan Survey, 2003, 2004

From the data above the number and growth of students enrolled in at least one online course continues to be concentrated among public institutions. This sector had 82.9% of all online students for Fall 2003. The number of online students at public institutions during the Fall 2003 term (1,634,770) exceeds the total number at all institutions the preceding year (1,602,970). Private, non-profit institutions account for only 200,000 online students, while Private, for profit institutions represents only about two thirds as many students as the nonprofits.

Figure 35: Offer Online Courses



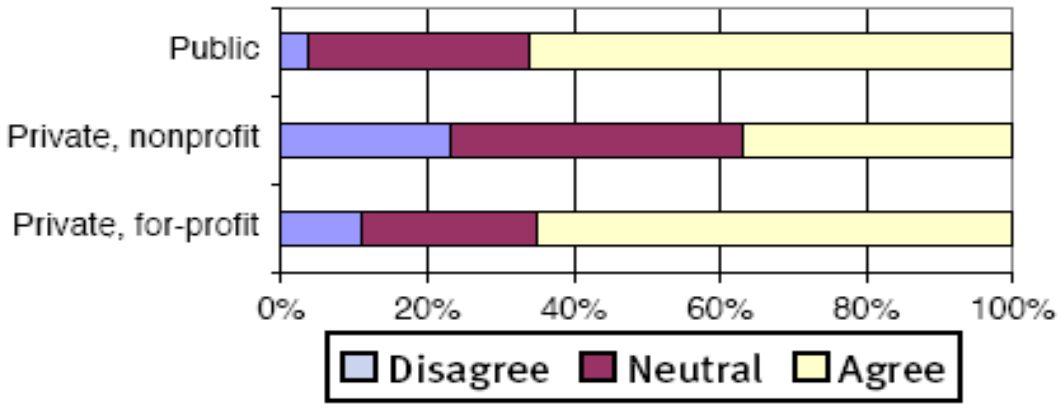
Source: Sloan Survey, 2003, 2004

From the data above virtually all public institutions offer online courses, at a rate that has remained constant at around 90% over the two survey years. The largest growth in the offering of online courses is among the Private, for-profit institutions. Although the numbers of schools in this sector, and the number responding to the survey, are small, this is a significant increase from last year's survey. The percentage of private, for-profit schools offering at least one online course increased from 44.9% in last year's study to 88.6% this year. There was a very small, non-significant drop in the percent of Private; non-profit schools offering online courses (54.5% to 52.6%).

Online Learning as a Long Term Strategy

The evidence from the report is that most institutions do believe in the importance of online learning. Within this survey academic leaders rated their level of agreement using a seven point scale ranging from strong disagreement ("1"), through neutral ("4") and up to strong agreement ("7"). Over one-half (52.6%) of all schools surveyed selected one of the top two ratings ("6" or "7") and believe that online education is critical to their institution's long term strategy, a response that is virtually the same as last year's (51.1%). A bit over a third of the schools (35.1% in 2004 and 36.7% in 2003) are neutral (a rating of "3", "4", or "5"), with only a small fraction disagreeing (12.3% in 2004 and 12.2% in 2003 giving a rating of "1" or "2").

Figure 36: Online Education is Critical to Long-Term Strategy



Source: Sloan Survey, 2003, 2004

From the data above; virtually all Public institutions (96.2%) and 89.1% of Private, for-profit institutions agree or are neutral to the statement that online learning is critical to the long-term strategy of their institution. Over three-quarters, 76.9%, of Private, non-profit institutions agree or are neutral.

Measuring the Quality of Online Learning-Learning Outcomes.

One of the earliest perceptions about online learning was that it was of lower quality than face-to-face instruction. The evidence from last year's study showed academic leaders did not agree with this assessment. When asked to compare learning outcomes in online courses with those for face-to-face instruction, academic leaders put the two on very close terms, and expected the online offerings to continue to get better relative to the face-to-face option. Results from this year's survey show that academic leaders continue to believe in the quality of their online offerings. Details are presented below:

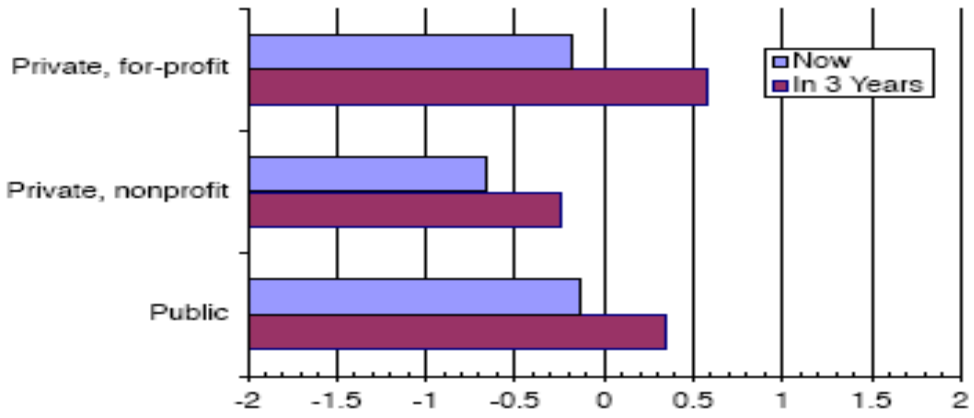
Table 36: Learning Outcomes in Online Education are currently

	Public		Private, nonprofit		Private, for-profit	
	2003	2004	2003	2004	2003	2004
Superior	17.4%	13.4%	7.0%	8.3%	12.0%	4.3%
Same	57.6%	62.0%	32.8%	35.5%	39.6%	78.3%
Inferior	24.9%	24.5%	60.3%	56.2%	48.5%	17.3%

Source: Sloan Survey, 2003, 2004

From the data above over 50% of respondents rated online learning outcomes as equivalent to as or better than their face-to-face counterparts. However, this majority, when examined shows Private, non-profit institutions rate online learning outcomes as inferior or equivalent while public and private, for-profit institutions rate online learning outcomes as equivalent or superior. This finding has not changed from last year's report. The greatest change has been in the Private, for-profit institutions where significantly more Chief Academic Officers believe learning outcomes are now equivalent in online and face-to-face courses (78.3% in 2003 vs. 39.6% in 2002).Thus from the survey a majority rate online learning outcomes as equivalent to face-to-face learning.

Figure 37: Learning Outcomes



Source: Sloan Survey, 2003, 2004

From the data above; every group, even Public institutions where over 90% are offering online courses, rate the current learning outcomes of online courses, on average, as slightly inferior to those of face-to-face instruction. However, given the amount of discussion about perceived lower quality of online offerings, these results are not as negative as might have been expected.

FUTURE TRENDS

Growth of Online Enrolments

The main question in this regard is whether the rapid increase in online enrolments for the last several years will continue, or will schools begin to reach a plateau? The previous study, *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003* reported that over 1.6 million students were studying online in the fall of 2002, and that schools expected that number to grow substantially by the fall of 2003 to 1.9 million students. The nearly 20% expected growth rate in online enrolments far exceeds the overall rate of growth for the entire higher education student population.

Results from the institutions surveyed in 2004 show that online enrolment continue to grow, and at a faster rate than even the institutions themselves had predicted. The total number of students taking at least one online course in the fall of 2003 grew to 1,971,397 from 1.6 million the previous year (for a year-to-year growth rate of 22.9%) This exceeded what the institutions had predicted a year ago (1,920,734, or a 19.8% growth rate). The school's predicted growth rate for Fall 2003 to Fall 2004 is even higher at 24.8%, for an expected total of over 2.6 million students learning online.

Details combining information from both surveys are presented below:

Table 37: Number of students taking at least one online course

Time Period	Number of Students
Reported for Fall 2002:	1,602,970
Predicted Spring 2003 for Fall 2003:	1,920,734
Reported for Fall 2003:	1,971,397
Predicted Spring 2004 for Fall 2004:	2,634,189

Source: Sloan Survey, 2003, 2004

Expected Growth in Online

Table 38: Enrolment Fall 2003 to Fall 2004

Enrollment Size	Mean Percent Increase
Under 1500	41.6%
1500 to 2999	16.3%
3000 to 7499	22.1%
7500 to 14999	14.7%
15000+	16.4%

Source: Sloan Survey, 2003, 2004

The percent growth in online enrolment for Private, for-profit institutions (42.8%) is double the growth rate expected at Public institutions (20.3%) and nearly double the rate expected in Private, non-profit schools (24%). The expected rate of growth differs with the size of the school; the smallest schools are expecting the largest percentage increases. Although public institutions are expecting the smallest percentage increase, this still translates to a large increase in the total number of online students, since these institutions represent over 80% of all online students. The larger expected growth rates for the Privates (both for-profit and non-profit) indicate that they may be closing the enrolment gap to the Public schools a bit, the Private for-profit sector much faster than the Private, non-profit schools.

SURVEY 5

ALLEN, I.E. AND SEAMAN, J. GROWING BY DEGREES: ONLINE EDUCATION IN THE UNITED STATES, 2005, HTTP://WWW.SLOAN-C.ORG/PUBLICATIONS/SURVEY/INDEX.ASP, NEEDHAM, MA: SLOAN-C, 2005.

Online Education is Part of Long-Term Strategy for Most Schools

The proportion of institutions which believe that online education is important to their long-term strategy continues to increase, growing from 48% of all institutions in 2003 to 53% in 2004 and 56% in 2005. Details are presented in the Table below:

Table 39: Online Education is Critical to Long-Term Strategy: 2003, 2004, and 2005

	2003	2004	2005
Agree	48.8%	53.5%	56.0%
Neutral	38.1%	33.7%	30.9%
Disagree	13.1%	12.9%	13.1%

Source: Sloan Survey, 2005.

According to the data above; associates institutions show the sharpest increase over the last three years, moving from 58% to 67% to 72%. By contrast, only 28% of Chief Academic Officers in Baccalaureate schools identified online education as a critical strategy in 2005. A large majority of colleges of all sizes (except for schools under 1500 students) believe online education is critical to their long term strategy (ranging from 61% to 71%). Public institutions continue to express a strong belief that online education is key to their long-term strategy (67% in 2003, 66% in 2004, and 74% in 2005). However, Private, non-profit schools which make this part of their long-term strategy are still in the minority, but the percentage continues to increase (from 35% in 2003 to 37% in 2004 to 41% in 2005).

Impact- Learning Outcomes

Evaluating Online Courses No More Difficult than Face-to-face

Online education is a new experience for many faculty and academic administrators. One concern that has been raised over time is whether it will be more difficult to evaluate your online offerings than face-to-face courses? Will the "distance" between the student and the instructor hinder the ability to assess the pedagogical impact of the course?. Details of results are presented below:

Table 40: It Is More Difficult To Evaluate the Quality of an Online Course - Fall 2004

	Doctoral/Research	Masters	Baccalaureate	Associates	Specialized
Agree	9.7%	14.8%	18.9%	20.3%	20.6%
Neutral	42.9%	52.1%	58.7%	48.8%	56.4%
Disagree	47.4%	33.2%	22.5%	30.9%	23.0%

Source: Sloan Survey, 2005.

From the details above, academic leaders believe that the evaluation of an online course is no more difficult than for face-to-face instruction. Eighty-two percent of respondents do not agree with the statement "It is more difficult to evaluate the quality of an online course than of a face-to-face course." This response is about the same from institutions which offer online courses (83%) and those which don't (80%).

Online Enrolments Show Steady Growth

The number of students taking at least one online course is now over two million, with over 2.3 million total students in Fall 2004. Overall online enrolment increased from 1,971,397 in

Fall 2003 to 2,329,783 for Fall 2004. The number of new students added to those studying online matched the number added for the previous year (around 360,000 in both cases).

The National Center for Education Statistics issues enrolment projections annually. The most recent of these, *Projections of Education Statistics to 2014*, provides three alternatives projections for total enrolments for all degree-granting postsecondary institutions. The projected growth rates for the comparable period (2003 to 2004) range from a low of 0.87% to a high of 1.31%. These numbers are dwarfed by the 18.2% rate observed for the growth of the online enrolments.

Table 41: Number of Students Taking at Least One Online Course

Time Period	Number of Students
Reported for Fall 2002:	1,602,970
Predicted Spring 2003 for Fall 2003:	1,920,734
Reported for Fall 2003:	1,971,397
Predicted Spring 2004 for Fall 2004:	2,634,189
Reported for Fall 2004:	2,329,783

Source: Sloan Survey, 2005.

From the data above, the online enrolment growth, while substantial, did not measure up to what institutions themselves had predicted in 2003 (2.6 million) and the year-to-year growth rate of 18.2% for 2003 to 2004 is somewhat lower than the 22.9% rate observed from 2002 to 2003.

Online Course and Program Offerings are Mainstream

The number of students who study online has been increasing at a rate far in excess of the rate of growth in the overall higher education student population. The two previous reports in this series, *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003* and *Entering the Mainstream: The Quality and Extent of Online Education in the United States, 2003 and 2004*, have demonstrated both the continued growth in the numbers of online students and the wide variety of institutions that provide online offerings. The following analysis examines the penetration rate for online offerings by course type, program type, and program discipline.

Online Course Offerings becoming Pervasive

The evidence from this year's study indicates that online education has made strong inroads in the core offerings for most types of institutions. Eighty-nine percent of all institutions offer face-to-face undergraduate-level courses, and 55% of all institutions offer online undergraduate-level courses. This means that 62.5% of all those institutions that offer undergraduate face-to-face courses also offer the same level course online; in other words, online

has a 62.5% penetration rate for undergraduate-level courses. Far fewer institutions provide graduate-level courses (only 26%), but the percentage of these that also have an online offering is actually slightly higher (65%) than the penetration rate for undergraduate courses.

This analysis does not address the number of courses that institutions offer in face-to-face and online modes, only if they offer any or not. These penetration rates are more dramatic among Doctoral institutions and mid-size (3000–7499 students) schools. Among Doctoral institutions with graduate and undergraduate face-to-face courses, 79% also offer graduate courses online and 64% offer undergraduate courses online. Among mid-sized schools offering graduate and undergraduate face-to-face courses, 80% are also offering undergraduate courses online and 70% are offering graduate courses online.

Table 42: Online Course Penetration - Fall 2004

	Doctoral/Research	Masters	Baccalaureate	Associates	Specialized
Undergraduate Level	64.3%	67.6%	33.9%	77.5%	31.7%
Graduate Level	78.9%	65.8%	32.2%	100.0%	58.2%
Continuing Education	74.1%	48.5%	29.1%	70.8%	26.3%

Source: Sloan Survey, 2005.

From the data above, the 100% penetration rate for graduate-level courses among Associates institutions bears mentioning. Most institutions classified as *Associates* are two-year schools, but a few offer graduate-level courses. The 100% figure indicates that there are very small but equal numbers of Associates institutions with face-to-face and online graduate-level offerings. Survey responses also refute the notion that "non-core" Continuing Education courses account for the bulk of the growth in online learning. While the penetration rate for Continuing Education courses is relatively high (56%), the rates for undergraduate and graduate instruction are even higher. The conclusion is that growth in online course offerings is occurring at all levels—undergraduate and graduate as well as Continuing Education.

Online Program Offerings Show Wide Adoption

Table 43: Online Program Penetration - Fall 2004

Certificate Program	35.3%
Associate Program	39.8%
Bachelors Program	29.9%
Masters Program	43.6%
Doctoral Program	12.4%
Professional Program	15.3%

Source: Sloan Survey, 2005.

From the data above, a similar pattern of broad penetration is found when one examines online programs. Online certificate, professional and traditional degree programs go hand in hand with face-to-face programs. Forty-four percent of schools offering face-to-face Master's programs also offer Master's programs online, the highest penetration rate for any program type. The figure is even more impressive among specific subgroups of institutions. The penetration rate for Master's programs rises to 56% in Public institutions and to 78% in Private, for-profit institutions. Doctoral institutions also have a relatively high penetration rate (66%) for Master's programs. Programs at the Associate level have the next highest overall penetration rate, with four out of every ten schools with face-to-face Associate's programs also offering at least one online version. The Associates and Doctoral/Research institutions represent the bulk of these offerings, but approximately one-quarter of all other school types with Associate's programs also offer online alternatives. Certificate programs show the widest range of penetration by type of institution. Doctoral/Research institutions lead all others, with a penetration rate of 60%. Very few Baccalaureate institutions offer face-to-face Certificate programs (only 29%) and only a small fraction of these (17%) provide an online Certificate offering. Programs at the Bachelor's level are offered in face-to-face format by over 90% of all Doctoral/Research, Master's, and Baccalaureate institutions.

Most Discipline Areas Well Represented Online

In addition to asking if institutions offer courses and programs at particular levels, it is important to understand what discipline areas these courses and programs cover. Questions on program penetration by discipline areas were collected in our 2004 survey and are presented here.

Table 44: Online Penetration by Program Discipline - Fall 2003

Business	42.7%
Computer and Information Sciences	35.1%
Education	24.9%
Health Professions and Related Sciences	31.4%
Liberal Arts and Sciences, General Studies, Humanities	40.2%
Psychology	23.6%
Social Sciences and History	28.4%
All Other Programs	36.2%

Source: Sloan Survey, 2005.

Among disciplines being offered, business program offerings have the highest penetration rate with 43% of colleges offering face-to-face business programs also offering online business programs. Business programs are followed closely by liberal arts and sciences, general studies, humanities (40%), computer and information sciences (35%), and the catch-all category of all

other programs (36%). The penetration rate for business programs is relatively low among Private, non-profit institutions (27%), but greater than half (51%) for Public institutions, and is relatively high for Private, for-profit colleges, where 81% with face-to-face also offer a business program online. The pattern is different for the liberal arts and sciences category where 40% of schools offering face-to-face programs also offer online programs. In this case an equal proportion of Public and Private, for-profit institutions offer online programs (55% for both) while a small minority of Private, non-profit institutions offer online liberal arts and sciences programs (20%).

REVIEW OF QUANTITATIVE DATA- GERMANY

REPORT 1

INFORMATION SOCIETY GERMANY 2006 ACTION PROGRAMME: A MASTER PLAN FOR GERMANY'S ROAD TO THE INFORMATION SOCIETY.

This policy report by the German government prepared in 2006 builds upon the previous initiatives such as the "Innovation and Jobs in the Information Society of the 21st Century" programme (1999) that serves as a strategic master plan for Germany's road to the information society. It aims at boosting access to new media in the "internet for all" programme through increased digitization and use of ICT for education, training and the promotion of equal opportunities.

Policy

Specific policy objectives of the "Information Society Germany 2006" programme which directly or indirectly will go a long way in influencing the development and application of e-learning technologies in higher educational institution in the country are reflected in the Tables below:

Table 45: Details Of National Policy Aimed at Enhancing the Digital Economy.

OBJECTIVE: DIGITAL ECONOMY	WHEN?
Internet use: Increase to 75% of population plus further increase of proportion of female users	By 2005
Broadband: Approx. 7 million broadband lines; Dominant form of Internet access, in line with EU eEurope 2005 programme> 20 million broadband lines (> 50% all homes)	By 2004 By 2005 By 2010

Mobile telecommunication: GSM/GPRS: 65 million subscribers (> 80% of population) Expansion of network provision to 50%	By 2004 By spring 2004 By end 2005
Total digitisation of broadcasting services via aerial, cable and satellite: TV & Radio	By 2010 By 2015

Source: "Information Society Germany 2006" Action Programme Report.

Table 46: Details Of National Policy Aimed at Enhancing Education and Training.

OBJECTIVE: EDUCATION AND TRAINING	When?
Increased penetration of new media in schools, vocational training institutions and universities	By 2006
Development of strategies for use of computers in full-time schools	By 2006
Establishment of a network of excellence and a technical grid infrastructure for German research and business	By 2004
Development and enhancement of e-science applications	As of 2004
Further increase of proportion of women in IT training and computer studies courses to 40%	By 2006

Source: "Information Society Germany 2006" Action Programme Report.

The initiative indicates an increased level of the government initiative in providing the enabling platform for the continual development and application of e-learning technologies. This could impact on the growth of the education sector and specifically the higher education sector.

SURVEY 2

RINN, U., BETT, K., WEDEKIND, J., ZENTEL, P., MEISTER, D. M., HESSE, W.F. (2003): VIRTUAL EDUCATION AT GERMAN INSTITUTIONS OF HIGHER LEARNING IN ALLIANCE. PART I. AN EMPIRICAL STUDY OF THE PROJECT CONCEPTIONS SUBMITTED FOR THE INITIATIVE TO PROMOTE THE USE OF NEW MEDIA IN HIGHER EDUCATION WITH THE GOVERNMENT PROGRAM "NEW MEDIA IN EDUCATION".

The German Ministry for Education and Research (BMBF) is the designated sponsor for the development and testing of multimedia-based and network aided educational materials (2000-2004). The response to the call for proposals to promote the utilization of new (digital) media in higher education was so great – approximately 460 project plans were submitted – that a quasi-representative reproduction of the e-learning ideas, theories and practice, so prevalent in 2000, is

anticipated within the scope of this report. Within the framework of the companion program initiative "Concepts and elements of the virtual university – kevih", the Knowledge Media Research Center in Tuebingen took on the task of reviewing the great variety of possibilities and their potential for an integration of digital media into education, and then evaluating these options according to specific scientific criteria. This report is the end result of this evaluation process and provides insight into data and interpretations. Key extractions made are as follows:

POLICY AND STRATEGY

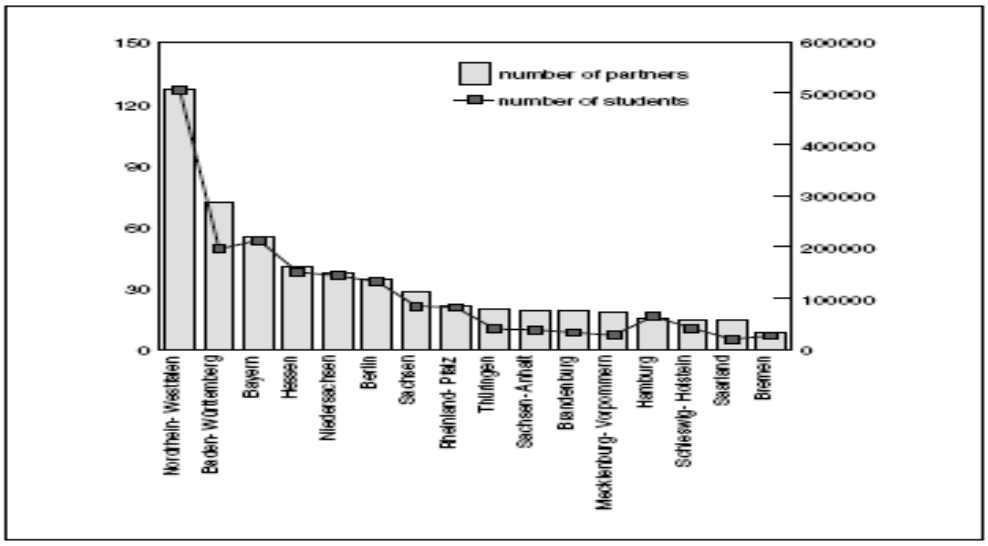
Structure characteristics of the participating project alliances

In the first part of our study, we pursue questions to the macro level, which is we collect basic data that illuminate both the political dimension, as well as the organizational aspects of the projects. Within this context, we detail the German state distribution of the project alliances, their national and international orientation, as well as the institutional and task distribution.

State distribution

In relation to the BMBF promotion of inter-university alliance initiatives, the question is raised as to the degree of program participation among the individual German states. The Figure below shows the individual state participation in the promoted program in direct comparison with the respective number of students.

Figure 39: State distribution of project partners and students by number



Source: kmrc "Kevih Report" Tuebingen 2003.

From the figure above, it is apparent that the German States of Nordrhein-Westfalen, Baden- Württemberg and Bayern have the largest number of partners participating in the promoted program. If one compares the level of participation with the number of students in each state, however, a more equitable picture emerges: proportionate to their student population, the smaller states are participating in the federal program at levels comparable to those of the

larger states. Hence, viewed quantitavely, the financially strong state initiatives in Nordrhein-Westphalia, Baden- Wuerttemberg and Bavaria did not experience a greater level of participation in the federally promoted program.

National and international orientation

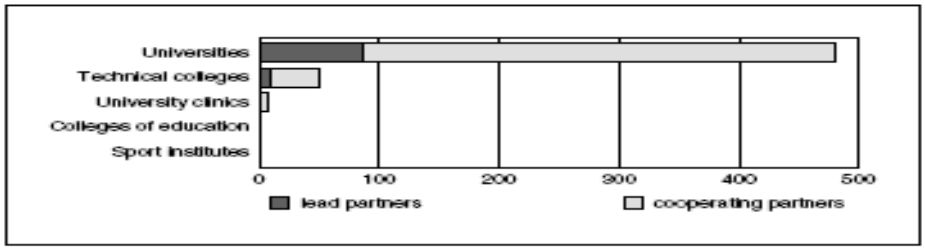
An important component of the funding program's call for proposals is the cooperation of multiple partners from different German states. In accordance with this prescriptive, 67 of the 100 project alliances offer their instructional products in multiple German states. 25 project alliances offer their products nationwide. Only a few offer products go beyond their national borders (four throughout Europe and four worldwide). These numbers lend themselves to the conclusion that the orientation of the alliances supports the amalgamation of German universities and colleges and their increased networking.

The minimal number of alliances, which address the international market, is unusual in that the virtualization of the educational domain is equated with its internationalization. The fact that the funding program does have the potential for an international orientation, however, is reflected by the fact that 30 percent of project alliances are offering their instructional material in English, either exclusively or as an alternative. If the approved project outlines are compared with the unapproved, it becomes clear that a surprising number of unapproved projects (16.8%) did not provide for cooperation across state borders, even though this was one of the criteria for disqualification.

Institutions of higher education and task distribution

As the Figure below shows, universities represent the largest group in the funding program, working as leading project partners in charge of directing the project alliances, or as cooperating partners.

Figure 40: Types of Institutions of Higher Learning among Project Partners



Source: kmrc "Kevih Report" Tuebingen 2003.

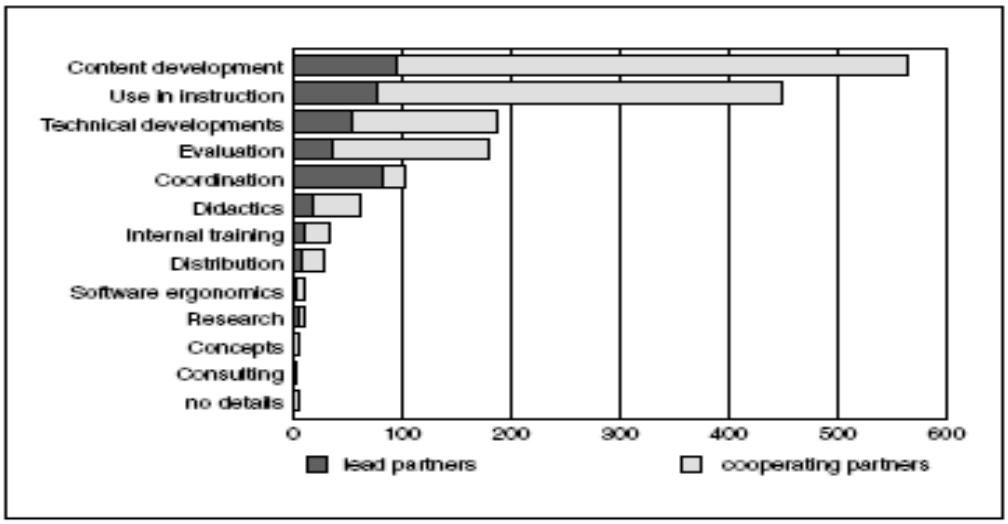
Compared with the total number of institutions of higher learning, the technical colleges are greatly underrepresented. However, this apparent discrepancy can be qualified when one considers the respective student enrolment numbers. There are 1,167,800 students enrolled at German universities and 421,000 students at German technical colleges (see BMBF, 2003). The technical colleges also profit from the measure whereby 20 percent of the instructional materials

are conceived for technical colleges, as well. However, projects with a technical college as leading institution were not given the same level of consideration in the selection process (9% approved projects vs. 20.66% unapproved projects).

Main Orientation of e-learning Projects

According to the report the emphasis of the activities is on content development. Many projects also name its use in instruction as one of their tasks. The different functions performed by the leading and cooperating partners become apparent in the area of coordination, which is primarily assigned to the former (see Figure below).

Figure 41: Project partner task areas



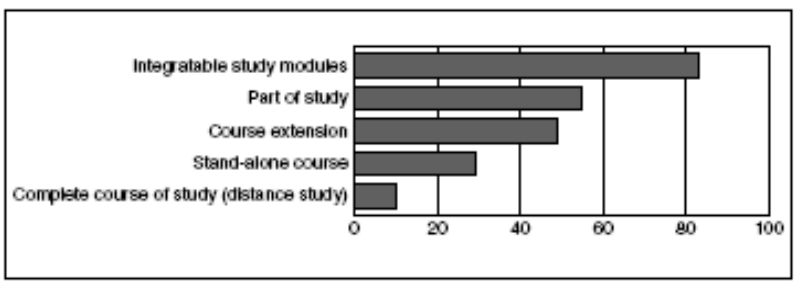
Source: kmrc "Kevih Report" Tuebingen 2003.

FORMS OF E-LEARNING PRODUCTS/PROGRAMS

Granularity of the instructional products

The report indicates that on a close examination the instructional products developed within the promoted program, the objective of the activities is not directed at eliminating traditional educational products, but rather at enhancing them.

Figure 42: Product range



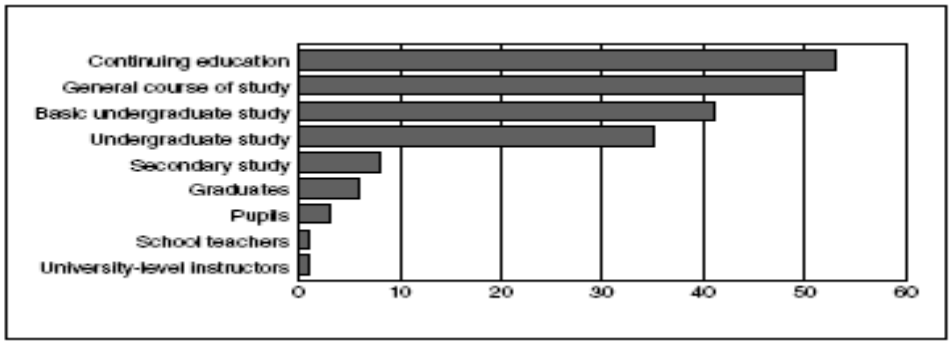
Source: kmrc "Kevih Report" Tuebingen 2003.

From the figure above most project alliances conceive integratable study modules/basic study components to expand regular courses. Thus, the significant expansion of the media based variety of university instruction is to be expected. The traditional set of course types (lecture, seminar, exercise) will also be enhanced by stand-alone virtual education products (i.e., the virtual seminar, WBT). Complete study products offered as a form of distance study play a more secondary role.

Target groups

Consistent with the funding program's call for proposals, the figure below shows that more than half of all the project alliances have also conceived their instructional products for purposes of continuing education. It is reasonable to assume that the integration of e-learning at universities could make university-level content accessible for a larger circle of people.

Figure 43: Target groups

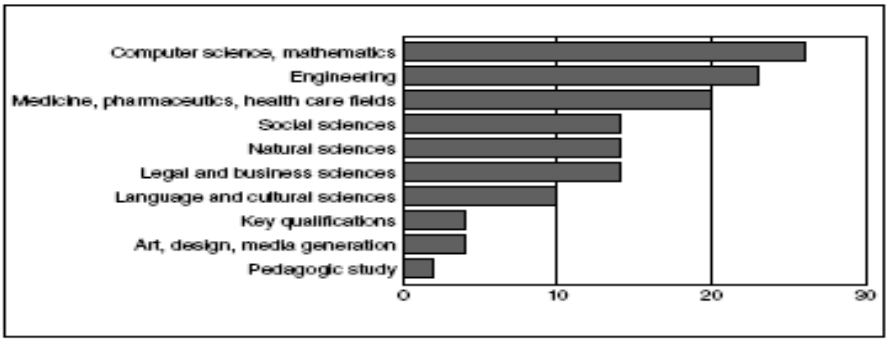


Source: kmrc "Kevih Report" Tuebingen 2003.

From the data above 41 project alliances are planning products for basic undergraduate study. The large number of projects with plans for continuing education products is acting in accordance with the prescripts of the promoted program's call for proposals. This becomes apparent when comparing approved and unapproved projects: Whereas 53 percent of approved projects have plans for continuing education, just 12.4 percent of the unapproved projects have such plans.

Disciplinary groups

Figure 44: Disciplinary groups



Source: kmrc "Kevih Report" Tuebingen 2003.

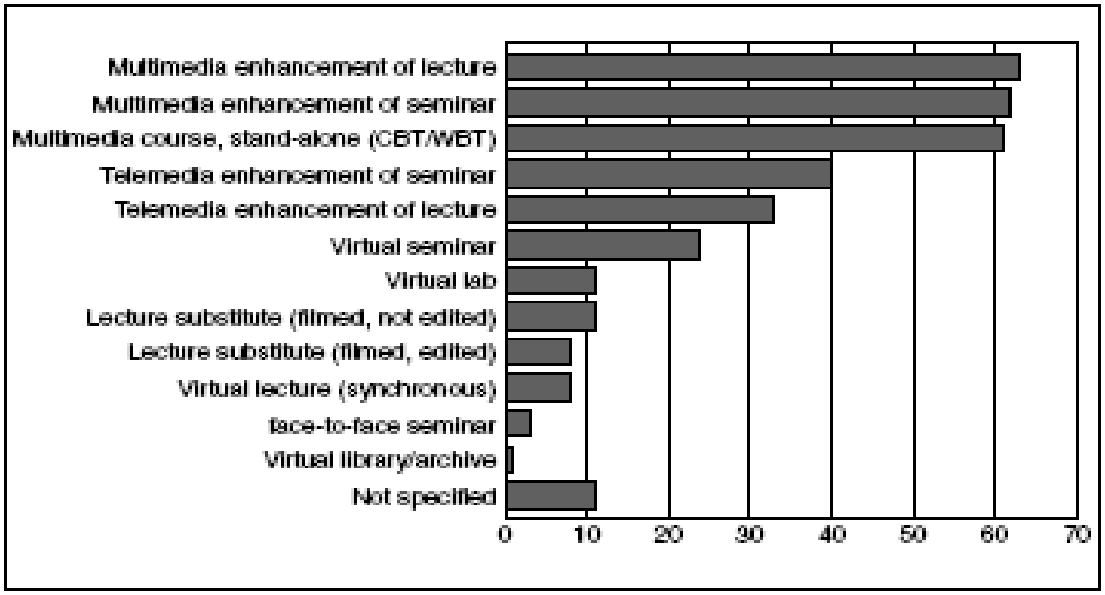
As the Figure above illustrates, this is the general tendency, also in the BMBF promotion of inter-university alliance initiatives. The affinity of the disciplinary groups "computer science/ mathematics" and "engineering" for new media is apparent. The disciplinary group "medicine/pharmaceutics/ health care fields" is also a key player in the funding program.

DIDACTICAL/PEDAGOGICAL APPROACH OF PRODUCTS

- *Instructional scenarios*

According to the report; in the area of higher education, there are essentially three different instructional scenarios. In the first scenario, the focus is on traditional face-to-face instruction, enhanced with virtual elements. In the second scenario, partial-virtual forms are realized and, in the third scenario, purely virtual courses are realized. The analysis of the project outlines reflects these three possible instructional scenarios at institutions of higher learning. Details are presented below.

Figure 45: Instructional Scenarios



Source: kmrc "Kevih Report" Tuebingen 2003.

From the data above, similar to the analysis of usage forms, the implementation of multimedia forms is predominant. In two thirds of the analyzed project outlines, multimedia elements are recommended to enhance lectures and/or seminars. Equally as often, self-guided study coupled with multimedia support (i.e., CBT/WBT) is the objective. However, one-third of the projects name telemedia elements to enhance instruction. Purely virtual courses, such as the virtual seminar, are planned by just 24 % of the projects, virtual labs by 11% and virtual lectures by only 8%. Therefore, it can be surmised that the focus of university -level education is on mostly hybrid scenarios.

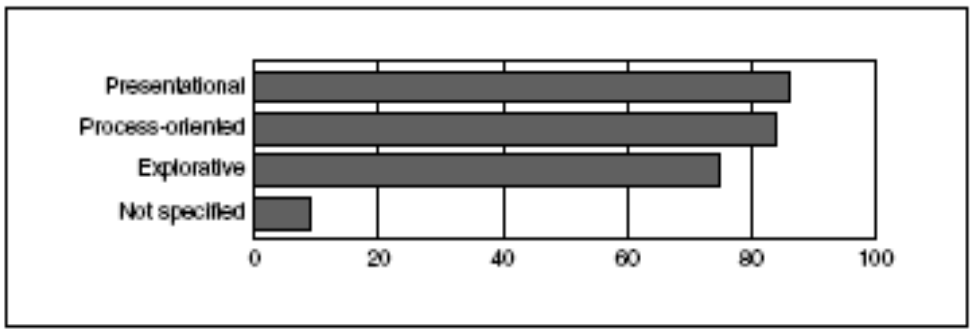
Instructional forms

According to the report, the analysis of the instructional forms verifies the previously mentioned theory that primarily hybrid forms are realized by the projects. Hence, almost all of the projects (91%) implement the new media for the enhancement and expansion of live instruction. Two thirds of the projects realize independent, as well as unsupervised, virtual study. Approximately two thirds of the projects also utilize a combination of distance study (virtual) and face-to-face instruction.

Instructional Methods

According to the report traditional higher education is characterized by mainly presentational methods (speech, lecture) and process-oriented/hands-on methods (practicum, exercise). Analysis of the project outlines, however, shows a change in the methodological conceptualization. In addition to presentational instructional media (86%), the funded program projects also implemented media with which students could attain process-oriented (84%), as well as explorative (75%), knowledge. Details are shown in the Figure below:

Figure 46: Instructional Methods



Source: kmrc "Kevih Report" Tuebingen 2003.

E-LEARNING TECHNOLOGIES

-Tools for Product Distribution

According to the report, in almost all of the projects, product distribution is to take place over the Internet, which is (89%), CD-ROM (28%) and DVD (7%) or other data carriers are only to be viewed as extensions of this general distribution form. Almost half of the projects utilize databases for this distribution and one-fourth use XML.

-Tools

According to the report, 40 projects provide concrete indications of the intended use of tools for the development of project materials. Naming specific development tools, such as Macromedia Director, Flash or Web Editors, is less meaningful, since all projects must use

suitable tools. It should be noted that 12 projects view the development of their own tools as a necessity. 40% of the projects provide descriptions of the programming systems used in development. Languages, such as Java (36%) and Java Script (14%), are mentioned for Web-based developments. This is in accord with the tendency to distribute project materials over the Internet.

- Platforms

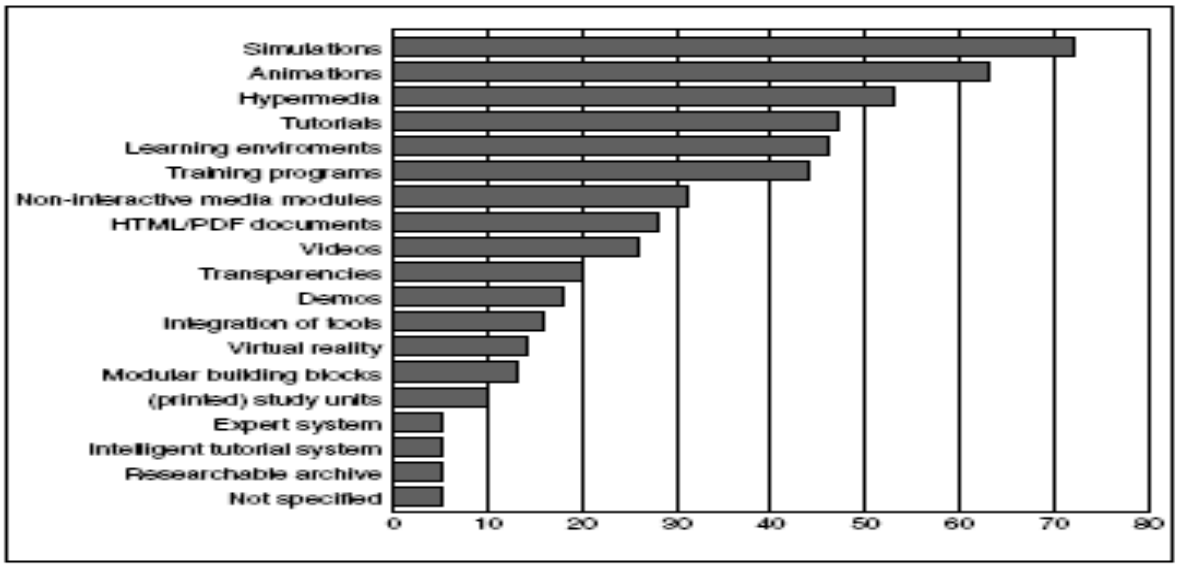
According to the report, only half of the documents submitted by the project alliances provide details of the intended use of certain course management systems (learning platforms). The systems that were mentioned reflected the scope of the (then) available platforms. It is clear that ILIAS and the Virtual Campus of the distance university Hagen were already resonating positively (ILIAS 7%, Virtual Campus FU Hagen 5%).

APPLICATIONS OF E-LEARNING TECHNOLOGIES

- Multimedia usage forms

The majority of projects provide a very sound description of the usage of multimedia forms. In many projects, content is not only visualized, but also, to a great extent, interactively presented via simulations (72%), hypermedia (53%) or animations (63%). To a somewhat lesser extent, traditional usage forms, such as tutorials (47%), learning environments (46%), and training programs (44%), were implemented. The data show that particularly the targeted usage of multimedia potential was the focus of the projects. This was also apparent in those non-interactive elements, such as transparencies (20%) or (printed) study units (10%), were utilized much less often, mostly only being described as secondary measures. (see Figure below).

Figure 47: Multimedia usage forms



Source: kmrc "Kevih Report" Tuebingen 2003.

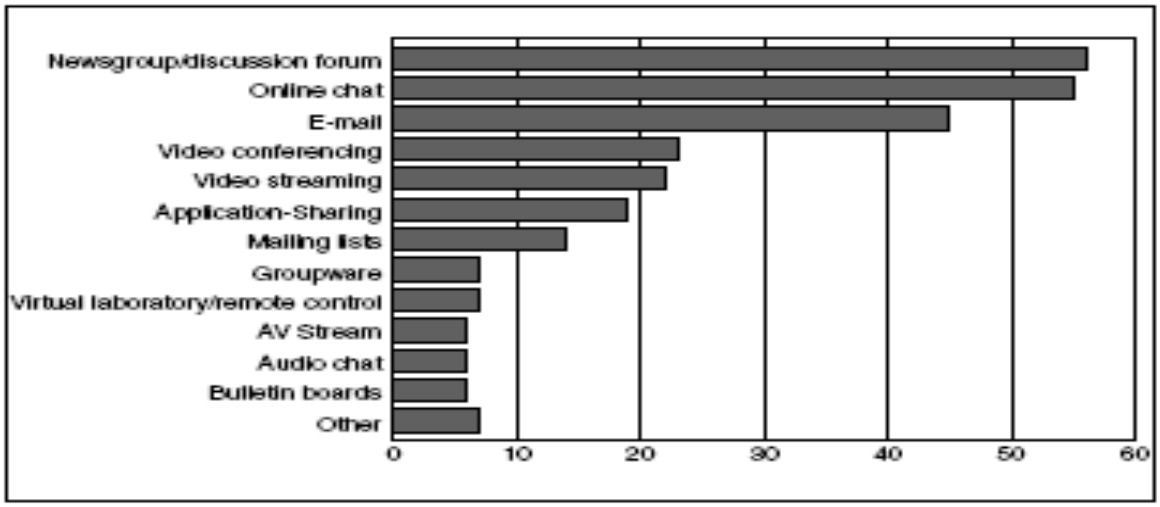
According to the report, if one studies the usage forms in relation to the various disciplinary groups, specific preferences can be determined for the engineering vs. the language and cultural sciences group. In the engineering group, simulations are implemented at a rate of 96%, while that rate is only 30% for the language and cultural sciences. This difference is not surprising when didactic requirements for each field are considered (Kevih Report, 2003).

TELEMEDIA APPLICATIONS

- Telemedia applications

In relation to telemedia usage forms, network-supported communication (77%) and the distribution of instructional materials (76%) are emphasized most. Collaborative forms are mentioned as keywords (49%), but no further declarations are made as to their manifestation. In most of the projects, communication is considered an opportunity for inquiry and exchange between instructors and students (69%) and among students (63%). In terms of telemedia applications, mostly text-based forms, such as newsgroups (56%), online chat (55%), or e-mail (45%), are mentioned, whereas more costly applications, such as video conferencing (23%), video streaming (22%) or application-sharing (19%), are seldom mentioned. See details below:

Figure 48: Telemedia Applications



Source: kmrc "Kevih Report" Tuebingen 2003.

REPORT 3

RINN, U., BETT, K., MEISTER, D. M., WEDEKIND, J., ZENTEL, P., HESSE, W.F. (2004): VIRTUAL EDUCATION AT GERMAN INSTITUTIONS OF HIGHER LEARNING IN ALLIANCE. PART II. RESULTS OF THE ONLINE SURVEYS OF IINITIATIVES TO PROMOTE THE USE OF NEW MEDIA IN HIGHER EDUCATION THROUGH THE FUNDING PROGRAM "NEW MEDIA IN EDUCATION" . TÜBINGEN (INSTITUT FÜR WISSENSMEDIEN).

The German Federal Ministry of Education and Research (BMBF) is the designated sponsor for the development and testing of multimedia-based and network-aided educational materials (2000- 2004). The response to the call for proposals to promote the utilization of new (digital) media in higher education was so great – approximately 460 project plans were submitted – that a quasi representative reproduction of the e-learning ideas, theories and practice, so prevalent in 2000, is anticipated within the scope of this funding. Within the framework of the companion program initiative "Concepts and elements of the virtual university – kevih", the Knowledge Media Research Center in Tuebingen took on the task of reviewing the great variety of possibilities and their potential for an integration of digital media into education, and then evaluating these options according to specific scientific criteria. This report provides a comprehensive look into the results of the accompanying survey. Portions of results extracted from the report that have relevance for this study are presented below:

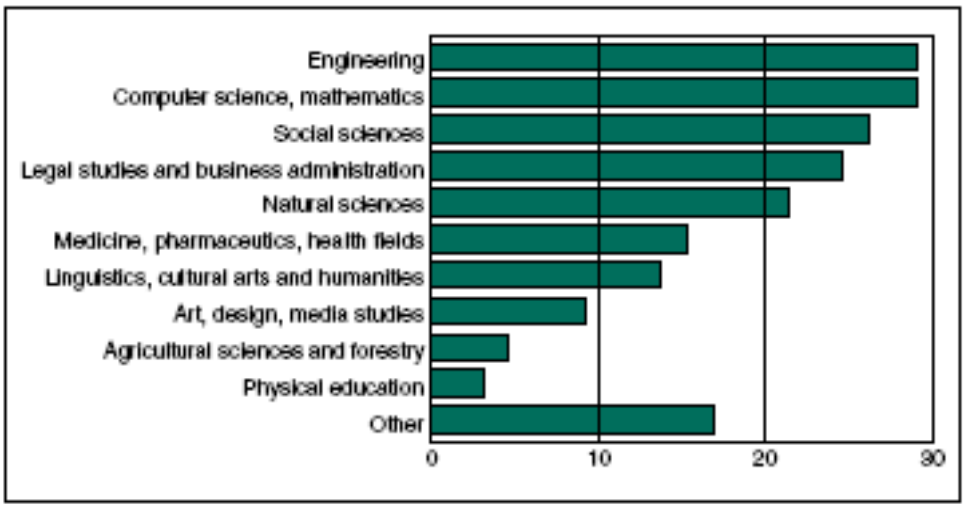
POLICY AND STRATEGY

According to the report, within the framework of the first online survey, 100 project alliance coordinators were contacted. 65 individuals responded, equivalent to a 65% response rate. The questions of interest concerned the product target groups, the product types, product reliability, product usage and the international range (i.e., global applicability) of the products.

- Target group

The products developed within the framework of the BMBF promotion of inter university alliance initiatives are primarily intended for the disciplinary groups mathematics, natural science and engineering. The figure below gives further details:

Figure 49: Product distribution by disciplinary group



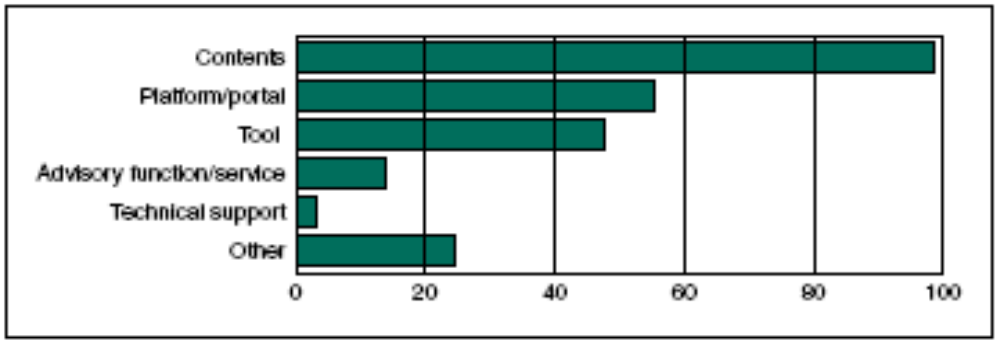
Source: kmrc "Kevih Report" Tuebingen 2004.

Therefore, according to the report it can be concluded that even disciplines not normally regarded as technologically oriented are integrating new media into their instructional scenarios at an increasing rate.

-Product types

The main focus here was to find out what how the products that are available for the instructors and students look like? Results obtained are depicted in the figure below:

Figure 50: Product types



Source: kmrc "Kevih Report" Tuebingen 2004.

According to the report within the framework of the BMBF promotion, almost all projects have generated content in accordance with the call for proposals (98.5%). Further, almost half of the projects cite the production of development tools for content development (47.7%). Compared with the basic analysis, this represents a clear increase – in the project outlines, only 23 percent of the projects cited the generation of so-called "tools". This change in project goals could be connected to the fact that many projects were not able to find tools that met their specific requirements and thus were forced to develop their own solutions. In relation to the naming of platforms and portals (55.4%), a qualification must be noted: these are self-assessments and terms are not used uniformly. Already in the analysis of the project outlines, it became clear that detailed websites on a topic area were already being designated as "portals" and simple databases as "learning platforms"

-International Product Range

According to the report the virtualization of institutions of higher learning is frequently associated with the globalization of the educational marketplace. Even though limitations are certainly placed on the globalization of the educational marketplace as a result of cultural differences, there appears to be a broadening of the project alliances beyond Germany's borders. Whereas 44.6 percent of the alliances cooperate with partners across Germany exclusively (inter-state cooperation was a decisive funding criterion), 29,2 percent of the project coordinators cite co operations with partners in other German-speaking countries, and 20 percent with partners in non- European countries as shown by the figure below:

Figure 51: International Product Range

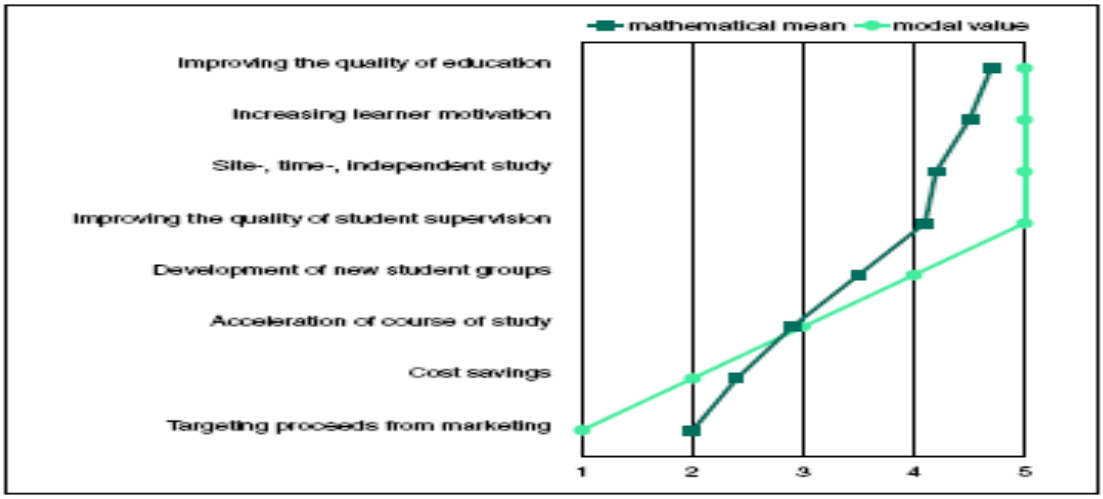
Source: kmrc "Kevih Report" Tuebingen 2004.

According to the survey the international orientation of the alliance projects is also apparent from the language versions available for the products. Whereas the bulk of project alliances offer products in German, 36.9% of the products are offered in English, either as an option or exclusively. An increased cooperation with other European Union countries is not evident from these statistics. Rather, when seeking contacts outside of the German-speaking realm, it appears that non- European countries are preferred.

-Main Goals of Products

This is reflected in the intentions of projects: Improvement of the quality of education is given the highest rating (4.76). Increasing student motivation (4.5), achieving temporal and physical independence of study (4.2) and the improvement of the quality of student supervision (4.1) are all in second place. The development of new groups of study is still classified as important (3.5), whereas the acceleration of the course of study (2.9), cost efficiency (2.4) and targeting proceeds from marketing (2.0) are assessed as being less important. For details see the Figure below:

Figure 52: Project Partner Goals



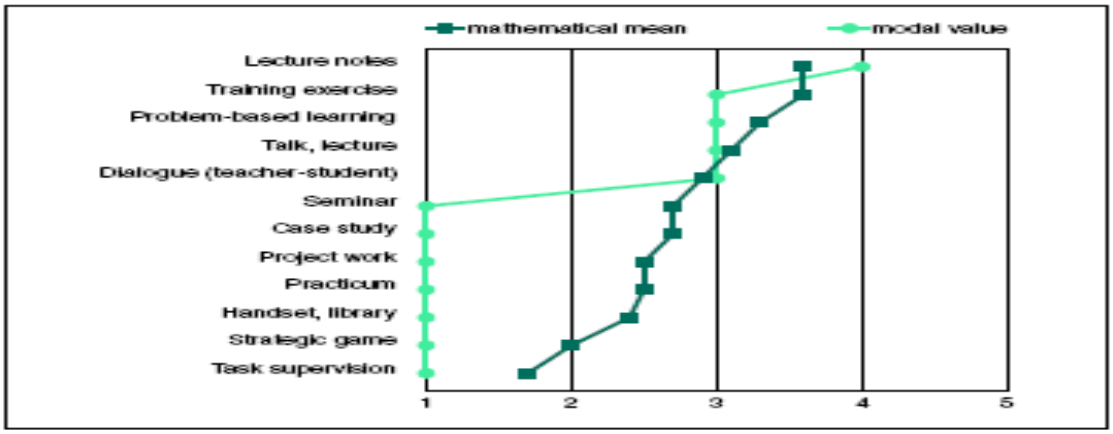
Mathematical mean and the modal value of the responses based on a 5- point rating scale.

Source: kmrc "Kevih Report" Tuebingen 2004.

-Instructional Design/Pedagogical Approaches of the products

According to the report the educational programs within the framework of „traditional" higher education encompasses different course forms, such as lecture, seminar and training. Thereby, in addition to the lecture, numerous other instructional methods, such as dialogue, case study, project work, etc., can also be integrated for the acquisition of educational content. As to the question to what extent various course forms and instructional forms used in higher education are virtualized, details of a two-part answer is provided below:

Figure 53: (Partial-) virtualized instructional forms

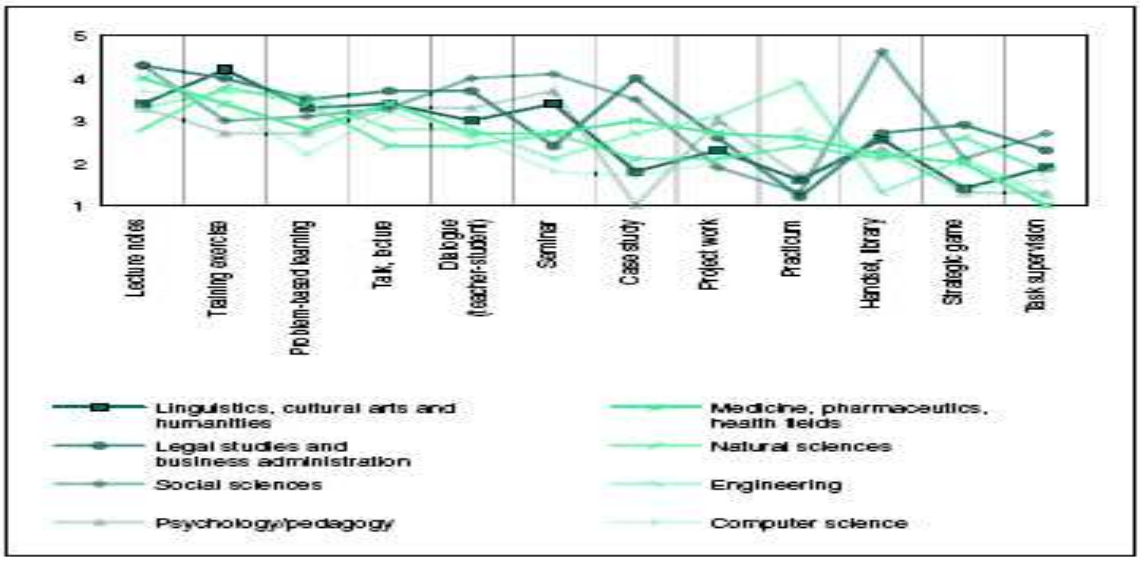


Mathematical mean and the modal value of responses based on a 5- point rating scale

Source: kmrc "Kevih Report" Tuebingen 2004.

According to the survey, the analysis of the (partial-) virtualized instructional forms according to disciplinary groups reveals a diverse picture that can be traced back to disciplinary-specific didactic differences in particular. For details see the Figure below:

Figure 54: (Partial-) virtualized instructional forms according to disciplinary groups



Mathematical means of the responses based on a 5-point rating scale

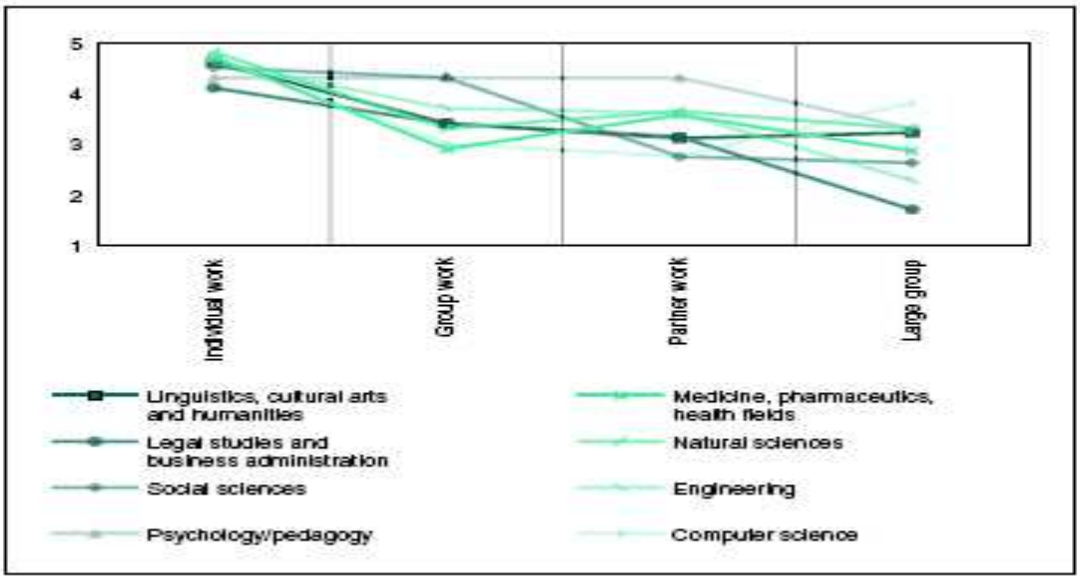
Source: kmrc "Kevih Report" Tuebingen 2004.

According to the survey the virtualization of presentation oriented teaching and transfer forms, such as lectures and lecture notes, is shown to be less important for natural scientists and engineers, in comparison with other disciplinary groups. The virtualization of process-oriented educational methods, such as training exercises (especially for natural scientists) and practicum (for engineers) is comparatively more relevant. On the other hand, in the disciplines "humanitarian/ social sciences", primarily lecture notes, seminars, teacher-student dialogue are virtualized, reflecting a distinct, discipline-specific discourse orientation by means of written materials. In the disciplinary group „legal and business sciences", problem-based learning, especially in the form of case studies, is particularly emphasized as a virtualized instructional form, in addition to lecture notes, lectures and dialogue.

- Social Forms

Inquiring about the semantics of various social forms, i.e., about the "group size" and the kind of interaction between participants revealed that "individual work" (4.6) is the most important social form by far. Group work (3.6) and partner work (3.5) were assessed about one rating point lower; large groups (2.8) were considered least important. While individual work is (very) important for almost all disciplines, the assessments of group and partner work, as well as large groups, clearly diverge (see Figure below).

Figure 55: Social forms by disciplinary group



Mathematical means of responses based on a 5-point rating scale

Source: kmrc "Kevih Report" Tuebingen 2004.

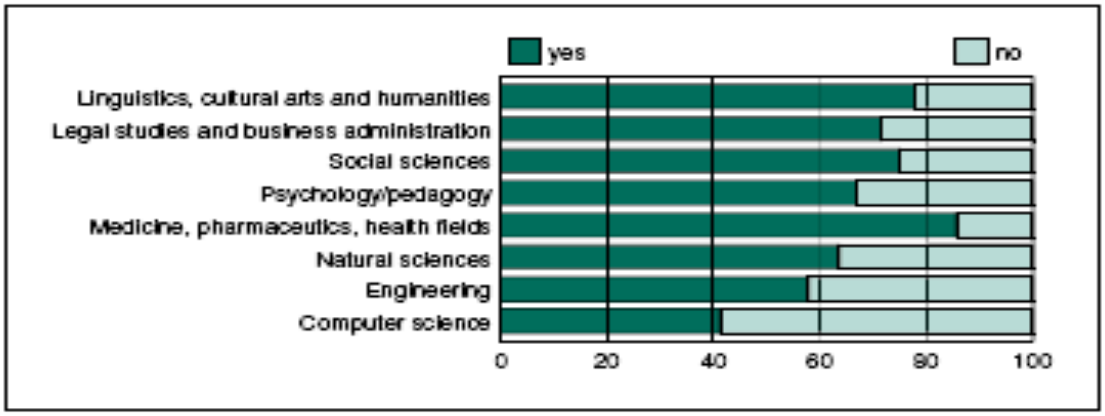
According to the survey the result concerning the implemented social forms concurs with the analysis of the project outlines drawn up before the project start with one exception whereas partner work is scarcely mentioned in the project outlines, it is assessed in the online questionnaire as having almost the same level of importance as group work. Overall, it appears

that cooperative instructional forms in (partial-) virtual scenarios have increased in importance as compared to "traditional" study.

- Instructional principles and concepts

About two thirds of the project partners state that their project is based on explicit instructional concepts and principles. Proportionally speaking, the disciplinary group medicine, pharmaceutics, health fields indicates the most frequent use of explicit instructional concepts and principles. For details see Figure below:

Figure 56: Use of instructional concepts by disciplinary group



Source: kmrc "Kevih Report" Tuebingen 2004.

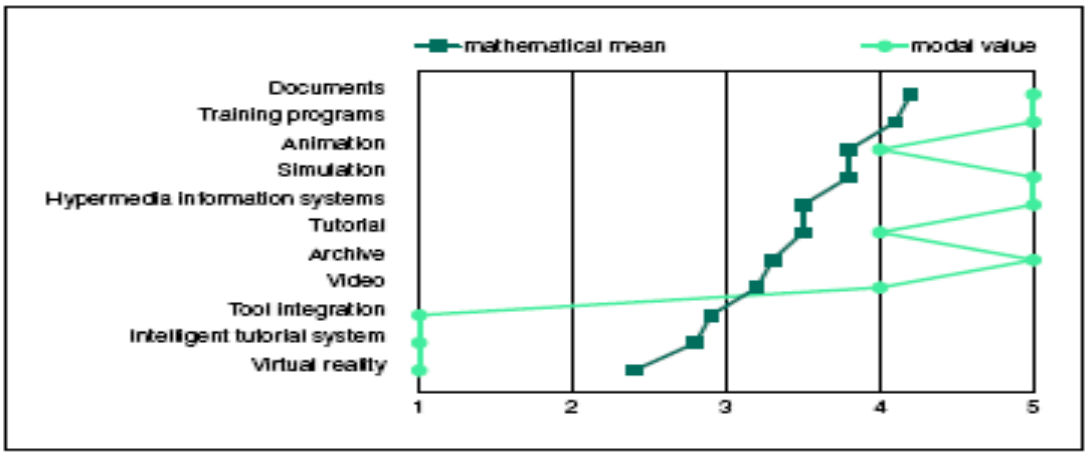
According to the report, the inquiry into the use of instructional concepts involved the use of more in-depth questions. The first question pertained to which concepts and principles formed the basis of the subproject. According to project entries, these were primarily approaches based on problem-based learning (37 mentions), explorative learning (24 mentions) and self-directed learning (21 mentions). Whereas some instructional design models from the Anglo-American realm were explicitly mentioned (15 mentions), it appears the German didactic tradition has found less explicit entry into the projects' instructional settings. The results lead one to the assumption that practical experiences from the numerous preceding projects had played a significant role in project conceptions. The study results allow the conclusion to be drawn that the funding program absolutely led to a greater integration of scientific concepts in (online) education.

-Applications of E-Learning Technologies

Of particular interest in the survey were the usage forms of technologies. New media usage forms can be divided into two basic types: multimedia and telemedia usage forms. In the survey on multimedia usage forms, documents, which, as a rule, contain few if any multimedia elements, were rated highest (4.2). This is certainly due to development costs: not all content is suitable for multimedia processing and – especially in the case of short-lived content – such a conversion is often too time-consuming and costly. However, multimedia usage forms are also

found at a higher interactivity level in the upper half of the ratings, i.e., animations (3.8), simulations (3.8), and hypermedia information systems (3.5) (see Figure below).

Figure 57: Multimedia usage forms

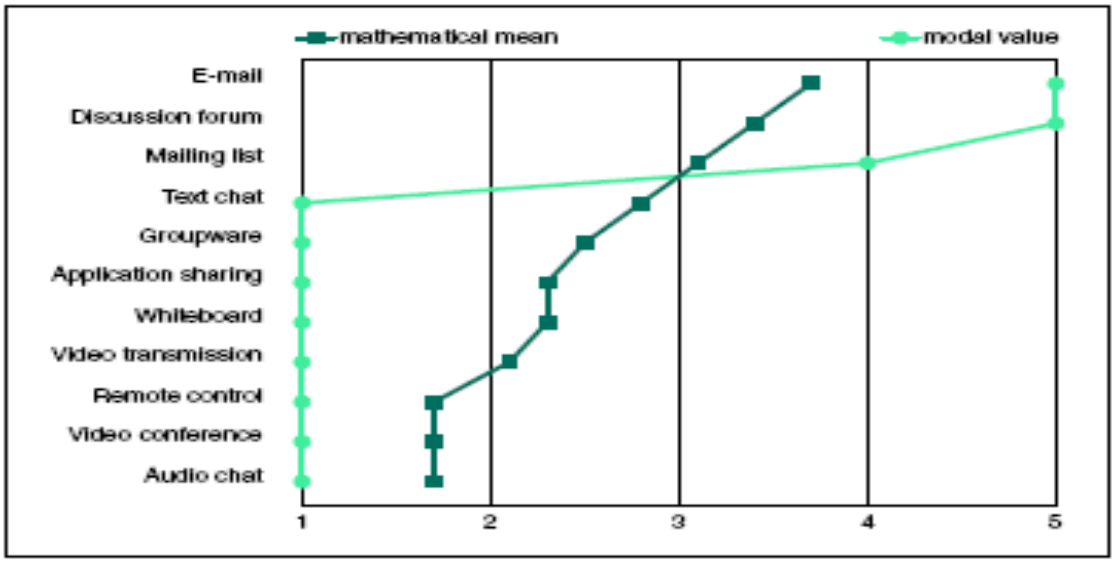


Mathematical mean and the modal value of the responses based on a 5- point rating scale

Source: kmrc "Kevih Report" Tuebingen 2004.

However the questionnaire results outline a more realistic depiction (see Figure below): Asynchronous forms, such as e-mail (3.7), discussion forums (3.47) and mailing lists (3.1) – applications now considered tried and tested components of intensive online communication and cooperation -- were assessed as most important. The telemedia applications are used primarily for communication (3.8), cooperation (3.6) and distribution (3.6); coordination/ organization (3.2) are attached less importance.

Figure 58: Telemedia applications



Mathematical mean and the modal value of the responses based on a 5-point rating scale

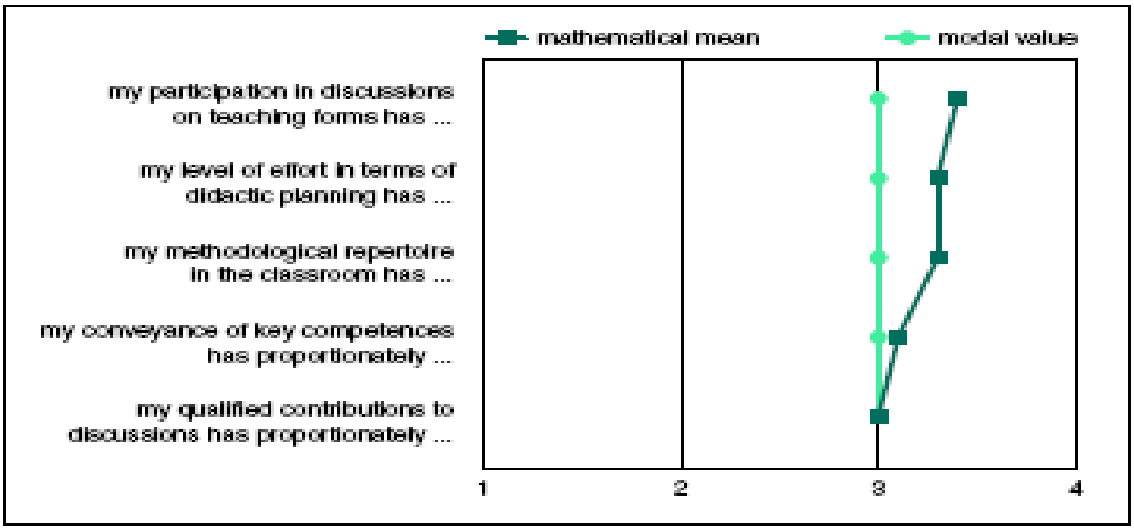
Source: kmrc "Kevih Report" Tuebingen 2004

IMPACT OF E-LEARNING

- Transformations Through The Use Of New Media

According to the report new media usage is accompanied by various changes in the higher educational landscape. Almost half of the interviewees (49.8%) cited an increase in discussions concerning higher education teaching forms and 47.2 percent reported a dramatic increase in their own level of participation. For details see the Figure below:

Figure 59: New media usage

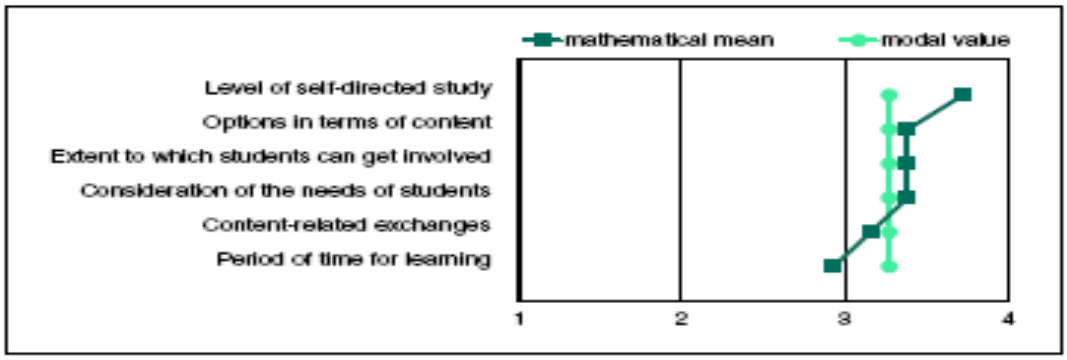


Mathematical mean and the modal value of the responses based on a 4- point rating scale

Source: kmrc "Kevih Report" Tuebingen 2004

According to the survey participation in discussions as a result of an increase in experience is shown by the identical increase in didactic planning. The ability to greatly increase the flexibility of both the design and organization of study and work is the reason given for new media usage. With respect to the possibilities for flexibility, the project participants' assessment is moderate or restrained. For details see the Figure below:

Figure 60: Flexibilization



Mathematical mean and the modal value of the responses based on a 4- point rating scale.

Source: kmrc "Kevih Report" Tuebingen 2004

QUANTITATIVE REVIEW: INTERNATIONAL COMPARISONS OF GERMANY, UK AND USA.

Information and data on the activities of international educational delivery across Germany, USA and United Kingdom are in general scarce and extremely difficult to evaluate. In particular data on virtual types of cross-border higher education supply or in other words "global e-learning" are hard to obtain.

- Policy and Strategy

International level data comparisons relating to e-learning policy and strategy reflect more on the investments, the provision of infrastructure and other e-learning enabling technologies. The following Tables and Figures highlight the details:

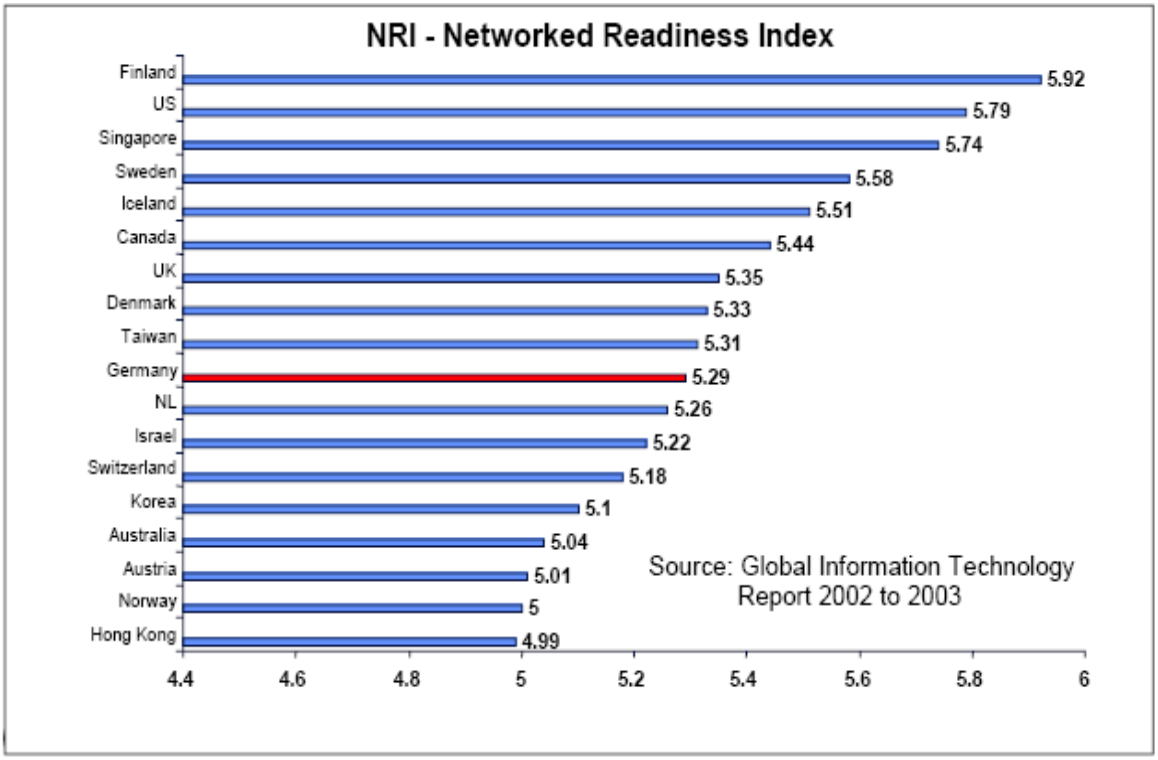
Networked Readiness: Germany, United States and Britain.

REPORT- 1

GLOBAL INFORMATION TECHNOLOGY REPORT 2002-2003: READINESS FOR THE NETWORKED WORLD (ECONOMICS)WORLD ECONOMIC FORUM, SOUMITRA DUTTA, BRUNO LANVIN, FIONA PAUA.

Networked readiness reflects the capacity of a country to deliver ICT based services such as technology enhanced distance education (e-learning). The Table below gives further details:

Figure 61: Details of networked readiness of Germany, UK and USA.



Out of 80 countries examined in the Global Information Technology Report; 2002-2003, the USA emerges in the second position, the UK in the seventh position and Germany in tenth position in the "networked readiness" index. This ranking clearly implies that the three countries all have a strong potential to become one of the world's leading ICT enabled education, training and business environments.

REPORT-2

THE 2005 E-READINESS RANKINGS REPORT: A WHITE PAPER FROM THE ECONOMIST INTELLIGENCE UNIT.

The annual e-readiness ranking of the world's largest economies have been published since 2000. Currently 65 countries are assessed. A country's e-readiness is a measure of factors that indicate how amenable a market is to Internet-based opportunities. It is a weighted collection of nearly 100 quantitative and qualitative criteria, organised into six distinct categories of a country's social, political, economic and technological development. It goes beyond the number of computer servers, websites and mobile phones (although a core component), and looks also at citizens' ability to utilise technology skillfully, legal systems, and extent that governments encourage the use of digital technologies.

Table 47: Economist Intelligence Unit e-readiness rankings, 2005 (1st 20 Countries)

2005 e-readiness rank (of 65)	2004 rank	Country	2005 e-readiness score (of 10)*	2004 score
1	1	Denmark	8.74	8.28
2	6	US	8.73	8.04
3	3	Sweden	8.64	8.25
4	10	Switzerland	8.62	7.96
5	2	UK	8.54	8.27
6 (tie)	9	Hong Kong	8.32	7.97
6 (tie)	5	Finland	8.32	8.08
8	8	Netherlands	8.28	8.00
9	4	Norway	8.27	8.11
10	12	Australia	8.22	7.88
11	7	Singapore	8.18	8.02
12 (tie)	11	Canada	8.03	7.92
12 (tie)	13	Germany	8.03	7.83
14	12	Austria	8.01	7.68
15	16	Ireland	7.98	7.45
16	19	New Zealand	7.82	7.33
17	17	Belgium	7.71	7.41
18	14	S. Korea	7.66	7.73
19	18	France	7.61	7.34
20	22	Israel	7.45	7.06

Source: Economist Intelligence Unit, 2005

The report pointed out that the US, which last year fell to 6th place largely because its broadband development lagged other global leaders, has recovered to the second position. Not only has the US seen broadband adoption surge forward, but the remains a global leader in secure Internet server penetration and ICT spending. Further west European countries (such as UK and Germany) have lost some grounds in this year's rankings. This is more the result of the faster ICT progress of other countries—for example the US, Switzerland etc. than to any regression. The UK, for example, though slipped to 5th place this year from 2nd place in 2004; it continues to enjoy high levels of connectivity and benefits from substantial government commitment to achieving information society objectives, but education is one area where the UK is somewhat weaker than previously thought.

REPORT-3: GERMAN ASSOCIATION FOR INFORMATION TECHNOLOGY, TELECOMMUNICATIONS AND NEW MEDIA E.V. (BITKOM); 2002, 2003.

- ICT Infrastructure

Overall, ICT infrastructure has developed positively across the three countries. This year there are 30 million PCs installed in Germany, that means (not quite) 4 computers per 10 inhabitants. The situation in the UK is also not quite different. Notwithstanding; the USA continues to have a much higher PC density rate. The tables below gives further details:

Figure 62: Details of PCs per 100 inhabitants across the three countries.

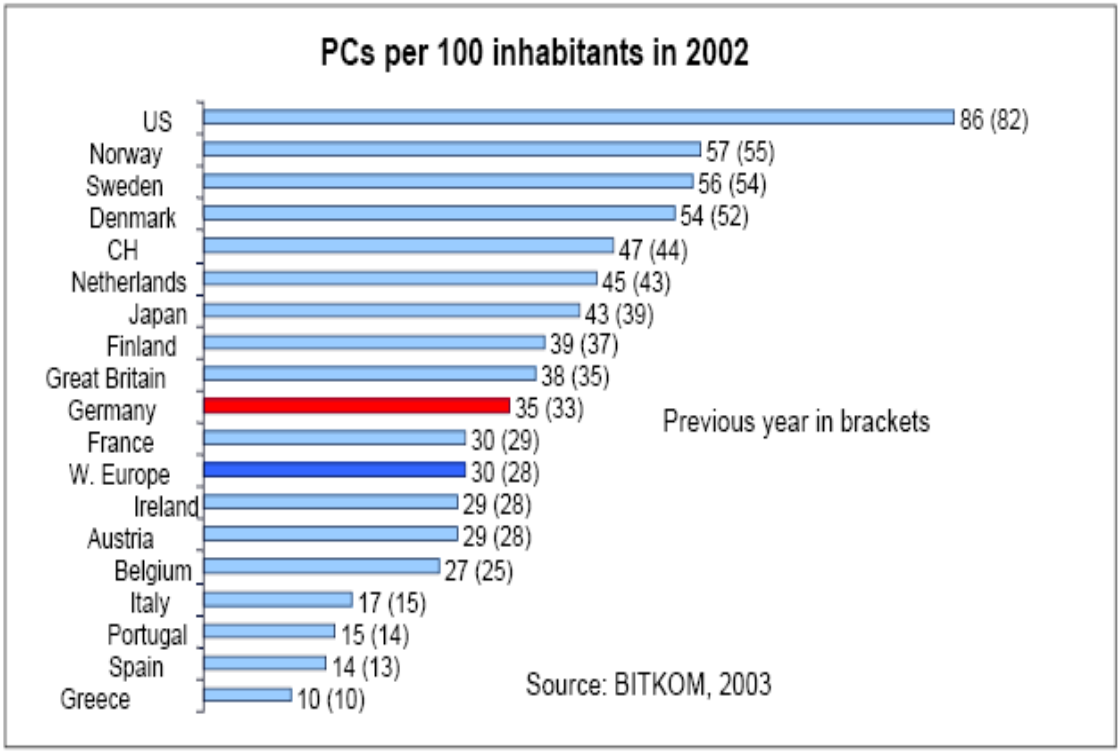
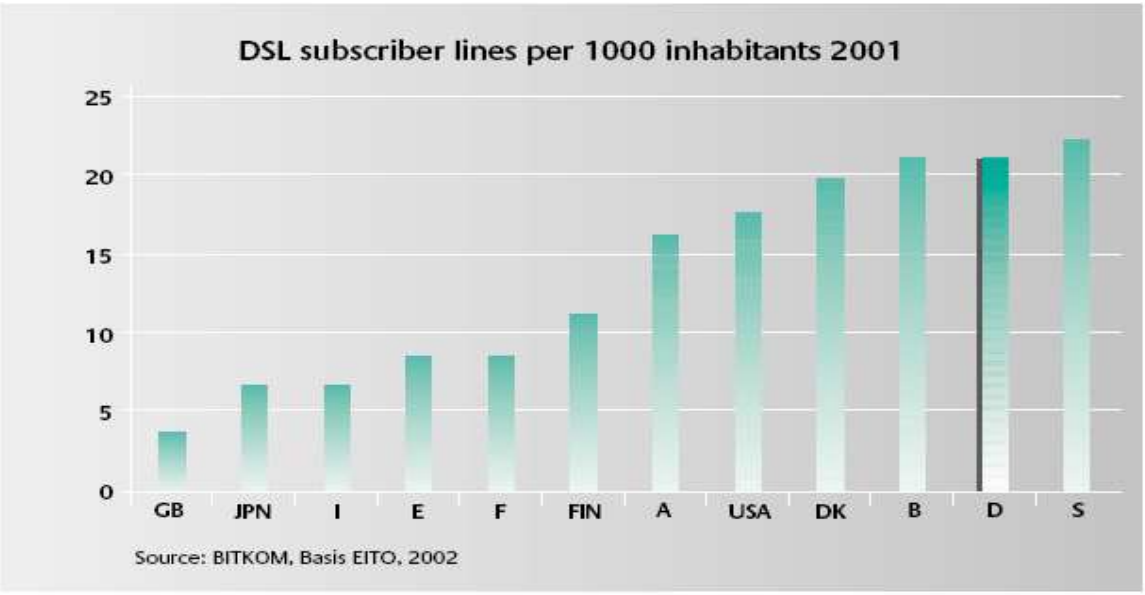
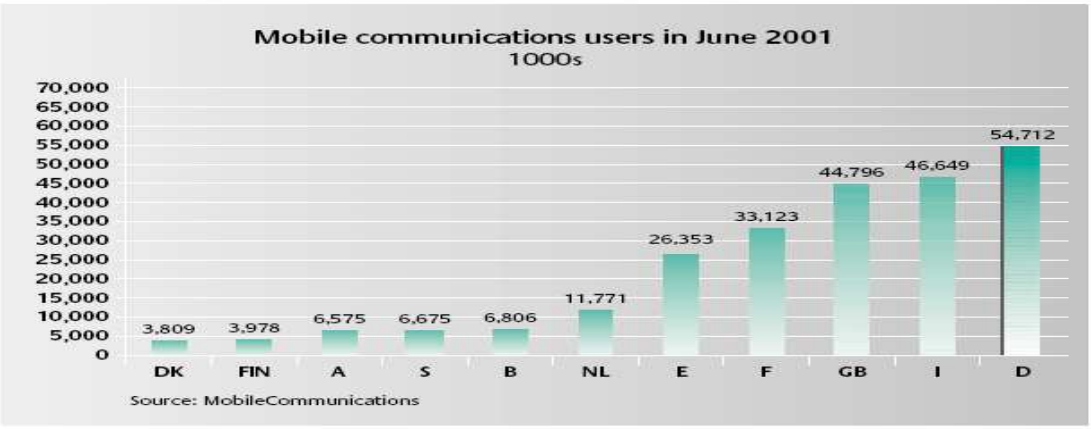


Figure 63: Details of DSL Subscriber lines as at 2001.



According to the data above, Germany is a leading country in terms of the availability of ISDN. Every fifth ISDN subscriber line (20%) around the world is to be found in a German household or company. In view of the high level of fixed network penetration (95% of households in western Germany, 92% in eastern Germany), Germany has a high internet potential. More and more German households are accessing the internet via broadband DSL. Germany is one of the leading international markets for this cutting-edge technology. Germany takes second place in Europe with 21 lines per 1000 inhabitants, behind Sweden. At the beginning of 2001, the number of mobile communications users in Germany exceeded the number of fixed-network subscriber lines, at just fewer than 50 million subscribers. By the end of 2001, there were already 56 million people using mobile communications. This means that Germany has come closer – in terms of the rate of penetration (69%) – to the leading countries in Europe, for instance the UK. The USA also has a fairly high level of penetration.

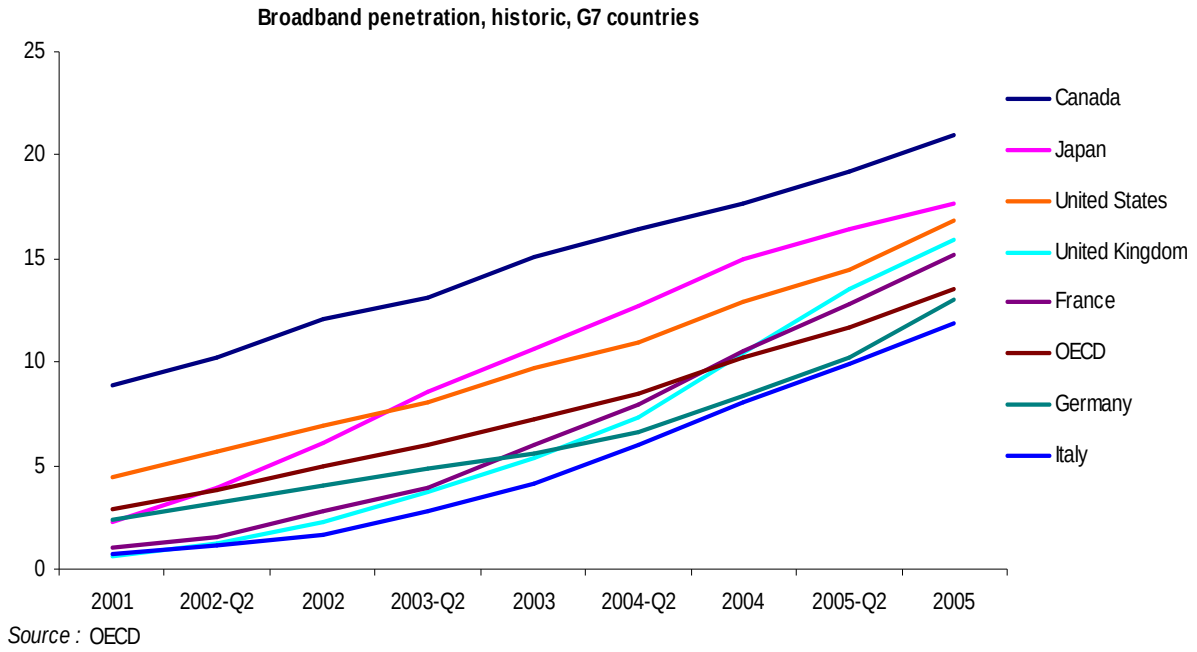
Figure 64: Gives Details of Mobile Communications Users as At 2001.



According to the data above, the internet is becoming a mass medium in Germany. In December 2001, 48% of the German population aged over 14 (30.8 million) used the internet. That equates to a rise of 24% within a year. By December 2002, around 4 million new users are expected. With these growth rates, Germany is far above the European average, so that the density of internet users is coming closer and closer to that of the leading Scandinavian countries, which is in line with the USA. The UK also continues to experience a high level of penetration.

REPORT-4 ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2005 REPORT

Figure 65: Details of Broadband Penetration among the G7 Countries.



Source : OECD

Table 48: Details of Broadband Penetration among the G7 Countries.

	2001	2002-Q2	2002	2003-Q2	2003	2004-Q2	2004	2005-Q2	2005
Canada	8.8	10.2	12.1	13.1	15.1	16.4	17.6	19.2	21.0
Japan	2.2	3.9	6.1	8.6	10.7	12.7	15.0	16.4	17.6
USA	**4.5**	**5.7**	**6.9**	**8.1**	**9.7**	**10.9**	**12.9**	**14.5**	**16.8**
UK	**0.6**	**1.3**	**2.3**	**3.7**	**5.4**	**7.4**	**10.5**	**13.5**	**15.9**
France	1.0	1.6	2.8	4.0	5.9	7.9	10.5	12.8	15.2
OECD	2.9	3.8	4.9	6.0	7.3	8.5	10.2	11.7	13.6
Germany	**2.3**	**3.2**	**4.1**	**4.8**	**5.6**	**6.6**	**8.4**	**10.2**	**13.0**
Italy	0.7	1.2	1.7	2.8	4.1	6.0	8.1	10.0	11.9

From the report, a closer look at the data in table above indicates an increased level of broadband penetration among the three countries.

Figure 66: Gives Details of Broadband Penetration Per Capita.

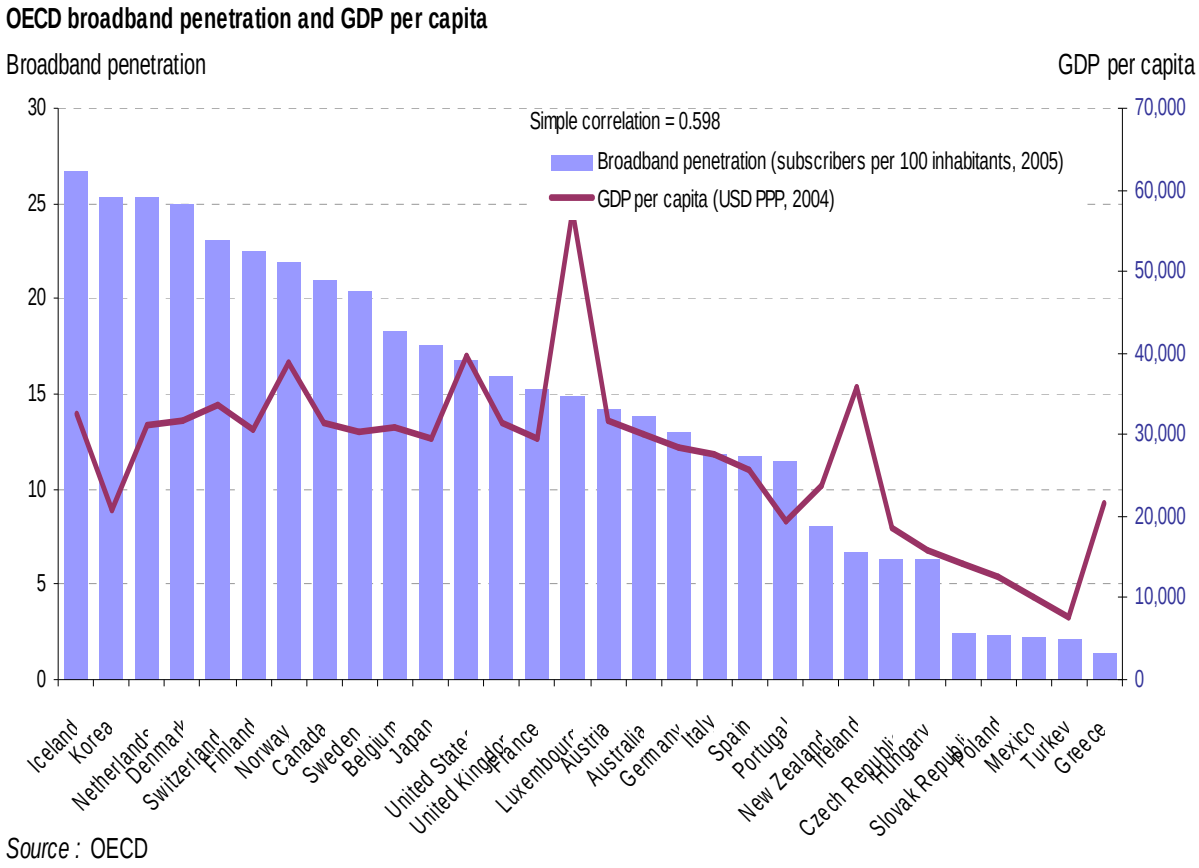


Table 49: Broadband Statistics among the Three Countries.

OECD Broadband Statistics

9. OECD broadband penetration and GDP per capita

	Broadband penetration (subscribers per 100 inhabitants, 2005)	GDP per capita (USD PPP, 2004)
United States	16.8	39,700
United Kingdom	15.9	31,400
Germany	13.0	28,500
OECD	**13.6**	**27,700**

Source, OECD, 2005

Figure 67: OECD Broadband Subscribers per 100 inhabitants.

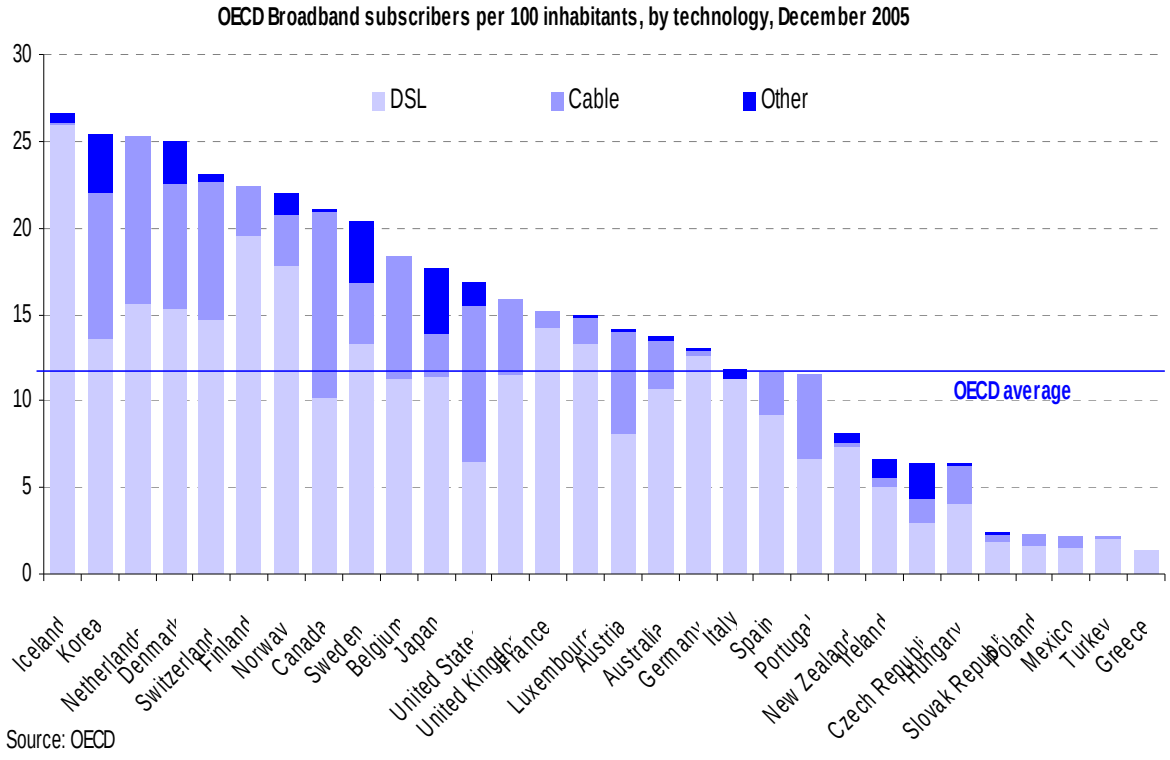


Table 50: OECD Broadband Statistics.

OECD Broadband statistics
OECD Broadband subscribers per 100 inhabitants, by technology, December 2005

	DSL	Cable	Other	Total	Total subscribers
United States	6.5	9.0	1.3	16.8	49,391,060
United Kingdom	11.5	4.4	0.0	15.9	9,539,900
Germany	12.6	0.3	0.1	13.0	10,706,600

Source: **OECD**

REPORT-5

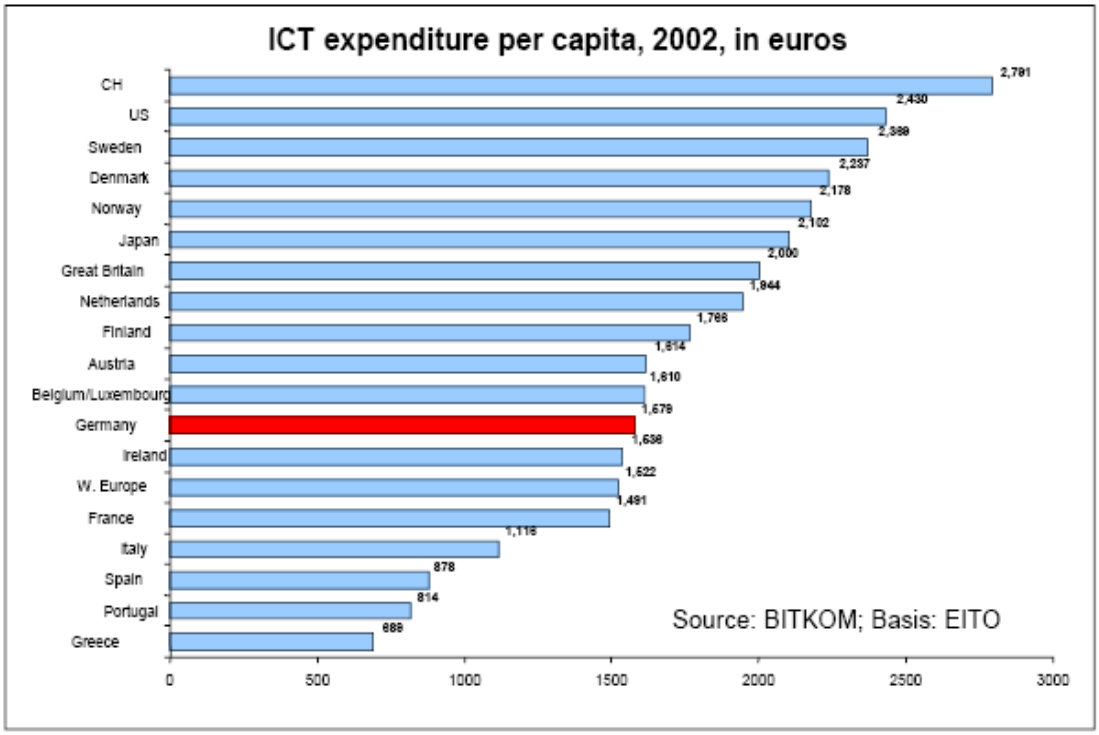
ICT EXPENDITURE PER CAPITA, 2002, IN EUROS; BITKOM; BASIS: EITO

- ICT Expenditure

International studies show that investment in ICT has a positive impact on the growth of the e-education sector. OECD study concludes, for example, that ICT investment contributed more than 0.8% to growth in the US in the period 1995-2001 - the figure for Germany was just under 0.4%. The exact amount of growth attributable to ICT depends greatly on the methods

and assessment criteria used in the study concerned as well as the period it covers. However, one thing is clear -Germany does not number amongst the international vanguard. They still have some catching up to do as can be seen in the following chart for ICT expenditure per capita in 2002. The UK indicates a strong level of investment in ICT expenditure.

Figure 68: Gives Details Of ICT Expenditure Per Capita, 2002, In Euros.



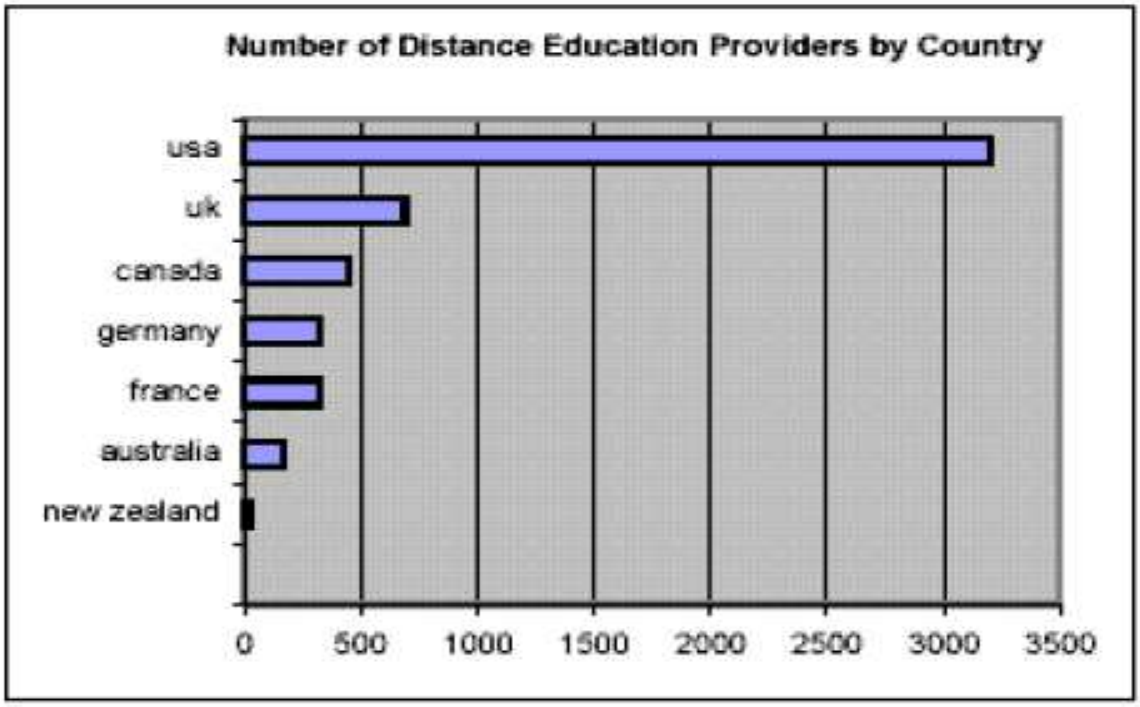
REPORT- 6

<u>THE ROLE OF US HIGHER EDUCATION IN THE GLOBAL E-LEARNING MARKET (MARIJK VAN DER WENDE, 2002).</u>

- E-learning Provisions across the Three Countries

As stated in a recent OECD report (2000), the US is clearly leading the way on most measures of information technology capacity. The Campus Computing Project reports yearly on the rise of ICT use in instruction. Last year, 60% of the institutions make systemic use of email, 42% of Internet resources and 31% of WWW pages as an element of instruction. The proportion of students who own computers, and who could thus benefit from e-learning provisions at home, is rising, up to 71.5 percent of all students in 2001, compared to 58.6 percent in 2000 (Green, 2001 cited by Van Der Wende, January 2002). The following figure and table gives further details.

Figure 69: Comparison of Distance-Learning Providers in the US and Its Main Competitors in International Trade in Educational Services.



Source: Van Der Wende, January 2002.
(USA Higher Education in the Global E-Learning Market)

Table 51: Relative Provision of Distance Learning In the US and Its Main Competitors in International Trade in Educational Services.

	Number of distance learning providers	Number of distance learning providers per 10,000 studs*	Number of distance learning providers per 100,000 inhabitants**
Australia	167	1.6	0.87
Canada	450	2.5	1.44
France	324	1.6	0.55
Germany	324	1.5	0.39
New Zealand	25	1.5	0.59
United Kingdom	688	3.8	1.13
United States	3193	2.2	1.06

* Data on size of student population: UNESCO Statistical Yearbook, 1999. Paris: UNESCO
** Data on size of countries' population: US Dep. Of Commerce, Economics & Statistics Administration, 2000

Source: Van Der Wende, January 2002.
(USA Higher Education in the Global E-Learning Market)

In order to estimate relative performance, the domestic provision will be related to potential domestic demand, i.e. the number of potential consumers, which will be calculated both in terms of the size of the country's higher education student population and its total population as indicated in the Table above.

According to the report it appears that the USA is certainly the world's largest provider of e-learning (also among countries not listed in this overview none has a larger number of providers) and has also by and large more providers than the countries which are its main competitors; for instance Germany and the UK. Compared with its competitors, the USA has more e-learning providers in both absolute and relative terms, although the difference seems not to be very important in terms of the number of e-learning providers compared to the size of the higher education student population. Also the differences in figures between the three countries differ to a great extent. But clearly, the USA will find (and is finding) itself in competition with distance education exporting countries notably the UK (Van Der Wende, 2002)

Overall, the comparisons of e-learning provisions seem to indicate that the US holds a strong position in the market indeed, although certain of its main competitors seem to have a relatively larger domestic supply. Success or relative performance of the US in international markets, however, will not only depend on the volume of its e-learning provision, but also very much on the type of global strategies that its higher education institutions and other e-learning providers apply in approaching these markets (Van Der Wende, January 2002).

SUMMARY COMPARISONS OF NATIONAL AND INTERNATIONAL QUANTITATIVE REPORTS

This section attempts to draw inferences from the national and international reports reviewed across the UK, Germany and USA. However as indicated in the reports the inferences may not be statistically representative but rather seek to depict tendencies as reflected in the national and international reports.

Table 52: Comparisons of Policy and Strategy

INDICATOR: POLICY & STRATEGY	GERMANY	UK	USA
Forms and Content of E-learning Products	Reports indicate that most of the e-learning products are in the form of distance or blended learning programs. They are used to supplement existing programs.	Reports indicate that there are e-learning modules that are part of degree programs. There are many universities also that offer Bachelor, Master and PhD programs	Reports indicate diverse forms of e-learning programs. Some serve as supplements to degree courses. Many universities offer Bachelor, Master and

	The institutions that offer bachelor, master and PhD level e-learning programs are quite few.	100% as distance or blended programs.	PhD programs as either distance or blended programs. There are also 100% web-based programs.
Orientation to National and/or International Markets	Majority of e-learning programs are offered in the German language and oriented more towards the local market. Instances of international offers are few and focus more on the German speaking countries.	Majority of the e-learning programs offered are equally oriented to the national as well as the international market.	Most of the e-learning programs offered by universities focus on both local and international market. Still there are distance programs that focus mainly on the international market.
Philosophy Behind E-learning	Most e-learning initiates are aimed at enhancing and flexibilizing existing programs in higher education institutions.	Programs are aimed at enhancing existing programs, increasing access to HE as well as meeting the needs of international students.	Aimed at enhancing the quality of existing courses, promoting flexibility and access to a broad range of students nationally and internationally.
Investments & Infrastructure For E-learning	Provision of infrastructure and investments in e-learning in HE come from state and federal sources through funded projects. Involvement of the private sector is limited.	Provision of infrastructure and investments mainly come from government sources. Other universities use own internal resources. There is also a certain level of private investments.	State institutions are funded by the state and federal governments. Private institutions rely on own sources. There are also high levels of corporate involvement in e-learning projects.

Table 53: Comparison of E-learning Technologies and Applications

INDICATOR: E-LEARNING TECHNOLOGIES AND APPLICATIONS	GERMANY	UK	USA
Types of E-Learning Technologies Used.	Institutions make a fair use of commercial tools, open source tools such as Moodle and internally developed tools.	Institutions use extensively commercial tools such as Blackboard as well as internally developed tools.	Institutions make a high use of commercial tools such as Blackboard as well as internally developed tools.
Applications of E-Learning Technologies	Applied in content development and management. Also in creating collaborations, providing feedback, assessments etc.	Applied in content development and management. Also in creating collaborations, providing feedback, assessments etc.	Applied in content development and management. Also in creating collaborations, providing feedback, assessments etc.

Table 54: Comparison of Pedagogical/Didactical Approaches

INDICATOR: PEDAGOGICAL APPROACHES	GERMANY	UK	USA
Forms of pedagogical approaches	Diverse, not uniform. Several approaches are applied such as case studies, role play, problem-based learning etc.	Diverse, not uniform. Use constructivist, situative and other instructional approaches in course design.	Diverse, not uniform. Different types of instructional designs employing chats, role-play, case study etc.

Table 55: Comparison of Impact of E-learning.

INDICATOR: IMPACT OF	GERMANY	UK	USA

E-LEARNING			
On Faculty	Increased level of participation in e-learning initiatives by lecturers.	Diverse impact on those who willingly accept e-learning and those who are still sceptical about e-learning. Overall, changed the way faculty members do things.	Diverse impact on those who willingly accept it and those who are still sceptical. Overall, changed the way faculty do things by placing new demands.
Learning Outcomes	Difficult to estimate and detect.	Cases of enhanced performance however generally difficult to estimate and detect.	Cases of enhanced performance however generally difficult to estimate and detect.
Higher Education Capacity	Added value in promoting flexibility. Boosted HE capacity nationally to an extent. No real impact internationally.	Added value in promoting flexibility and access. Has boosted HE capacity nationally and internationally to a large extent.	Added value in promoting access and enhanced competition. Boosted HE capacity nationally and internationally on a wider scale.

Table 56: Comparison of Limiting Factors.

INDICATOR: LIMITING FACTORS	**GERMANY**	**UK**	**USA**
Forms of limiting factors	Diverse: Lack of funding, programs mostly in German language thus inhibiting international penetration, lack of training for faculty members etc.	Diverse: Lack of adequate training for faculty and support staff, strain on faculty member's time etc.	Diverse: Broadband availability, strain on faculty member's time, institutional and other administrative problems, quality issues.

Concluding the review of both national and international reports, I must emphasise that the tendencies depicted so far in the review were not conclusive enough for a reliable and valid testing of all proposed hypotheses. This is as a result of the following reasons:

1.1. On a careful look at the country specific reports one could realize that each report considered touched on different indicators. In cases where the same indicators are considered, the scope of the data collected, the context within which these data were collected as well as the specific sample considered were totally different. These consequently make the process of undertaking a holistic description quite problematic.

1.2. At the international level there were huge gaps in data due to the fact that scanty if not totally non existent international reports so far have compared activities of e-learning across these three countries. Reports that sought to do this mainly focused on data covering ICT infrastructure, country investments in ICT aimed at enhancing higher education as well as the level of broadband penetration. The reports hardly examined the indicators, policy and strategy, e-learning technologies and applications in a specific way, didactical approaches and future e-learning scenarios across the three countries.

In lieu of the issues discussed above and to promote reliability and validity in answering all the hypotheses proposed, the results of qualitative data analysis (using Maxqda2) are considered in the next section.

QUALITATIVE ANALYSIS AND RESULTS (EXPERT INTERVIEWS)

The results of the analysis of expert interview transcripts with the qualitative software Maxqda2 are presented below:

For hypothesis 1 which states that: ***There will be differences in the pedagogical philosophies (concept), strategy and tactics (procedural) between the three countries:-***

Qualitative data relating to the following themes under the main category ***policy and strategy*** were extracted separately for each country for analysis and comparison across the three countries: 1) What is e-learning 2) Forms of e-learning products 3) Content of e-learning programs, 4) Orientation to local or international markets 5) Main philosophy or strategy for e-learning and 6) current emerging trends.

A. Findings on what e-learning is for each country are presented below:

Table **57: What is e-learning?**

Germany	
Theme	Major Categories of repeating ideas.
What is e-learning?	• A wide variety of IT based support for teaching and learning. • Use of more complex scenarios (e.g. learning management systems (LMS) for learning. • All types of activities for teaching and training by the use of electronic media. • A form of distance education based on e-learning and face-to-face on-campus situation.

From Table 57 above the main repeating ideas for what e-learning is in Germany falls within both narrow and broad conceptualization of e-learning. The broad definition of e-learning is exemplified by the following quotes from experts in that school of thought.

"It's not only the teaching processes itself but the overall configuration of teaching student, administration and including production of interfaces or other ICT based systems. So e-learning means to have a wide variety of information technology based support for teaching and learning in general" (Interviews\G1, Sept. 2006).

"For me e-learning is a way to support learning in institution and outside institution with technology; mainly digital media and in more narrow sense learning with new media. It's something to do with supporting instructional processes on one hand and supporting self-guided, self directed learning processes on the other hand with different kinds of technologies. So e-learning in the broader sense is everything that has to do with using technologies to support processes of learning. In a more narrow sense it has to do with teaching or institutionalized learning supported with technology and of course on the other hand providing tools and providing environments for self directed learning as well" (Interviews\G3, Oct. 2006).

"I think today it is everything that is electronic. Every content that is provided in an electronic way…." (Interviews\G6, Aug. 2006).

On the other hand a much narrow definition of e-learning is exemplified by the following quote from an expert in that school of thought.

"E-learning is more than applying PowerPoint slides and beamer presentations. E-learning in my opinion will be to use more complex scenarios of e-learning for example to use a learning management system (LMS) with more functions than only upload and download files. For example if you use chart programs" (Interviews\G 2, Oct. 2006).

Table **58: What is e-learning?**

United Kingdom(UK)	
Theme	Major Categories of repeating ideas.

What is e-learning?	• Technology enhanced learning. • Holistic and flexible approach to learning. • Process of equipping learners with skills in a digitally enhanced context. • Maximizing the learning or pedagogical opportunity afforded by ICT. • Use of ICTs to support individuals and groups with their overall learning needs.

From Table 58 above the main repeating ideas for what e-learning is in the United Kingdom (UK) falls within both narrow and broad conceptualization of e-learning. The broad definition of e-learning is exemplified by the following quotes from experts in that school of thought.

"[…] is using computer-based technology to support learning primarily by students. Technology enhanced learning rather than e-learning partly because it expresses more clearly that the starting point is the learning and the technology is used to enhance that" (Interviews\U2, July 2006).

"[…] is electronic form of providing any learning" (Interviews\U 7, Aug. 2006).

"A wide range of applications of digital technology to support learning, studying and education generally" (Interviews\U4, July 2006).

On the other hand a much narrow definition of e-learning is exemplified by the following quotes from experts in that school of thought.

"E- learning has moved beyond a very traditional approach which is based on electric page turning and on the delivery of content to a much more holistic and flexible approach which involves not only the delivery of course work and content but only also on facilitating through imitation between students and between students and tutors" (Interviews\U1,Oct. 2006).

"[…] it is the process of equipping learners with skills that they need to operate effectively in the 21st century in a digitally enhanced context" (Interviews\U5, July 2006).

"We have problems with this. We have a government definition in the UK which we have to abide by regarding whatever work that we do which is simply any use of technology in teaching and learning. Personally I don't think that will account as e-learning unless e-learning has an important role to play in the actual teaching" (Interviews\U6, July 2006).

Table **59: What is e-learning?**

United States of America (USA)	
Theme	Major Categories of repeating ideas.

What is e-learning?	• Instruction delivered over the internet in the World Wide Web. • Delivery of instruction and learning via various technologies. • Instruction across a distance • Hybrid type of learning

From Table 59 above the main repeating ideas for what e-learning is in the United States (USA) emphasizes a broad definition of e-learning. This is exemplified by the following quotes from experts interviewed.

"[…] is teaching courses using the World Wide Web (www) to assist with learning" (Interviews\A7, Aug. 2006).

"[…] any type of electronic learning whether it is through the internet or through CD ROMS or any other electronic devices including PDAs" (Interviews\A8, Aug. 2006).

"[…] education delivered over the internet and normally in the scope of my work that will be classes. […] from my perspective as a professor here in the college of education, when I think of e-learning in my own life it will be delivering course materials or an entire course over the internet. I guess the key factor in that will be the internet" (Interviews\A9, Aug. 2006).

B. Findings on Forms of e-learning products for each country are presented below.

Table **60: Forms of e-learning products**

Germany	
Theme	Major Categories of repeating ideas.
Forms of e-learning products.	• Blended learning • Distance learning • Web-based learning management systems • Computer-based training

From Table 60 above the main repeating ideas for the forms of e-learning products in Germany points to blended learning, distance learning, web-based learning as well as computer-based training. This is exemplified by the following quotes from some of the experts interviewed.

"I know from my own experience and from institutions where I taught that there is not much about pure distance education. I will say that at the moment there are several types of technologies that are used to support blended types of learning. So blended learning environment is accompanying electronic environments that is to prepare or to work with the content of more traditional learning environments, seminars for example in universities and that is more complementary. There are of course also distance education approaches for example Virtual Hochshule Bayern and also ideas about the Elite Schule at the LMU as well" (Interviews\G3,Oct. 2006).

"I think traditionally there has been some distance learning curricular and programs for example there is the University of Hagen, there is also in Bavaria in Munich there are distance learning programs. But I think the general tendency is rather towards blended learning approaches where traditional classroom teaching, or take off seminars are then combined with distance learning forms of e-learning" (Interviews\G4,Aug. 2006).

"I have the feeling that most universities use a form of blended e-learning […….] dedicated distance educating institutions for instance the Fern Universität generally does not use e-learning but traditional correspondence teaching. But generally I think the normal universities up till now have some or you can see some attempt to flexibilize programs by adding e-learning component but otherwise I think the proper programs delivered completely or mainly at a distance are rare" (Interviews\G9, Aug. 2006).

Table **61: Forms of e-learning products**

United Kingdom(UK)	
Theme	Major Categories of repeating ideas.
Forms of e-learning products.	• Distance learning • Blended learning • Web-based learning

From Table 61 above the main repeating ideas for the forms of e-learning products in the UK points to distance learning, blended learning as well as web-based learning. This is exemplified by the following quotes from some of the experts interviewed.

"It depends entirely on the institution. There is one large distance learning institution in the UK which is the Open University with 250,000 students that is the largest university in the UK and is entirely distance learning institution. It has a blended learning approach and is now moving over more to Web-based learning. There are also institutions such as Berbeck College which provide some elements of distance learning. But the main use of e-learning in UK higher education is to support campus- based learning through VLEs and other tools to enable more flexible part of the study." (Interviews\U2, July 2006)

"Most people focus on blended learning [……] it is highly prevalent in all of the distance courses." (Interviews\U4, July 2006)

"There are some universities that are doing 100% distance learning. They are not that many. But most universities in the UK are adopting some form of blended learning. The web-based learning is a big issue in the UK. The issue is that e-learning can actually help us to move forward than web-based learning." (Interviews\U10, Oct. 2006)

Table **62: Forms of e-learning products**

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Forms of e-learning products.	• Blended learning • Distance education • 100% web-based

From Table 62 above the main repeating ideas for the forms of e-learning products in the UK points to distance learning, blended learning as well as web-based learning. This is exemplified by the following quotes from some of the experts interviewed.

"I will say that if you were to look at e-learning environments across the United States in higher education you will find that there are a significantly higher proportion of blended learning approaches." (Interviews\A5, Sept. 2006)

"I think most of e-learning which we will also call distance education is being delivered." (Interviews\A2, Sept. 2006)

"I will say it is equal part. It's equal part pure virtual instruction, teaching and learning where the teacher and the student never interact with one another all way over to about half of it what I will call hybrid." (Interviews\A6, Sept. 2006)

"I think initially there were blended programs. But we seeing more and more 100% web-based." (Interviews\A3, Sept. 2006)

C. Findings on Content of e-learning programs for each country are presented below.

Table 63: Content of e-learning programs

Germany	
Theme	Major Categories of repeating ideas.
Content of e-learning programs	• Supplements. • Complementary. • Enhance teaching with web elements.

From Table 63 above the main repeating ideas for the content of e-learning programs in Germany points to supplements and complementary content to enhance teaching. This is exemplified by the following quotes from some of the experts interviewed.

"There are some examples for stand alone degree programs but this is just a minority. Mainly to understand e-learning is used in integrated manner with other programs just to provide materials for students or to give another way to learn certain issue." (Interviews\G1, Sept. 2006)

"But I will say that the main parts of activities that are going on at the moment are more directed in how we can support the traditional learning environment with using the new media with a focus on how to use the

computer, the internet in seminars. So to my knowledge different approaches to some standards on learning platform that can be used to have complementary lessons to traditional lessons and also to have more distance education type of education." (Interviews\G3, Oct. 2006)

"Yes most of them are supplements." (Interviews\G6, Aug. 2006)

Table 64: Content of e-learning programs

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Content of e-learning programs	• Entirely linked to degree programs. • Supplements. • Complementary

From Table 64 above the main repeating ideas for the content of e-learning programs in the UK points to contents that are entirely linked to degree programs, supplements and complements. This is exemplified by the following quotes from some of the experts interviewed.

"They are almost entirely linked to our undergraduate and postgraduate degrees." (Interviews\U1, Oct. 2006)

"Most universities in the UK have adopted virtual learning environments to supplement the campus-based teaching. Most universities in the UK now have institutional VLEs to support the traditional campus-based learning. There are other approaches for example for supporting part-time students or students learning at a distance." (Interviews\U2, July 2006)

"All of those happen. Sometimes people tend to see it as supplementary because lecturers are not very enthused about what e-learning can offer. It is also used as a complementary to lectures. It is used as a complementary teaching method when it does something that nothing else can do. Overall the forms of e-learning products in the UK increasingly point to contents that are part of main degree programs and supplements." (Interviews\U4, July 2006)

Table 65: Content of e-learning programs

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Content of e-learning programs	• Part of degree courses. • Stand alone degree programs • Supplements

From Table 65 above the main repeating ideas for the content of e-learning programs in the USA points to contents that are part of degree courses, stand alone degree programs and supplements. This is exemplified by the following quotes from some of the experts interviewed:

"They are part of core courses for bachelors which are a four year college degree; there is also a lot of technical education on courses at this point for two years degrees. There are all sorts of degree granting courses." (Interviews\A2, Sept. 2006)

"I would say by their very format some are obviously stand alone….." (Interviews\A3, Sept. 2006)

"Again, the ones that I work with are all either degree or certificate programs that are separate from the normal degree programs." (Interviews\A4, Sept. 2006)

D. Findings on orientation to local or international markets for each country are presented below:

Table 66: Orientation to local or international markets.

Germany	
Theme	Major Categories of repeating ideas.
Orientation to local or international markets	• Local Market. • Few cases of international programs (oriented to German speaking countries)

From Table 66 above the main repeating ideas for orientation of e-learning products to the local or international markets in Germany indicates an orientation to mostly the German market and to a limited extent German speaking countries. This is exemplified by the following quotes from some of the experts interviewed:

"Most of them German market. They use often German language." (Interviews\G2, Oct. 2006)

"I would say at the moment it is directed towards more the German market." (Interviews\G3, Oct. 2006)

"German, they have problems presenting themselves on the international market because of the issue of language and when international then it is mostly for the German speaking countries." (Interviews\G6, Aug. 2006)

Table 67: Orientation to local or international markets.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Orientation to local or international markets	• Both local and international markets.

From Table 67 above the main repeating ideas for orientation of e-learning products to the local or international markets in the UK indicates an orientation to both the local and international markets. This is exemplified by the following quotes from some of the experts interviewed:

"Both, because we have got a lot of face-to-face students here at Surrey who also use e-learning. Students use You Learn and our distance learning students who are based in our overseas centres such as Germany,

Mauritius, Barbados, and Athens on our MBA programmes also use e-learning with them."(Interviews\U1, Oct. 2006)

"I think is both. If you are teaching internationally then you have to use e-learning. But it is used just as much for campus-based students." (Interviews\U4, July 2006)

"I am finding it difficult to answer this question because the answer is always both. Where we are delivering courses in the international market they involve e-learning, where we deliver courses to the UK market they involve e-learning. So our international involvement involves both e-learning and non e-learning initiatives plus we do a lot of sending teachers to other countries or bringing students here. We use e-learning for international students but it is not a main drive." (Interviews\U6, July 2006)

Table 68: Orientation to local or international markets.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Orientation to local or international markets	• Both local and international markets.

From Table 68 above the main repeating ideas for orientation of e-learning products to the local or international markets in the USA indicates an orientation to both local and international market. This is exemplified by the following quotes from some of the experts interviewed:

"I think one characteristic is that these courses are an extension of what the university is already doing. And generally they are designed to meet the needs of particular clients so there is some US corporate clients and there is some international both academic and corporate client." (Interviews\A4, Sept. 2006)

"So far what we have seen are all US based. US based teachers, US based students, but we are starting to see much more internationalization of that so that we have got students here for example here at Pennsylvania State enrolled in degree programs who live in Thailand, UK or Australia, even Africa." (Interviews\A6, Sept. 2006)

"Both." (Interviews\A8, Aug. 2006)

E. Findings on main philosophy or strategy for each country are presented below.

Table 69: Main philosophy or strategy.

Germany	
Theme	Major Categories of repeating ideas.
Main philosophy or strategy.	• No commonly shared philosophy/strategy • Connect e-learning activities • Technologically driven philosophy/how to bring technology into the classroom • Provide better learning environment

From Table 69 above the main repeating ideas for the main philosophy or strategy for e-learning in Germany indicates that there is no commonly shared strategy, but the main philosophies existing are to connect e-learning activities, getting the technology into the classroom and providing better learning environments. This is exemplified by the following quotes from some of the experts interviewed:

"I don't think there is a shared common main philosophy in this sense. I think now with the Bologna declaration, now the university think they have to employ e-learning. Mostly; it more organizational questions which make the basis for e-learning." (Interviews\G2, Oct. 2006)

"There is no strategy behind it." (Interviews\G5, Aug. 2006)

"I think there is no main philosophy; no main strategy. The programs you mentioned are coming from the governments of different Lander region and therefore they are according to different policies. And there are also the European programs for e-learning. I think there is no mutual strategy for the development of e-learning." (Interviews\G8, Aug. 2006)

Table 70: Main philosophy or strategy.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Main philosophy or strategy.	• To support campus-based learning • Government "e"-strategy tries to disseminate good practice • Responding to student demand and student expectation. • A transition tool • Raising attainment and achievement • Getting e-learning embedded

From Table 70 above the main repeating ideas for the main philosophy or strategy for e-learning in UK points to an overall government "e"- strategy to disseminate good practice, support campus-based learning, respond to student demand and expectation as well as raise attainment and achievement by ensuring that e-learning is embedded in higher education. This is exemplified by the following quotes from some of the experts interviewed:

"The main philosophy is to use learning technology appropriately to support campus-based learning." (Interviews\U2,July 2006)

"I think people will say that it is constructivist. Well my impression of the national strategy in the UK. I am thinking specifically of the department for education's e-learning strategy which is now turned into the e-strategy and the Higher Education Academy e-learning strategy. When I enquired of the people who were in charge of putting together those strategies what their main purpose was; I think much of the focus is around trying to

disseminate good practice but also to allow people and individual institutions to point to that national strategy as the reason for why they are instituting those strategies." (Interviews\U5, July 2006)

"Probably the major thing is responding to student demand and student expectation. Students expect a fairly high level of e-learning involvement in their courses and the government is partly responding and leading it in terms of the government e-strategy and e-government initiative. In terms of the recent funding initiatives they are partly intended to wrap up some of the work that has been going on for the last 15 years. On the rather adhoc basis there has been lots of different kinds of sums of money coming in from all over the place towards e-learning. There is now a kind of attempts to rationalize it, I don't know if it attempts to put in more money." (Interviews\U6, July 2006)

Table 71: Main philosophy or strategy.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Main philosophy or strategy.	• Provide quality educational coursework • Provide different method of delivering course content. • Equity

From Table 71 above the main repeating ideas for the main philosophy or strategy for e-learning in USA points to the provision of quality coursework, flexibility of course content to different types of students and equity (i.e. making education fairly available to everybody). This is exemplified by the following quotes from some of the experts interviewed:

"I think the main strategy is to provide quality educational coursework to a large and vast group of various students as possible." (Interviews\A2, Sept 2006)

"I will say that for most instructors or in most programs the aim of polices is to service the students. So I think from a pragmatic stand point the move towards more e-learning environment is the way to meet the perceived needs of potential students for these programs and that is to help them get higher education and give the training they need without inconveniencing them as much as coming to a face-to-face program."(Interviews\A5, Sept. 2006)

"The main philosophy behind it is to provide different method of delivery of course content. So the philosophy at our university is it is designed to give students convenience and options so they can fit the program in and around their lifestyle." (Interviews\A7, Aug. 2006)

F. Findings on the current emerging trends for each country are presented below:

Table 72: Current emerging trends.

Germany	
Theme	Major Categories of repeating ideas.
Current emerging trends	• Increased use of LMS and integration with student administration technologies.

	• State-wide initiatives. • Social tools (e.g. wiki's, blogs). • Orchestration of technologies with learning. • Scripting computer supported collaboration • Blended learning scenarios • Mobile learning • Competency based e-learning • Provision of learning units with e-learning materials. • Intensification of co-operation with international partners.

From Table 72 above the main repeating ideas for the current emerging trends for e-learning in Germany are increased use of LMS, social tools, blended learning scenarios and intensification of co-operations with external partners. This is exemplified by the following quotes from some of the experts interviewed:

"First trend is that most of the universities now have at least one (1) learning management system (LMS) in place that is used by a growing number of teachers and students. Second trend is that some good examples for the integration of such systems with the student administration technologies. Besides there is a number of state-wide activities that try to develop solutions available for each state like Bavaria or Saxony or others." (Interviews\G1, Sept. 2006)

"I think from technology point of view, social technologies; Wiki's, Blogs which are very new trend but which are in mass use at the moment. We still need to know much more but there are some rather clear pictures that emerge that we did not know are how to really integrate these environments into larger instructional settings. So one part of the question; the key word for this research question is orchestration. So, orchestrating this model which is, individual learning, and small group learning, with technology, without technology in class room setting and beyond. So the question is how you can bring back the teacher to this expert role so that actual role distribution becomes an intelligence component of this whole system will re-do decisions, which are the tutorial decisions, instructional decisions." (Interviews\G3, Oct. 2006)

"The trend is to use a learning platform that is still the basic question for most institutes. Which learning platform will be used? When it comes to pedagogical things then competency based e-learning is the topic." (Interviews\G6, Aug. 2006)

Table 73: Current emerging trends.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Current emerging trends	• Use of mobile devices/mobile learning. • Open education and new educational structures. • Customization of e-learning materials or personalized learning. • Increased research into e-learning

From Table 73 above the main repeating ideas for the current emerging trends for e-learning in the UK is mobile learning, personalized learning, and increased impact of e-learning through research. This is exemplified by the following quotes from some of the experts interviewed:

"I think that some of the emerging trends are to do with newer technology such as mobiles devices such iPod, MP3 players to look at ways of conveying learning in a much more flexible basis. I think it is very much at the experimental phase." (Interviews\U1, Oct. 2006)

"The main emerging trend is students are coming to the university with their own technology particularly with wireless laptops. And universities are looking for strategies to enable students to be able to connect wireless laptops and looking for ways that can be used to support learning. There is considerable interest at the in other aspects of mobile learning; example allowing students to use text messaging in lectures to send messages to the lecturer during lectures or to use SMS text messaging to notify students. So there is a lot of interest in the UK for the use of mobile learning and supporting students with mobile wireless devices." (Interviews\U2, July 2006)

"The big trend is away from VLEs and increasing in social software use, which is Wiki's, Blogs. It's not well established as a main delivery mechanism for HE but that is the trend." (Interviews\U6, July 2006)

Table 74: Current emerging trends.

United States of America (UK)	
Theme	Major Categories of repeating ideas.
Current emerging trends	• Mobile devices (e.g. iPod, cell phones) • Adoption of highly interactive technologies (e.g. video conferencing tools) • Increased partnership between universities and corporations for the development of e-learning. • Standardization of course materials • Aggressive marketing. • Tremendous growth • More web-based and blended- learning courses

From Table 74 above the main repeating ideas for the current emerging trends for e-learning in the USA is increased growth through aggressive marketing, mobile devices and more web-based courses. This is exemplified by the following quotes from some of the experts interviewed:

"I think movement towards more online instruction, more advanced technologies for making that online instruction, more highly interactive adoption of such technologies as Delta Video Conferencing Technologies, collaborative software technologies such kind of thing." (Interviews\A1, Sept. 2006)

"Well, I suppose one of the emerging trends I am seeing is more aggressive marketing. In the early years of e-learning in higher education in the United States it was technology-driven and the students who sought out and became customers for this kind of education were, you know they didn't need to be persuaded, they were ready for it

they sought it out. Now the systems are more mature and richer the marketing is becoming more aggressive to go after students who normally will seek out a face-to-face instruction." (Interviews\A6, Sept. 2006)

"The current trend right now is there is tremendous growth; the competition among universities in the last few years has caused a tremendous growth in e-learning opportunities because the market is demanding it." (Interviews\A7, Aug. 2006)

Descriptive Comparisons of Germany, UK and USA- *Policy and Strategy.*

- What is e-learning?

Table 75: Comparisons of what is e-learning?

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• A wide variety of IT based support for teaching and learning. • Use of more complex scenarios (e.g. LMS) for learning. • All types of activities for teaching and training by the use of electronic media. • A form of distance education based on e-learning and face-to-face on-campus situation.	• Technology enhanced learning. • Holistic and flexible approach to learning. • Process of equipping learners with skills in a digitally enhanced context. • Maximizing the learning opportunity afforded by ICT. • Use of ICTs to support individuals and groups with their overall learning needs.	• Instruction delivered over the internet in the World Wide Web. • Delivery of instruction and learning via various technologies. • Instruction across a distance • Hybrid type of learning

- Forms of e-learning products

Table 76: Comparisons of e-learning products

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Blended learning • Distance learning • Web-based learning management systems • Computer-based training	• Distance learning • Blended learning • Web-based learning	• Blended learning • Distance education • 100% web-based

- Content of e-learning programs

Table 77: Comparisons of content of e-learning programs

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Supplements. • Complementary. • Enhance teaching with	• Entirely linked to degree programs. • Supplements.	• Part of degree courses. • Stand alone degree programs

web elements.	• Complementary	• Supplements

- Orientation to local or international markets

Table 78: Comparisons of orientation to local or international.

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Local Market. • Few cases of international programs (oriented to German speaking countries)	• Both local and international markets.	• Both local and international markets.

- Main philosophy or strategy for e-learning

Table 79: Comparisons of Main philosophy or strategy for e-learning

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• No commonly shared philosophy/strategy • Connect e-learning activities • Technologically driven philosophy/how to bring technology into the classroom • Provide better learning environment	• To support campus-based learning • Government "e"-strategy tries to disseminate good practice • Responding to student demand and student expectation. • A transition tool • Raising attainment and achievement • Getting e-learning embedded	• Provide quality educational coursework • Provide different method of delivering course content. • Equity

- Current emerging trends

Table 80: Comparisons of Current emerging trends

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Increased use of LMS and integration with student administration technologies. • State-wide initiatives. • Social tools (e.g. wiki's, blogs). • Orchestration of technologies with learning.	• Use of mobile devices/mobile learning. • Open education and new educational structures. • Customization of e-learning materials or personalized learning. • Increased research	• Mobile devices (e.g. iPod, cell phones) • Adoption of highly interactive technologies (e.g. video conferencing tools) • Increased partnership between universities and corporations for

• Scripting computer supported collaboration • Blended learning scenarios • Mobile learning • Competency based e-learning • Provision of learning units with e-learning materials. • Intensification of co-operation with international partners.	into e-learning	the development of e-learning. • Standardization of course materials • Aggressive marketing. • Tremendous growth • More web-based and blended- learning courses

HYPOTHESIS TESTING: Based On Results from both Quantitative (Reports) and Qualitative (Expert Interviews) Results.

Based on:

- Summary comparisons of quantitative data (Reports) derived across the three countries (see Table 52)
- The findings of qualitative expert interview analysis above in Tables 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67,68, 69, 70, 71, 72, 73, 74 and comparative analysis between the countries above in Tables 75, 76, 77, 78,79, and 80, hypothesis 1 which states that:

There will be differences in the pedagogical philosophies (concept), strategy and tactics (procedural) between the three countries was supported though there were traces of similarities across the three countries.

For hypothesis 3 which states that: ***There will be differences in the types of e-learning technologies used across the three countries.***

Qualitative data relating to technologies used were extracted separately for each country for analysis and comparison across the three countries. Findings for each country are presented below:

Table 81: Prevalent e-learning technologies/tools.

Germany	
Theme	Major Categories of repeating ideas.
Prevalent e-learning technologies.	• Commercial systems **Blackboard** and **WebCT** • Open source systems like **Sudip, ILIAS** • Moodle.

	• e-mail, PowerPoint • Sytrex • Learning Space • WebTycho • EverLearn • ITOS

From Table 81 above the main repeating ideas for prevalent e-learning technologies in Germany are Blackboard, WebCT, ILIAS and Moodle. This is exemplified by the following quotes from some of the experts interviewed:

"There are two (2) commercial systems. That is blackboard and WebCT. These are learning management systems (LMS). In addition to LMS there are also some open source systems like Sudip, ILIAS that is mainly the technology. For learning management there is less standardization for the authoring process, there is wide variety of different tools and there is less accessibility for the standardized tool." (Interviews\G1, Sept. 2006)

"I think there is a broad variety and I think that most tools at the moment are tools which provide content. Then follow tools providing collaboration. There are different ones like ELIS, Learning Space, and Blackboard." (Interviews\G7, Aug. 2006)

Table 82: Prevalent e-learning technologies/tools.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Prevalent e-learning technologies.	• WebCT and Blackboard. • Moodle • Student portals • Shared forums, Wiki's and blogs • MNET referencing technologies • Online whiteboards. • Conferencing tools like First Class • Lambs • Web2 technologies

From Table 82 above the main repeating ideas for prevalent e-learning technologies in the UK are the classic VLEs WebCT, Blackboard, and Moodle. This is exemplified by the following quotes from some of the experts interviewed:

"WebCT and Blackboard. A small number of universities have adopted Moodle as VLE. Increasingly, universities have adopted the student portal as well….." (Interviews\U2, July 2006)

"Blackboard, WebCT is very prevalent most or most used in colleges. PowerPoint is very much in use by lecturers and a degree by students. All students use the web and search engines, word processing tools, quite a lot of people use excel spreadsheet but it depends on the subject areas. Expert technologies tools like MNET referencing

technologies are being used a lot, conferencing tools like First Class or sometimes audio graphic systems, online whiteboards." (Interviews\U4, July 2006)

"Certainly there is a lot of use of classic VLEs, which is WebCT, Blackboard, and Moodle. There are plenty other tools that are used for video conferencing, audio conferencing. But the easy thing to say is classic VLEs." (Interviews\U6, July 2006)

Table 83: Prevalent e-learning technologies/tools.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Prevalent e-learning technologies.	• Blackboard and WebCT • Breeze • Open source soft wares • E-mail • Video, Pod casting, Streaming audio • Internet/ Broadband cable internet

From Table 83 above the main repeating ideas for prevalent e-learning technologies in the USA are Blackboard, WebCT, Breeze, Open Source soft wares, E-mail, Video, Pod casting, streaming audio and Internet. This is exemplified by the following quotes from some of the experts interviewed:

"Content management tools such as Blackboard and WebCT. That has emerged out of one. Blackboard bought WebCT but that is the dominant technology right now for online instruction." (Interviews\A1, Sept. 2006)

"E-mail is probably the most overlooked tool that is used in e-learning as a primary vehicle between student to student and student to instructor communication. As far as programs and classes I think you are seeing more and more media; video, Pod casting, Streaming audio and those types of things moving into the market." (Interviews\A5, Sept. 2006)

Descriptive Comparisons of Germany, UK and USA- *Prevalent E-Learning Technologies.*

- Prevalent e-learning technologies

Table 84: Comparisons of prevalent e-learning technologies.

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Commercial systems Blackboard and WebCT • Open source systems i.e. Sudip, ILIAS • Moodle. • e-mail, PowerPoint • Sytrex	• WebCT , Blackboard • Moodle • Student portals • Shared forums, Wiki's and blogs • MNET referencing technologies • Online whiteboards.	• Blackboard, WebCT • Breeze • Open source soft wares • E-mail • Video, Pod casting, Streaming audio • Internet/ Broadband

• Learning Space • WebTycho • EverLearn • ITOS	• Conferencing tools like First Class • Lambs • Web2 technologies	cable internet

HYPOTHESIS TESTING: Based On Results from both Quantitative (Reports) and Qualitative (Expert Interviews) Results.

Based on:

- Summary comparisons of quantitative data (Reports) derived across the three countries (see Table 53)
- The results of qualitative analysis above in Tables 81, 82, 83 and comparative analysis between the countries above in Table 84, hypothesis 3 which states that:

There will be differences in the types of e-learning technologies used across the three countries was supported on the basis of the diverse categories of technologies available though there were traces of common tools mentioned.

For hypothesis 4 which states that: ***There will be differences in the applications of e-learning technologies across the three countries.***

Qualitative data relating to applications of e-learning technologies were extracted separately for each country for analysis and comparison across the three countries. Findings for each country are presented below:

Table 85: Specific ways technologies /tools are applied.

Germany	
Theme	Major Categories of repeating ideas.
Specific ways technologies are applied.	• A shared workspace to download and upload files • Used for learning management to distribute documents accompanying seminars. • To support self-regulated learning

From Table 85 above the main repeating ideas for specific ways e-learning technologies are applied in Germany are as a shared workspace, learning management system and to support self-regulated learning. This is exemplified by the following quotes from some of the experts interviewed:

"For the LMS I already said that it more like a shared workspace to download and upload files. This is the most common use of LMS. Of the social software I think they will be developing two trends 1) the teacher how

he or she wants to employ the technology in the class. 2) The pupils or students they will use the social software beside, teachers won't have control over it." (Interviews\G2, Oct. 2006)

"It depends. Some offers make use of the whole range of opportunities of learning management systems and others only use for learning management to distribute documents accompanying a lecture; accompanying a seminar." (Interviews\G8, Aug. 2006)

Table 86: Specific ways technologies /tools are applied.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Specific ways technologies are applied.	• A shared workspace to download and upload files • Communicative ways for online discussions • Support group work • Virtual conferences, simultaneously shared functions, link to websites. • Support collaborations • Organize assessments • To deal with external markets.

From Table 86 above the main repeating ideas for specific ways e-learning technologies are applied in the UK are as a shared workspace, support group work/collaborations, assessments and deal with external markets. This is exemplified by the following quotes from some of the experts interviewed:

"They are used to provide the VLE for students including online course material, discussion groups but it depends on the individual academic, individual lecturer or tutor how they are applied. Some of them just use them to put their course materials online. Some of them just use them in more communicative ways for example for students to hold online discussions relating to their courses or to support student projects. Also allow students to do group work online." (Interviews\U2, July 2006)

"Create collaboration of students or create online discussion between students." (Interviews\U4, July 2006)

"Most people believe by introducing a VLE into their university somehow create better resources for their students in a cheaper way than they can do it on campus. And there are a small number of people who are using VLE to address the market outside the UK." (Interviews\U7, Aug 2006)

Table 87: Specific ways technologies /tools are applied.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Specific ways technologies are applied.	• Deliver coursework • Provide instructional presence & feedback. • Create discussion with discussion boards • Provide assessments

	• Collaborations • Enable students to publish their knowledge (i.e.Wiki's) • Support problem solving (e.g. 3-D environments)

From Table 87 above the main repeating ideas for specific ways e-learning technologies are applied in the USA are to deliver coursework, instructional presence, feedback, assessments, collaborations, knowledge dissemination and enable problem solving activities. This is exemplified by the following quotes from some of the experts interviewed:

"People deliver courses. And people deliver courses using quiz tools, shared document and online forums, online grade box those kinds of tools that support their courses." (Interviews\A1, Sept. 2006)

"Well the most common as I said before is e-mail which is a more personal individualized communication medium. It is primarily used as a way for an instructor to include an instruction presence in the communication that they have with students because it is more individualized. E-mails also a way for students use to reduce ambiguities about topics or to resolve questions that they have in the online environment. E-mail is also used successfully by instructors as a way to motivate students by sending them out current grades or reminders and little tips to again inject instructional presence into an asynchronous learning environment." (Interviews\A5, Sept. 2006)

"We use the web-based technology to deliver content, to create discussion through discussion boards, to conduct live discussions using chart rooms, to present lecture materials via streaming video and to give students assessments using the assessment tool so they do live assessments." (Interviews\A7, Aug. 2006)

Descriptive Comparisons of Germany, UK and USA- *Applications of E-Learning Technologies.*

- Applications of e-learning technologies

Table 88: Comparisons of applications of e-learning technologies.

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• A shared workspace to download and upload files • Used for learning management to distribute documents accompanying seminars. • To support self-regulated learning	• A shared workspace to download and upload files • Communicative ways for online discussions • Support group work • Virtual conferences, shared functions, link to websites. • Support collaborations • Organize assessments • To deal with external markets.	• Deliver coursework • Provide instructional presence & feedback. • Create discussion with discussion boards • Provide assessments • Collaborations • Enable students to publish their knowledge (i.e. Wiki's) • Support problem solving activities (e.g. 3-D environments)

HYPOTHESIS TESTING: Based On Results from both Quantitative (Reports) and Qualitative (Expert Interviews) Results.

Based on:

- Summary comparisons of quantitative data (Reports) derived across the three countries (see Table 53)
- The results of qualitative analysis above in Tables 85, 86, 87 and comparative analysis between the countries above in Table 88, hypothesis 3 which states that:

There will be differences in the applications of e-learning technologies across the three countries was supported in the context of the wide varieties of applications across the three countries.

For hypothesis 2 which states that: ***There will be differences in the educational/ pedagogical models/didactical approaches of e-learning products in higher educational institutions across the three countries.***

Qualitative data relating to didactical/pedagogical approaches and fit to educational philosophies of other countries were extracted separately for each country for analysis and comparison across the three countries. Findings for each country are presented below.

Table **89: Didactical/pedagogical approach(s)/uniformity**

Germany	
Theme	Major Categories of repeating ideas.
Didactical approaches	• Not uniform • Collaborative learning process • Hierarchical form of teaching • No real instructional/pedagogical approach • Competency based education • Mixtures of blended learning conception

From Table 89 above the main repeating ideas for didactical approaches used in Germany are not uniform, they vary from co-operative learning, hierarchical forms of teaching to constructivist learning. This is exemplified by the following quotes from some of the experts interviewed:

"Well often there is no specified didactical approach that the developers or people who adopt it have in mind but if you have a closer look, we can see that some smaller group of adopters just focus on a co-operative collaborative learning process." (Interviews\G1, Sept. 2006)

"No I don't think so. I think they are quite open to different didactical approaches. Of course they have strengths in terms of providing multiple choice text and things like that which sometimes related to behaviouristic pedagogical view but I don't think this is the truth because it is also possible to use them in different for example constructivist pedagogical approaches." (Interviews\G8, Aug. 2006)

Table 90: Didactical/pedagogical approach(s)/uniformity

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Didactical approaches	• Diverse didactical approaches • Modular approach to teaching • Seminar based teaching • Resource based learning • Collaborative learning • Constructivist approach • Problem-based learning group • Enquiry-based learning group

From Table 90 above the main repeating ideas for didactical approaches used in Germany are not uniform, they vary from co-operative learning, hierarchical forms of teaching to constructivist learning. This is exemplified by the following quotes from some of the experts interviewed:

"The e-learning products facilitate a certain sort of more appropriate use than other so they aim particularly at the type of teaching where as in the UK you have a modular approach to teaching and learning and within those modules primarily lecturing content-based. The VLEs are particularly suited to that sort of content lecturing, seminar based teaching and also for resource based learning so that students can access course materials online. Then particularly at the moment for example collaborative learning." (Interviews\U2, July 2006)

"No. I don't think they project a single pedagogical approach." (Interviews\U6, July 2006)

"I think that a lot of e-learning resources that exist are still very teacher dependent or tutor dependent except those built into information resources for students. And therefore it does depend on teachers developing their pedagogy in order to enlarge the range of approaches that they take. And certainly within the UK there is some evidence that some teachers can do that. But many teachers have difficulty with it." (Interviews\U9, Aug. 2006)

. **Table 91: Didactical/pedagogical approach(s)/uniformity**

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Didactical approaches	• Both standardized and non-standardized didactical approaches. • Modularized instructional units • Constructivist learning

From Table 91 above the main repeating ideas for didactical approaches used in the USA are modularized instructional units and constructivist learning approaches. This is exemplified by the following quotes from some of the experts interviewed:

"No they are free for faculty to design and deliver as they want to." (Interviews\A2, Sept. 2006)

"Yes they do. For instance in the online academy was a project that I had to work on at the University of Kansas. It makes use of a very standardized lecture format. All the presentations or lectures were produced to have a similar format; all the interfaces are the same and so on. My own program here we are looking forward moving towards more of a flexible but still standardized template environment that will ensure that students have a commonality of experience across the various classes in the program despite having different instructors. So I think those are one of the emerging trends we will see having more standardization of presentation and methodologies." (Interviews\A5, Sept. 2006)

Table 92: Fit to educational philosophies of other countries.

Germany	
Theme	Major Categories of repeating ideas.
Fit to other countries	• They fit into international education

From Table 92 above the main repeating ideas relating to the fit of didactical approaches of Germany to that of other countries indicates that they fitted appropriately. This is exemplified by the following quotes from some of the experts interviewed:

"Yes absolutely. Especially this co-operative usage fit into international education or international programs." (Interviews\G1, Sept. 2006)

"I think the didactical approach of course fits to other countries. If you have things like collaborative learning for example or collaborative knowledge construction which is very important for acquiring sustainable knowledge then it is really favourable to other countries however of course we have to consider country specific constraints of collaboration. May be some countries they will have to introduce the collaboration differently from other countries because collaboration may be associated to other values." (Interviews\G7, Aug. 2006)

Table 93: Fit to educational philosophies of other countries.

United Kingdom(UK)	
Theme	Major Categories of repeating ideas.
Fit to other countries	• They fit into international education

From Table 93 above the main repeating ideas relating to the fit of didactical approaches of the UK to that of other countries indicates that they fitted. This is exemplified by the following quotes from some of the experts interviewed:

"I think they do. I mean I can say that now when I am looking at teachers and tutors using e-learning resources I am seeing wider pedagogical approaches that I have seen in the past. And it does strike me in looking at teaching practices in other countries that those current pedagogies will fit whichever country one looks at. And many other countries are themselves of course very keen to develop pedagogies. They don't necessarily want to remain with the pedagogies that they have got. They are quiet happy to think about other approaches if they have got the resources that will enable them to do that. So I think the current approach will endeavour staff in pedagogical terms to involvement in other countries." (Interviews\U9, Aug. 2006)

"Yes I do. I think it depends. There are different cultures and I think you can't make assumption about the UK context is easily transferable to another country. Because we know over here teaching overseas student's cultures are very different and we have to adopt so I think broadly speaking I think yes. Because it is about student autonomy, personalized learning but for different countries it will have to be adopted if you like, it can't just be transferred enblock. It has to be looked at and made to work within that particular culture and the context of that country." Interviews\U10, Oct. 2006)

Table 94: Fit to educational philosophies of other countries.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Fit to other countries	• They fit into international education

From Table 94 above the main repeating ideas relating to the fit of didactical approaches of the USA to that of other countries indicated that they fitted. This is exemplified by the following quotes from some of the experts interviewed:

"I do. I haven't had issues with international students that I know of. I haven't had issues with international students feeling more or less uncomfortable in my courses because of the technology. That hasn't been my experience. I have had lots of international students." (Interviews\A1, Sept. 2006)

"Yes I do. I think this is not governed by language, or custom or culture. I think the application is only limited by the imagination of the instructors and students involved." (Interviews\A7, Aug. 2006)

Descriptive Comparisons of Germany, UK and USA- *Didactical approaches and fit to other countries.*

- Didactical approaches and fit to other countries

Table 94: Comparisons of didactical approaches

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Not uniform • Collaborative learning processes • Hierarchical form of	• Diverse didactical approaches • Modular approach to teaching	• Both standardized and non-standardized didactical approaches. • Modularized

teaching • No real pedagogical approach • Competency based education • Mixtures of blended learning conception	• Seminar based teaching • Resource based learning • Collaborative learning • Constructivist approach • Problem-based learning group • Enquiry-based learning group	instructional units • Constructivist learning

Table 96: Comparisons of fit to educational philosophies of other countries.

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• They fit into international education	• They fit into international education	• They fit into international education

Hypothesis Testing: Based On Results from both Quantitative (Reports) and Qualitative (Expert Interviews) Results.

Based on:

- Summary comparisons of quantitative data (Reports) derived across the three countries (see Table 54)
- The results of qualitative analysis above in Tables 89, 90, 91, 92,93, 94 and comparative analysis between the countries above in Table 95 and 96, hypothesis 2 which states that:

  There will be differences in the educational/ pedagogical models/didactical approaches of e-learning products in higher educational institutions across the three countries were supported as well as the fit to other countries.

For hypothesis 5 which states that: ***There will be differences in terms of the limiting factors and the impact of e-learning across the three countries.***

Qualitative data relating to impact and limiting factors were extracted separately for each country for analysis and comparison across the three countries. Findings for each country are presented below:

Table 97: Impact

Germany	
Theme	Major Categories of repeating ideas.
Impact of e-learning	• Limited impact

	• Improved media competency of learners and some teachers. • Learners and teachers have a better insight in courses • Provided a variety of possibilities to deliver on campus teaching • Change in pedagogical conceptions

From Table 97 above the main repeating ideas relating to the impact of e-learning in Germany points to a limited impact in terms of the improved media competency of learners and some teachers, provision of a variety of possibilities to deliver on campus teaching and a change in pedagogical conceptions. This is exemplified by the following quotes from some of the experts interviewed:

"I think not more than 5% of faculty use e-learning in a more complex way ……I think there was a little bit of development till funding stopped in 2005. When it stopped faculty didn't use e-learning as before. But now we have a new funding program which I think started in 2005 and will end in 2008. And with this new approaches are being made." (Interviews\G2, Oct. 2006)

"It didn't have much impact." (Interviews\G5, Aug. 2006)

"I think there are e-learning materials which have a sophisticated didactical design and they have improved the learning outcomes quite sustainably. On the other hand there are many e-learning offerings which just put some materials on the net, just let people follow some video slides or some PowerPoint presentations slides and I think particularly these may even have decreased the achievements for the learners. So, some of the e-learning offers are sure obstacles for learning." (Interviews\G7, Aug. 2006)

Table 98: Impact

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Impact of e-learning	• Improve the students learning experience • Enabled far more people to engage in higher education • Reduced the burden on faculty members in managing the learning process • Wider use of e-learning

From Table 98 above the main repeating ideas relating to the impact of e-learning in the UK points to the massification of higher education and enabling faculty to effectively manage the learning experience. This is exemplified by the following quotes from some of the experts interviewed:

"I think that it has helped to improve the students learning experience. I think however it has been necessary because of the large student increases in the UK. Each lecturer now teaches far more students and this only possible by teaching students in large lecture theatres and the technology is being very useful by providing

support for teaching large numbers of students. And UK universities are very active internationally and the technology has helped us to deliver materials at a distance." (Interviews\U1, Oct. 2006)

"I think it has done a lot certainly. I could cite a number of examples where for instance e-learning has definitely contributed to the UK's agenda of massification of HE. I think you know that the UK government has got an aim of 50% going to university. So for instance there is a range of foundation degree mainly all of which will be delivered through some form of virtual learning. The third could be proven in terms of student learning outcomes. There have been a number of projects as well to support students with disability, you know the more students you have the more diverse they are going to be and the best your teaching has to become and e-learning is clearly part of that." (Interviews\U7, Aug. 2006)

Table 99: Impact

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Impact of e-learning	• Provided greater learning opportunities for students. • Enabled institutions to expand the geographical reach of their programs • Impacted on willing faculty members • Improved student learning

From Table 99 above the main repeating ideas relating to the impact of e-learning in the USA pointed to the provision of greater learning opportunities, enhanced the work of faculty members and improved student learning. This is exemplified by the following quotes from some of the experts interviewed:

"It has provided greater opportunity but also on a much closer scrutiny because there is concern about the quality of online education. What we have to deal with constantly is what the learning outcomes, […..]" (Interviews\A2, Sept. 2006)

"So I think higher education has expanded the use of e-learning and online environment tremendously. I don't believe that internationally we have expanded in a very great manner, I think much more than if we have not moved to this kind of environment. Because now students don't have to come to the United States to get a degree….. They can actually take it online. And so that saves them money, it saves the United States money because tax dollars pay for this kind of things. We also get passed visa issue that we always have. So I would say that yes we have greatly expanded in all areas more so than we actually thought we will. I think we found it to be more successful than originally believed." (Interviews\A10, Aug. 2006)

Table 100: Limiting factors

Germany	
Theme	Major Categories of repeating ideas.
Limiting factors	• Lack of supporting structure politically and organizationally

	• Lack of individual knowledge and understanding among management of HEs. • Media competencies of the faculty • Sceptical faculty members • Lack of funding and research • No incentive for teachers to use e-learning • Lack of support services • Broadband applications • Lack of comprehensive didactical framework

From Table 100 above the main repeating ideas relating to the limiting factors in Germany pointed to diverse institutional and individual barriers. This is exemplified by the following quotes from some of the experts interviewed:

"Well first limiting factor too less money spent on it. Second is there is a huge lack of research. You know there are almost no systematic evaluations and there are almost no experimental studies analyzing the motivational and cognitive aspects. Third, university lecturers are not skilled, trained in using these technologies. It limits effective instruction with e-learning technology." (Interviews\G4, Aug. 2006)

"Most hindering factor I think is teachers. More traditionally oriented teacher. The workforce of teachers in Germany is quite old, quite traditional. Next to that I think broadband applications are needed. A lot of students do not have broadband at home. So it is still a technical problem." (Interviews\G6, Aug. 2006)

"Well a first factor will be that we are still lacking comprehensive didactical framework on e-learning. Often e-learning offers are driven not by pedagogical thought but by tactical opportunities. The second one will be that teachers at higher education level are not that accustomed to use e-learning and therefore they are quite reluctant when you offer them new system they say well it is interesting but I don't have the time to do so and so on[…..]There is also a lack of working support which is supporting some higher education teachers in providing e-learning offers." (Interviews\G8, Aug. 2006)

Table 101: Limiting factors

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Limiting factors	• Staff resources and staff time • Limited budget • Lack of knowledge on ICT tools • Lack of sound pedagogical skills • Lack of innovation, experimentation and research • Failure to manage change • Lack of tutor awareness and understanding • Institutional structure and processes. • IT infrastructures

From Table 101 above the main repeating ideas relating to the limiting factors in the UK pointed to diverse limiting factors both institutionally and individually. This is exemplified by the following quotes from some of the experts interviewed:

"There are several factors. Lets start with the teachers; the pedagogical skills of professors which is especially true for higher education. Teachers in higher education usually don't have teacher education. They are teaching because of the merit, not because they are known to be good teachers. Additionally a lot of times they don't have the knowledge on how to use ICT tools and that certainly hinders. On the other hand a limited budget is a problem for HE institutions …." (Interviews\U3, Oct. 2006)

"I would say [.....] Failure to manage change and to appreciate the difficulties that the workforce faces in that change and to ensure that training is giving a high enough priority and enough resources." (Interviews\U5, July 2006)

Table 102: Limiting factors

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Limiting factors	• Resistance of faculty to teaching online • Lack of time • Attitude of administrators • Connectivity /lack of high speed connectivity • Quality of online programs • How to conduct assessments in online education • Digital divide • Cost of tuition • Access to broadband • Stigma with online learning • Money, resources and leadership • Lack of technical support

From Table 102 above the main repeating ideas relating to the limiting factors in USA pointed to diverse limiting factors institutionally and individually. This is exemplified by the following quotes from some of the experts interviewed:

"I think the attitude of administrators and faculty are a limiting factor. As much as we think a lot of people use computer everyday there are still a lot of folks out there that are not confident with the use of computer, essentially if we go to the older generation." (Interviews\A2, Sept. 2006)

"I would say the most common barrier is connectivity. The next problem is to have quality online programs. The third issue is how you assess online education; would you like to do with blackboard, multiple choices or is it essay type questions. How do you properly assess online education?" (Interviews\A3, Sept. 2006)

Descriptive Comparisons of Germany, UK and USA- *Impact and Limiting factors*

- Impact and limiting factors

Table 103: Comparisons of impact

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Limited impact • Improved media competency of learners and some teachers. • Learners and teachers have a better insight in courses • Provided a variety of possibilities to deliver on campus teaching • Change in pedagogical conceptions	• Improve the students learning experience • Enabled far more people to engage in higher education • Reduced the burden on faculty members in managing the learning process • Wider use of e-learning	• Provided greater learning opportunities for students. • Enabled institutions to expand the geographical reach of their programs • Impacted on willing faculty members • Improved student learning

Table 104: Comparisons of limiting factors

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Lack of supporting structure politically and organizationally • Lack of individual knowledge and understanding among management of HEs. • Media competencies of the faculty • Sceptical faculty members • Lack of funding and research • No incentive for teachers to use e-learning • Lack of support services • Broadband applications • Lack of comprehensive didactical framework	• Staff resources and staff time • Limited budget • Lack of knowledge on ICT tools • Lack of sound pedagogical skills • Lack of innovation, experimentation and research • Failure to manage change • Lack of tutor awareness and understanding • Institutional structure and processes. • IT infrastructures	• Resistance of faculty to teaching online • Lack of time • Attitude of administrators • Connectivity /lack of high speed connectivity • Quality of online programs • How to conduct assessments in online education • Digital divide • Cost of tuition • Access to broadband • Stigma with online learning • Money, resources and leadership • Lack of technical support

HYPOTHESIS TESTING: Based On Results from both Quantitative (Reports) and Qualitative (Expert Interviews) Results.

Based on:

- Summary comparisons of quantitative data (Reports) derived across the three countries (see Tables 55 and 56)
- The results of qualitative analysis above in Tables 97, 98, 99, 100,101, 102 and comparative analysis between the countries above in Table 103 and 104, hypothesis 5 which states that:

  There will be differences in terms of the limiting factors and the impact of e-learning across the three countries was supported.

For hypothesis 6 which states that: ***Different future scenarios (next 5 years) are likely to emerge in terms of e-learning technologies, its applications, anticipated impact, future scenarios and implications for international knowledge transfer.***

Qualitative data relating to the future scenarios likely to emerge in the next 5 years were extracted separately for each country for analysis and comparison across the three countries. Findings for each country are presented below.

Table 105: Technologies anticipated in the next 5 years

Germany	
Theme	Major Categories of repeating ideas.
Technologies anticipated in the next 5 years.	• Open source softwares • Moodle • Social software/technologies • Cyber media • Micro Fabrication • Automated feedback board • Mobile technologies • All tools related to Web2.0 • Electronic tools (e.g. voting systems) • Smart boards • Open collaborative tools (e.g. Blogs, Web logs)

From Table 105 above the main repeating ideas relating to technologies anticipated in the next 5 years in Germany pointed to social technologies, mobile technologies, smart boards and open collaborative tools. This is exemplified by the following quotes from some of the experts interviewed:

"I think the trend will go more to Moodle. I think the commercial soft wares will not be employed so much. And I think also as a supplement the use of social software will increase." (Interviews\G2, Oct. 2006)

"I hope that it will innovate a little bit and not stay only on learning platforms but more that you see other electronic tools like voting systems when it comes to classroom education. Use of smart boards, use of mobile devices. That is more hardware then." (Interviews\G6, Aug. 2006)

Table 106: Technologies anticipated in the next 5 years

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Technologies anticipated in the next 5 years.	• Hand held devices (iPod, MP3 player etc) • Wiki's and blogs • Synchronous collaboration tools, modelling tools • Open source tools • Web-based technologies (e.g. web-based forms of video-conferencing) • Digital interactive TV

From Table 106 above the main repeating ideas relating to technologies anticipated in the next 5 years in the UK pointed to synchronous collaboration tools, social tools, mobile devices and web.2 technologies. This is exemplified by the following quotes from some of the experts interviewed:

"The use of more hand held devices, so content will be delivered to somebody's iPod (Pod casting), MP3 player. I still think also that there is going to be a considerable delivery through traditional means such as laptops and desktops." (Interviews\U1, Oct. 2006)

"I would anticipate a greater use of social software applications and the reduction in the use of VLEs." (Interviews\U6, July 2006)

Table 107: Technologies anticipated in the next 5 years

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Technologies anticipated in the next 5 years.	• Moodle and Freeware • Whiteboard • Open Source tools • Intelligent tutoring systems • video presentation, video lectures • Pod casting • Asynchronous technologies (e.g. discussion forums)

From Table 107 above the main repeating ideas relating to technologies anticipated in the next 5 years in the USA pointed to whiteboard, open source tools, intelligent tutoring systems and freeware. This is exemplified by the following quotes from some of the experts interviewed:

"I think it is all going to be all Open Source for universities because these other programs are going to be expensive and they charge like 200 Dollars for a student to use the software. That cut out the prospect considerably for the university or college." (Interviews\A3, Sept. 2006)

"But I will say again faster delivery of information in terms of capability of bandwidth but I think it will all be wireless, it will all be done through satellites." (Interviews\A9, Aug. 2006)

Table 108: Trend of technology applications in the next 5 years

Germany	
Theme	Major Categories of repeating ideas.
Trend of technology applications in the next 5 years.	• Replacement of certain local face-to-face based offers by e-learning • Central learning management systems (LMS) • More authentic learning • More offers which aim on mobile learning • Add on enhancements or improvements in terms of quality • Increased possibilities to provide learning materials on the university homepages.

From Table 108 above the main repeating ideas relating to the trend of technology applications in the next 5 years in Germany points to replacement of certain local face-to-face based offers with e-learning, more authentic learning, more offers aimed on mobile learning and improvements in terms of quality. This is exemplified by the following quotes from some of the experts interviewed:

"I don't think it will be a big change. I think within the next 5 years most of the universities will have central LMS and it will be normal to have a tool, when you go to the university the first thing you get is your matriculation number and access to the LMS." (Interviews\G2, Oct. 2006)

"Yes I would that there are much more offers which aim on mobile learning [……] For example offering of pod cast accompanying a lecture and so on and the tools to present this will change. I would even expect that the level of communication within the tools used in e-learning at higher education level on campus will decrease." (Interviews\G8, Aug. 2006)

Table 109: Trend of technology applications in the next 5 years

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Trend of technology applications in the next 5 years.	• Use of electronic voting systems to promote interactivity. • Supporting small group learning. • e-portfolios • Development and sharing of re-usable objects between institutions and staff. • More modelling tools that put more learning design in

	the hands of teachers. • Adaptation of open source software to institutional needs. • Expansion of user generated content • More subject specific applications

From Table 109 above the main repeating ideas relating to the trend of technology applications in the next 5 years in the UK pointed e-portfolios, supporting small group learning, re-usable objects, adaptation of open source software to meet institutional needs and expansion of user generated content. This is exemplified by the following quotes from some of the experts interviewed:

"As I said there will be more modelling tools and more learning activity management tools putting more learning design in the hands of teachers." (Interviews\U4, July 2006)

"I think the current applications will continue to develop, will continue to be there. What we will see is that we will see application that is added rather than those that are removed. I think that what will need to happen is the need to be a lot more specific applications created to allow things like music communication to happen more readily where music students can communicate because they have a music consol in front of them which is applied to their need as music student rather than doing something which is used to a general application like video conferencing or audio conferencing." (Interviews\U9, Aug. 2006)

Table 110: Trend of technology applications in the next 5 years

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Trend of technology applications in the next 5 years.	• Fewer packaged management tools and more freedom in design • Digital objects, course laboratories • Workforce development • More versatility in functions of tools • More personalization

From Table 110 above the main repeating ideas relating to the trend of technology applications in the next 5 years in the USA points to fewer packaged management tools and more freedom in design, digital objects, course laboratories, workforce development and more versatility in functions of tools. This is exemplified by the following quotes from some of the experts interviewed:

"I think we are going to go more towards digital objects, course laboratories so that faculty will have a place to go where they itemize course resources and put their own courses together and do have to build courses." (Interviews\A2, Sept. 2006)

"Yes I expect it to be even easier for the professor and for the students to interact with the system. I also expect more versatility in functions for example WebCT is to allow students to post to the calendar, blackboard at least the last version that I used I haven't used it this tenure but the feature wan not available. So I think more features will be available so that students will have more power. They will be enabled to do more work towards creating interacting courses." (Interviews\A8, Aug. 2006)

Table 111: Anticipated impact of e-learning in the next 5 years

Germany	
Theme	Major Categories of repeating ideas.
Anticipated impact in the next 5 years.	• With increased funding there could be sustainable integration of e-learning. • Increased subject specific impact. • Curriculum will be especially fitted to individual learning needs • More decentralized learning • Increased consolidation of e-learning • University continuing education will profit a lot from e-learning • Risk of decreased impact when funding continues to decrease.

From Table 111 above, the main repeating ideas relating to the anticipated impact of e-learning in the next 5 years in Germany points to sustainable integration of e-learning, consolidation and more decentralized learning. This is exemplified by the following quotes from some of the experts interviewed:

"I think in the next 5 years there are two possibilities. On one hand is the university: If they give money to support e-learning then there will be a sustainable integration of media in these cases. But I think in the cases that universities still wait for funding e-learning wouldn't be integrated." (Interviews\G2, Oct. 2006)

"A general issue for pedagogy is to get the students to spend time in learning. And e-learning in general and mobile learning in particular will offer more opportunities to the teachers to provide students with materials time appropriate for the students." (Interviews\G8, Aug. 2006)

Table 112: Anticipated impact of e-learning in the next 5 years

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Anticipated impact in the next 5 years.	• Increased overseas competition; requires improvement of quality of e-learning in UK. • Completely absorbed into teaching and learning provision of HE. • Increased impact in individual institutions across different potential outcomes. • Stronger institutionalization/integration of e-learning.

	• Reasonable degree of rejection of e-learning among certain courses. • Widening participation in HE • Development of new assessment methods

From Table 112 above the main repeating ideas relating to the anticipated impact of e-learning in the next 5 years in the UK points to improvement of quality, increased impact across individual institutions, stronger institutionalization and integration of e-learning. This is exemplified by the following quotes from some of the experts interviewed:

"E-learning will be completely absorbed into teaching and learning provision of higher education. You will not be able to separate e-learning from other source of learning. Students will be learning using a variety of technologies including their own personal technologies. It will not make sense in 5 or 10 years to talk about e-learning as a separate form of learning in general." (Interviews\U2, July 2006)

"I would expect; 5 years is probably too short a term but in the near future I would expect two trends. 1) There is going to be a stronger institutionalization of e-learning. Certain things will absolutely become standard parts of teaching. 2) I expect a reasonable degree of rejection. I think we will begin to see a significant amount of rejection of e-learning among certain courses and areas becoming stronger." (Interviews\U6, July 2006)

Table 113: Anticipated impact of e-learning in the next 5 years

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Anticipated impact in the next 5 years.	• Expansion of the recipients of education services (contingent on political, economic factors) • Increased scrutinization of e-learning • More penetration of e-learning in HE • More institutionalized support for the development online courses. • Diffusion of broadband tied directly to the continuing growth in e-learning. • Emergence of a truly virtual classroom • Better, faster, cheaper and more human • Better tools, increased faculty participation.

From Table 113 above the main repeating ideas relating to the anticipated impact of e-learning in the next 5 years in the USA points to increased expansion, penetration, more institutionalized support for e-learning, emergence of a truly virtual classroom, better tools and increased faculty participation. This is exemplified by the following quotes from some of the experts interviewed:

"Distance education is going to continue to grow and I think it is going to be looked at closely. The US government as far as financial aid is going on will continue to recognize that this is a viable form of education. But

I also think there are a lot of such institutions out there offering distance education that might impact by giving it a bad name." (Interviews\A2, Sept. 2006)

"I think the tremendous spread of access by people from not only this country but other countries in their ability to get to high speed internet access will just broaden the ability of students to join graduate education programs. I think it is going to broaden the opportunities for students to participate, learn, grow and we are going to learn from them because they are going to join classes that previously they were unable to join." (Interviews\A7, Aug. 2006)

Table 114: Strategic options for overcoming obstacles in the next 5 years

Germany	
Theme	Major Categories of repeating ideas.
Strategic options for overcoming obstacles in the next 5 years.	• Political pressure • Increased funding/ a differentiated field for funding options. • Qualification programs for faculty and e-learning competencies a job requirement. • Systematic evaluations • Need for institutionally based strategies • Cheaper broadband • Extra incentives for teachers • More emphasis on pedagogy than technology • Meetings and conferences to promote interdisciplinary collaborations

From Table 114 above the main repeating ideas relating to the strategic options for overcoming obstacles in the next 5 years in Germany are political pressure, increased funding options, systematic evaluation, extra incentives and more emphasis on pedagogy. This is exemplified by the following quotes from some of the experts interviewed:

"Well giving the state funding institutions to spend more money on these topics, you should have more projects that do systematic evaluations on e-learning projects so that you can get to empirically based conclusions and recommendations and you should also encourage programs that offer courses and courses to university lecturers and you should oblige university lecturers to educate themselves in teaching and learning methods especially in teaching with e-learning methods." (Interviews\G4, Aug. 2006)

"I think it has to provide some extra benefits which would not be able in present learning and it must provide better learning environment. There has to be some extra benefits otherwise it will not be prevalent." (Interviews\G7, Aug. 2006)

Table 115: Strategic options for overcoming obstacles in the next 5 years

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Strategic options for overcoming obstacles in the next 5 years.	• Increased support for innovation in teaching and learning • Teacher training • Increased funding for quality of teaching • Need for innovation e-learning tools • Workforce development oriented "e" strategies • Sharing, developing the awareness and expertise among faculty members • Need for persistent strategic approaches • Making barriers in structure and processes more enabling

From Table 115 above the main repeating ideas relating to the strategic options for overcoming obstacles in the next 5 years in the UK are teacher training and development, increased funding, persistent strategic approaches and making barriers in structures and processes more enabling. This is exemplified by the following quotes from some of the experts interviewed:

"Funding council (HEFC) has developed an e-learning strategy and its worth looking at that strategy because that strategy is helping drive innovation in e-learning. For example e-portfolios have been driven through support from HEFC and JISC so there is an interventionist stand by the HEFC to support innovation in teaching and learning particularly the development of web-based learning, e-portfolios and most student centred approach to teaching." (Interviews\U2, July 2006)

"[…] it is not something that is going to go away; […..]Something where we have to have a persistent strategic approach. We have to continue to put forward 5 years strategic plans for example to continue to measure where we are, to continue to measure where we want to be, to continue to identify for each HE institution where its strength are, where its weaknesses are and how each HE institution will be able to think about addressing those within the context in which it operates. […..] We do have to put in enough investment into teacher development not just into the technologies." (Interviews\U9, Aug. 2006)

Table 116: Strategic options for overcoming obstacles in the next 5 years

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Strategic options for overcoming obstacles in the next 5 years.	• Provision of support and incentives for faculty • More training, education, information, and more awareness. • Government subsidies and a co-ordinated national effort to take advantage of e-learning • Promoting understanding at the administrative level of HE institutions. • Increased technology diffusion and financing for

	higher education. • Increased research into e-learning

From Table 116 above the main repeating ideas relating to the strategic options for overcoming obstacles in the next 5 years in the USA are the provision of support and incentives for faculty, government subsidies and co-ordinated national effort to take advantage of e-learning and increased technology diffusion. This is exemplified by the following quotes from some of the experts interviewed:

"I suppose this is the area that public policy needs to catch up with the wave of entrepreneurship that got this innovation off the ground. I don't think public policy in the United States is going to go this way but I think public policy that pushes the diffusion and financing the broadband to make it cheap and to make it available to every one that will have a positive effect and then finding a way to make the tuition itself the cost of taking a course or acquiring a degree making them more affordable through government financing will also be a way to go. That has not been the tradition of US policy in these two areas; technology diffusion and financing higher education." (Interviews\A6, Sept. 2006)

"I think the only answer is education. Some of it in the next 5 years [….] some of it will just take care of itself. […..] Education in whatever form you want to give it for all of this, whatever age whatever stage in life that is going to be the key." (Interviews\A9, Aug. 2006)

Table 117: Future scenarios for e-learning in the next 5 years.

Germany	
Theme	Major Categories of repeating ideas.
Future scenarios for e-learning in the next 5 years.	• Mobility and transferability/ growing international market field • Higher education will profit from e-learning. • Social software, increased interactivity within e-learning scenarios. • More synchronous communication (e.g. video based communication) • More educational soft wares with simulations and 3-D simulations • Widespread use of mobile technologies • Increased impact • Increased use of learning units

From Table 117 above the main repeating ideas relating to the future scenarios for e-learning in the next 5 years in Germany are growing international market field, Social software, increased interactivity within e-learning scenarios, more synchronous communication and an increased impact. This is exemplified by the following quotes from some of the experts interviewed:

"I think e-learning will affect every aspect of school and learning institutions. Not only the learning part but the organizational part, procedure part. It is ridicules the opinion held by other experts that e-learning will not be the main topic. I agree when they are little bit disappointed to the new media or ICT based which we have seen in the last six years. We expected that it will happen much faster but it took us time but now we see more and more people are involved in e-learning. Even I think that e-learning will become that important that in the end in 5 or 10 years we will not write 'e' any more because it is not differentiating enough. We speak of learning but every learning will have an electronic component or a mobile device or whatever." (Interviews\G6, Aug. 2006)

"The future trend is that it will gain more strength than has already gained. Then what I mentioned before that it will be a growing international market field, that higher education will profit from e-learning." (Interviews\G10, Aug. 2006)

Table 118: Future scenarios for e-learning in the next 5 years.

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Future scenarios for e-learning in the next 5 years.	• Increased use of hand-held devices • Personalization through personal technologies • Increase in informal learning environments • Shift of power from providers of technology towards teachers and learners • Stabilization, rationalization and institutionalization • Widespread usage of VLEs. • Become a natural part of pedagogy, integrated into general approaches to teaching and learning • A diverse HE

From Table 118 above the main repeating ideas relating to the future scenarios for e-learning in the next 5 years in the UK are personalization, stabilization, rationalization, institutionalization, widespread application of VLEs as well as become a natural part of pedagogy, integrated into general approaches to teaching and learning. This is exemplified by the following quotes from some of the experts interviewed:

"I think it will be much more personalized. Students will expect to make use of their personal technologies. They expect to be connected by their laptops in a much more flexible pattern from homes, work and also more collaborative […..] The trend of personalization through personal technologies for small group working and flexible pattern of studies." (Interviews\U2, July 2006)

"What I see is that informal learning environment will emerge and be important. And higher education institutions will need to find the way to fit into that because education becomes available and accessible for everyone and you need ways to attract students and to attract good quality education which also means to provide access to communities of practice or networks of interest." (Interviews\U3, Oct. 2006)

Table 119: Future scenarios for e-learning in the next 5 years.

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Future scenarios for e-learning in the next 5 years.	• Instilled student-centred instructional design • Enhance and Widen student participation in HE • Wider adoption of e-learning by institutions • Increase or a capturing of market share • Increased faculty acceptance of e-learning • Prevalence of open source software • More multimedia, individualized, wider bandwidth

From Table 119 above the main repeating ideas relating to the future scenarios for e-learning in the next 5 years in the USA points to instilled student-centred instructional design, enhanced participation of students, wider adoption of e-learning by institutions, increased faculty acceptance of e-learning and increased prevalence of open source software. This is exemplified by the following quotes from some of the experts interviewed:

"More institutions will use distance education because they will realize it is a lot cheaper than building a new building, I think more faculty will become more comfortable with it, more faculty will begin to teach online, they will realize the advantages of it and I think it will continue to grow significantly." (Interviews\A2, Sept. 2006)

"I expect e-learning to continue growing and to be getting more sophisticated. I am hoping that with e-learning our students will be seeing what we are doing and whether they will be formally or informally trained they will go ahead and increase the amount of e-learning." (Interviews\A8, Aug. 2006)

Table 120: Implications for international knowledge transfer

Germany	
Theme	Major Categories of repeating ideas.
Implications for international knowledge transfer	• International co-operation /more opportunity to exchange knowledge • Increased competition • Reusable objects • Change in HE system to BA and Master Studies offers the ground to have knowledge transfer • Need to internationalize curricular and communication medium • Merging between private offers and offers of HEs in terms of e-learning.

From Table 120 above the main repeating ideas relating to the implications for international knowledge transfer in Germany points to increased international co-operation,

increased competition, internationalization of curricular and communication medium. This is exemplified by the following quotes from some of the experts interviewed:

"The implications will be international co-operation but I think even its easier for the university to co-operate with other universities in international way, but already the co-operation between national universities isn't that big in Germany." (Interviews\G2, Oct. 2006)

"MIT for example is offering quite a lot of e-learning courses world wide so they offer universities not only in the states but in China and Australia for example which are some local universities which receive about 60%, 70% or 80% of the MIT courses and distribute them locally. The implications for Germany are if they can produce courses in English language which they can sell anywhere else then they can get access to the international market, if they fail to do this they will just be local providers of education." (Interviews\G7, Aug. 2006)

Table 121: Implications for international knowledge transfer

United Kingdom (UK)	
Theme	Major Categories of repeating ideas.
Implications for international knowledge transfer	• Increased international knowledge transfer • Increased economies of scale. • Sharing of courses and Increased teaching • Increased quality and quantity level of educational materials • Need for increased communication across institutions. • Increased discussion on pedagogies and quality assurance • Need to learn from the mistakes of other countries • Demands institutions to be open to new approaches to teaching. • Need for national politics to adjust to international concepts. • Facilitate adaptation by recognizing differences in cultures

From Table 121 above the main repeating ideas relating to the implications for international knowledge transfer in the UK points to an opening up of international knowledge transfer, increased economies of scale, sharing of courses across institutions, increased discussion on pedagogies and quality assurance and facilitate the adaptation of e-learning by recognizing differences in cultures. This is exemplified by the following quotes from some of the experts interviewed:

"I think it opens up international knowledge transfer potentially as the technology spread. It also has implications for big players like Open University, expanding their markets because that can achieve economies of scale in the international market. Those economies of scale allow them to indulge in high levels of investment in the

new technology. I think some of the bigger players are going to be in stronger positions." (Interviews\U1, Oct. 2006)

"Well I won't want to transfer the mistakes. I think it depends on what the other countries coming in a second wave and learning from the mistakes that the UK has made. So for instance setting up big virtual universities, separate from the individual institutions is not going to work. Putting masses and masses of money into cabling and computers is not going to work. It needs to go into the support of academic staff." (Interviews\U7, Aug. 2006)

Table 122: Implications for international knowledge transfer

United States of America (USA)	
Theme	Major Categories of repeating ideas.
Implications for international knowledge transfer	• Instruction will become internationalized • HE will be available to all people across boarders • Internationalization of digital objects, course repository • Emergence of global type education • International knowledge transfer may be limited by cultural differences and ingrained traditions of higher education that works for each country. • Huge gains in communication, not just quantity but quality. • More opportunities to improve the educational system across the world.

From Table 122 above the main repeating ideas relating to the implications for international knowledge transfer in the USA points to internationalization of instruction, availability of higher education across boarders, emergence of a global type education, huge gains in communication and more opportunities to improve the educational system across the world. This is exemplified by the following quotes from some of the experts interviewed:

"I think I will go back to the digital objects, course repository. We are in a group right now that create objects within the state of Georgia; we will share those objects with other states in the US who have a federated repository. A federated repository will be lifted up to another level and be done on international basis. I think sharing educational material; educational resources will continue to grow at the international level." (Interviews\A2, Sept. 2006)

"Again with e-learning there are no barriers with travelling to a location so I expect there to be a much more international interaction just as there are a lot of international research associations or are conferences that are now not only face-to-face but over the internet." (Interviews\A8, Aug. 2006)

Descriptive Comparisons of Germany, UK and USA- *Future Scenarios*

- Technologies anticipated in the next 5 years

Table 123: Comparisons of technologies anticipated in the next 5 years

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Open source software • Moodle • Social software • Cyber media • Micro Fabrication • Automated feedback board • Mobile technologies • All Web2.0 tools • Electronic tools (e.g. voting systems) • Smart boards • Open collaborative tools (e.g. Blogs,)	• Hand held devices (iPod, MP3 player etc) • Wiki's and blogs • Synchronous collaboration tools, modelling tools • Open source tools • Web-based technologies (e.g. web-based forms of video-conferencing • Digital interactive TV	• Moodle and Freeware • Whiteboard • Open Source tools • Intelligent tutoring systems • video presentation, video lectures • Pod casting • Asynchronous technologies (e.g. discussion forums)

Table 124: Comparisons of trend of technology applications in the next 5 years

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Replacement of certain local face-to-face based offers by e-learning • Central learning management systems (LMS) • More authentic learning • More offers which aim on mobile learning • Add on enhancements or improvements in terms of quality • Increased possibilities to provide learning materials on the university homepages.	• Use of electronic voting systems to promote interactivity. • Supporting small group learning. • e-portfolios • Development and sharing of re-usable objects between institutions and staff. • More modelling tools that put more learning design in the hands of teachers. • Adaptation of open source software to institutional needs. • Expansion of user generated content • More subject specific applications	• Fewer packaged management tools and more freedom in design • Digital objects, course laboratories • Workforce development • More versatility in functions of tools • More personalization

Table 125: Comparisons of anticipated impact of e-learning in the next 5 years

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• With increased funding there could be sustainable integration of e-learning. • Increased subject specific impact. • Curriculum will be especially fitted to individual learning needs • More decentralized learning • Increased consolidation of e-learning • University continuing education will profit a lot from e-learning • Risk of decreased impact when funding continues to decrease.	• Increased overseas competition; requires improvement of quality of e-learning in UK. • Completely absorbed into teaching and learning provision of HE. • Increased impact in individual institutions across different potential outcomes. • Stronger institutionalization/integration of e-learning. • Reasonable degree of rejection of e-learning among certain courses. • Widening participation in HE • Development of new assessment methods	• Expansion of the recipients of education services (contingent on political, economic factors) • Increased scrutinization of e-learning • More penetration of e-learning in HE • More institutionalized support for the development online courses. • Diffusion of broadband tied directly to the continuing growth in e-learning. • Emergence of a truly virtual classroom • Better, faster, cheaper and more human • Better tools, increased faculty participation.

Table 126: Comparisons of strategic options for overcoming obstacles in the next 5 years

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Political pressure • Increased funding/ a differentiated field for funding options. • Qualification programs for faculty and e-learning competencies a job requirement. • Systematic evaluations • Need for institutionally based strategies • Cheaper broadband • Extra incentives for teachers • More emphasis on	• Increased support for innovation in teaching and learning • Teacher training • Increased funding for quality of teaching • Need for innovation e-learning tools • Workforce development oriented "e" strategies • Sharing, developing the awareness and expertise among faculty members • Need for persistent strategic approaches	• Provision of support and incentives for faculty • More training, education, information, and more awareness. • Government subsidies and a co-ordinated national effort to take advantage of e-learning • Promoting understanding at the administrative level of HE institutions. • Increased technology

pedagogy than technology • Meetings and conferences to promote interdisciplinary collaborations	• Making barriers in structure and processes more enabling	diffusion and financing for higher education. • Increased research into e-learning

Table 127: Comparisons of future scenarios for e-learning in the next 5 years.

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• Mobility and transferability/ growing international market field • Higher education will profit from e-learning. • Social software, increased interactivity within e-learning scenarios. • More synchronous communication (e.g. video based communication) • More educational soft wares with simulations and 3-D simulations • Widespread use of mobile technologies • Increased impact • Increased use of learning units	• Increased use of hand-held devices • Personalization through personal technologies • Increase in informal learning environments • Shift of power from providers of technology towards teachers and learners • Stabilization, rationalization and institutionalization • Widespread usage of VLEs. • Become a natural part of pedagogy, integrated into general approaches to teaching and learning • A diverse HE	• Instilled student-centred instructional design • Enhance and Widen student participation in HE • Wider adoption of e-learning by institutions • Increase or a capturing of market share • Increased faculty acceptance of e-learning • Prevalence of open source software • More multimedia, individualized, wider bandwidth

Table 128: Comparisons of implications for international knowledge transfer

Germany	UK	USA
Categories of repeating ideas.	Categories of repeating ideas.	Categories of repeating ideas.
• International co-operation /more opportunity to exchange knowledge • Increased competition • Reusable objects • Change in HE system to BA and Master Studies offers the ground to have knowledge transfer • Need to	• Increased international knowledge transfer • Increased economies of scale. • Sharing of courses and Increased teaching • Increased quality and quantity level of educational materials • Need for increased communication across institutions.	• Instruction will become internationalized • HE will be available to all people across boarders • Internationalization of digital objects, course repository • Emergence of global type education • International

internationalize curricular and communication medium • Merging between private offers and offers of HEs in terms of e-learning.	• Increased discussion on pedagogies and quality assurance • Need to learn from the mistakes of other countries • Demands institutions to be open to new approaches to teaching. • Need for national politics to adjust to international concepts. • Facilitate adaptation by recognizing differences in cultures	knowledge transfer may be limited by cultural differences and ingrained traditions of higher education that works for each country. • Huge gains in communication, not just quantity but quality. • More opportunities to improve the educational system across the world.

HYPOTHESIS TESTING: Based On Results from Qualitative Expert Interviews.

Relating the results of qualitative analysis above in Tables 105, 106, 107, 108,109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121 and 122 comparative analysis between the countries above in Table 123, 124, 125, 126, 127 and 128 to hypothesis 6 the findings indicate that the hypothesis which states that:

Different future scenarios (next 5 years) are likely to emerge in terms of e-learning technologies, its applications, anticipated impact, strategic options for overcoming obstacles, future scenarios and implications for international knowledge transfer was supported.

CHAPTER 5
DISCUSSION

Electronic mail, the Internet, and Web sites are rapidly becoming core components of the instructional experience of students. The availability of these resources across the various sectors of education has increased steadily since the early 1990s (Green 1998; Williams 2000). Though the availability of IT is becoming common at all levels of education, amidst the growing attention being paid to it, given the lack and often conflicting nature of e-learning usage, and empirically based research to inform basic questions about e-learning, an examination of e-learning technologies and its application in higher educational institutions across Germany, UK and USA offers potentially valuable insight into the current trends in the field as well as provide a valuable insight into the scenarios that are likely to emerge in the next 5 years with its consequent implications for international knowledge transfer. In that regard this study sought to provide answers to the following questions:

1. What are the current trends in relation to the use of e-learning in higher educational institutions across the three countries?
2. To what extent are there differences or similarities in relation to e-learning technologies and its application in higher educational institutions in across the three countries?
3. Which trends are likely to emerge in the next 5 years in relation to e-learning technologies and its applications in higher educational institutions across the three countries?
4. What are the implications on the development and application of e-learning nationally and internationally.

In seeking to provide answers to the above questions above, this study employed a mixed research methodology that derived quantitative data from a review of national and international reports between 2000 and 2005 and qualitative data through expert interviews across the three countries. The hypothesis formulated revolved around the following indicators: a) Policy and strategy b) E-learning technologies c) Application of technologies d) Pedagogical/ Didactical approaches e) Impact of e-learning f) Limiting Factors and g) Future Trends.

After reviewing summary comparisons derived from the filtering of quantitative data and analysis of qualitative data from expert interviews using the software Maxqda2 the following findings emerged:

Firstly; the hypothesis relating to **policy and strategy** which indicated that ***there will be differences in the pedagogical philosophies (concept), strategy and tactics (procedural) between the three countries; was supported.*** The factors considered in this hypothesis were the conceptualization of what e-learning are, forms of e-learning products, content of e-learning programs, orientation to local or international markets, main philosophy or strategy for e-learning

and current emerging trends. On the whole though there were no differences in terms of the conceptualization of what e-learning is across the three countries, the tendencies depicted in the quantitative and qualitative data points to differences in relation to the forms of e-learning products currently existing, the content of e-learning programs, the orientation of current e-learning products to either local or international markets, the main philosophy or strategy driving e-learning initiatives as well as the current emerging trends.

Secondly; the hypothesis relating to **prevalent e-learning technologies** currently being used across higher educational institutions which indicated that ***there will be differences in the types of e-learning technologies used across the three countries; was supported.*** The main factor considered in this hypothesis was the prevalent technologies used. On the whole though common references were made to some particular technologies the tendencies depicted in the quantitative and qualitative data points to differences in prevalence across the three countries.

Thirdly; the hypothesis relating to the **applications of e-learning technologies** in higher educational institutions across the countries which indicated that ***there will be differences in the applications of e-learning technologies across the three countries; was supported.*** The main factor considered in this hypothesis was the specific ways in which e-learning technologies were applied. On the whole though common references were made to some particular types of applications the tendencies depicted in the quantitative and qualitative data points to differences in applications across the three countries.

Fourthly; the hypothesis relating to the **didactical/pedagogical approaches** employed by e-learning products in higher educational institutions across the countries which indicated that ***there will be differences in the educational/ pedagogical models/didactical approaches of e-learning products in higher educational institutions across the three countries; was supported.*** The main factors considered in this hypothesis were the didactical approaches used, their uniformity or non uniformity and suitability to the educational philosophies of other countries. On the whole the tendencies depicted in the quantitative and qualitative data points to differences in the didactical or pedagogical approaches employed across the three countries though there was a common agreement across the three countries that notwithstanding the differences, the approaches fitted the educational philosophies of other countries.

Fifthly; the hypothesis relating to **impact and limiting factors** of e-learning in higher educational institutions across the countries which indicated that ***there will be differences in terms of the limiting factors and the impact of e-learning across the three countries; was supported.*** The main factors considered in this hypothesis were the impact of e-learning (i.e. improving higher education capacity, on faculty members, student learning outcomes) and the

factors limiting the effective use of e-learning. On the whole the tendencies depicted in the quantitative and qualitative data pointed to differences in terms of impact and limiting factors.

Sixthly; the hypothesis relating to **future trends/scenarios and implications for international knowledge transfer** of e-learning in higher educational institutions across the countries which indicated that ***different future scenarios (next 5 years) are likely to emerge in terms of e-learning technologies, its applications and implications for international knowledge transfer; was supported.*** The main factors considered in this hypothesis were technologies anticipated in the next 5 years, trend of technology applications in the next 5 years, anticipated impact of e-learning in the next 5 years, strategic options for overcoming obstacles in the next 5 years, future scenarios for e-learning in the next 5 years and implications for international knowledge transfer. On the whole the tendencies depicted in the quantitative and qualitative data pointed to differences in terms of future scenarios and implications for international knowledge transfer.

The findings above goes to reinforce my earlier theoretical propositions based on the theoretical frameworks of the Social Construction of Technology (SCOT) and the Social Shaping of Technology (SST) proposed by Pinch and Bijker (1984); Kline (1992), MacKenzie and Wajcman (1985) respectively which assumes that: a) technology does not determine human action, but that human action shapes technology (social shaping opposed to technological determinism), that technological artefacts are culturally constructed and interpreted which implies not only that there is flexibility in how people think of or interpret artefacts but also that there is flexibility in how artefacts are designed (interpretive flexibility), that relevant social groups share a particular set of meanings about an artefact, and that in the wider context the socio-cultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to a technological artefact. In that vein the findings and the issues that emerged from this study specifically in relation to each country will be discussed separately in the sections below in the context of the peculiarity of its culture, experiences, unique philosophies, socio-economic contexts and system of education in order to facilitate an objective descriptive comparison of the three countries.

1. POLICY AND STRATEGY

There is little doubt that public policy and funding instruments have given impetus to the purchase of hardware, software and training services in the higher educational sectors across all the three countries. Notwithstanding the considerable investments made by these three countries, the question still remains whether funding streams for investment in technologies, resources and services are "sustainable or simply one-off and short-term" (Study of the e-learning suppliers'

"market" in Europe Report, Sept. 2004). To provide an in-depth insight of current trends of e-learning policy and strategy across the three countries; the conceptualization of e-learning, forms of products, content of programs, orientation to national and/or international markets, main philosophy and strategy, and current emerging trends for each country is discussed below.

A) Germany

Tendencies depicted in Germany pointed to both a broad and narrow conceptualization of e-learning. It is worth noting that each level of conceptualization of e-learning is likely to influence policy as well as strategic approaches to e-learning in Germany. In the broad sense e-learning in Germany is seen as a wide variety of IT based support for teaching and learning or all types of activities for teaching and training by the use of electronic media. This conceptualization in my opinion widens the spectrum of what generally could be described as e-learning. A much narrow conceptualization also depicted in Germany sees e-learning as the use of more complex scenarios, for example, learning management systems (LMS) for learning. It is my opinion that this narrow conceptualization provides the appropriate criteria for looking at e-learning.

Within this broad and narrow conceptualization of e-learning the forms of e-learning products that were mentioned in this study were computer-based training, blended learning, Distance learning and Web-based learning management systems. The content of most e-learning programs in Germany mainly serves to enhance teaching with web elements, supplements or complementary contents. Such programs were often orientated to the local market with few cases of internationally oriented programs (even then they are more towards German speaking countries). According to the experts interviewed; in terms of philosophy or strategy generally there were no commonly shared philosophies or strategy though the existence of government initiatives aimed at promoting the new media in higher education cannot be denied. However the experts pointed out that, such government initiatives reflected more technologically driven philosophies whose main strategy is to bring technology into the classroom, connect e-learning activities and provide better learning environment. Some of the current emerging trends in relation to the use of e-learning technologies in Germany points to the increased use of LMS and integration with student administration technologies, state-wide initiatives, the emergence of social tools, orchestration of technologies with learning the increased use of blended learning scenarios, mobile learning, competency based e-learning and the intensification of co-operation with international partners.

Commenting on the waves of educational technology in Germany, Kerres & Nübel, (2005), stated that the discussion of e-learning was characterised by two big waves, disclosing both great expectations and disappointment. In the first wave with the availability of mainframe

computers in the mid-1960s e-learning boomed for the first time. The government invested money into national development centres, re-organized existing educational institutions and consistently adapted the planning of new institutions of higher education to the new approaches. But during the 1980s these developments almost came to a standstill partly because the feasibility of the projected scenarios in terms of technology and pedagogies were taken for granted. In the second wave with the availability of multimedia-systems in the 1990s the discussion about e-learning was revived with the focus shifting to the potentials of the presentation of multimedia information, process visualization, animation and the new hypertext concept. The national funding programs on multimedia learning set up in the second half of the 1990s drew on similar lines of argumentations as had been put forward during the first wave of educational technology. Against an economically sound background broadly funded programs were initiated at federal and state levels (Kerres & Nübel, 2005).

This point is further elaborated by Lepori and Succi (2004), who indicated that since the expansion of the higher education sector (1960-70s) in Germany alternative opportunities have been established for offering distance education such as the establishment of the Fernuniversität Hagen which is the sole university in the German-speaking world to offer courses of study by distance learning only and, with about 45'000 students in 2002/3, and currently serving as the largest provider of distance learning facilities at university level in Germany. Alongside, private Fernfachhochschulen (e.g. Privat-Hochschule Akad) offer distance learning courses of study all over Germany. The Federal Government and the Länder (states) are supporting these developments through the joint research promotion issue of distance learning established in 1993 by the Commission of the Federation and the Länder for Educational Planning and Research Promotion. Since then, additional new distance learning opportunities, which provide first degree courses as well as vocational, academic continuing education, have been established at Präsenzhochschulen (Lepori and Succi, 2004).

Currently; the e-learning trends in Germany as described above points to the intensification of e-learning activities. The Federal Government is pursuing the aim of consolidating the use of new media and their possible applications for education in universities and universities of applied sciences. Support is primarily given for the development of content and overall strategies for media use in higher education. Such strategies include the development, testing and implementation of innovative, multimedia forms of teaching and learning in the day-to-day activities of institutions. Also Projects for the development and introduction of an innovative concept for the integration of mobile learning in institutions are being funded under the second priority "Notebook University" as well as other leading projects such as "Virtuelle Fachhochschule (VFH)". Although the concepts differed in many ways, their implementation

definitely proved to be able to intensify the use of IT applications on campus (Kerres & Nübel, 2005).

Further, other initiatives such as the "New Media in Education Funding Programme" (BMBF 2000) were aimed at defining strategies for the integration of new media in the education sector. Another 100 Million Euros is estimated to be contributed by the German Bundesländer (states) to e-learning initiates. Within this project 450 proposals were submitted in 2000, out of which 100 projects have commenced. A key characteristic of this initiative is that most of the projects are co-operation projects between different universities with a specific focus on the development of e-learning materials for education (Kleinmann and Wannemacher 2004; cited by Lepori and Succi, 2004). In particular three leading projects concerning web-based learning were funded. The first project is aimed at the establishment of a virtual collaboration between Fachhochschulen (polytechnics) in two technical subjects. The second project is aimed at developing comprehensive and supra regional multimedia support. The third lead project is concerned with developing and testing technical and organizational solutions for tele-learning scenarios in continuing education centres among others (BMBF 2000). However it is worthwhile pointing out that before a comprehensive national program was established to coordinate these activities, there were several funding schemes scattered in most of the sixteen Länder (states). Examples are the Universitätsverbund Multimedia Nordrhein- Westfalen, Virtuelle Hochschule Bayern, Virtuelle Hochschule Baden-Württemberg (Bett et all 2002 cited by Lepori and Succi, 2004).

In lieu of the discussions above; it is worth noting that educational policy is a field, in which the German Länder tries to compete with each other and the educational policies of the federation. The constitutionally guaranteed cultural sovereignty of the Länder gives them extensive freedom to design and develop their educational systems. Each of the Länder has followed its own approach and with a different emphasis and investments in higher education. The consequences of such differences in the intensity and direction of educational policies increasingly become evident in recent years. A recent review of e-learning initiatives and development projects across German universities not only demonstrate an emphasis on the development of learning materials, but also that institutional support is not always present and as such there is the risk that many of these initiatives are abandoned at the end of the project funding period (Kleinmann and Wannemacher 2004). This further highlights the fact that German universities seem rather reluctant in introducing new educational technologies, for cultural reasons (the strength of the Humboldtian model of universities), and also for economic reasons (no incentives to acquire new students (Lepori, Cantoni and Succi 2003). This is explicitly expressed by Kerres & Nübel citing Müller-Böling:

"In Germany, the concept of universities and institutes of higher learning being autonomous organizations responsible for finding their strategic position on educational and science markets has not been explicitly developed so far. Instead, they continue to be seen as something like authorities subordinated to state ministries."

(Müller-Böling, 1994 cited by Kerres & Nübel, 2005).

Thus it is imperative to view within this framework how German higher educational institutions have been treating the issue of e-learning.

B) United Kingdom (UK)

Tendencies depicted in the UK also points to both a broad and narrow conceptualization of e-learning. This of course influences policy and strategic approaches to e-learning. In the UK e-learning is conceptualized as the use of ICTs to support individuals and groups with their overall learning needs. In that conception it is seen as a holistic and flexible approach to learning aimed at equipping learners with skills in a digitally enhanced context. Within this framework the forms of e-learning products that were mentioned were distance, blended and Web-based learning programs. The content of most e-learning programs in the UK cut across modules that are entirely linked to degree programs, supplements as well as complementary offers. Such programs were orientated both towards the local market as well as to the international market.

According to the experts interviewed, in terms of philosophy and strategy, there in the UK a government strategic policy on e-learning which tries to disseminate good practice and get e-learning embedded. In addition to that most institutions had their own policies regarding the application of e-learning technologies. In that vein the main philosophy or strategy was to support campus-based learning, respond to student demand and expectation, as a transition tool, and raising the attainment and achievement levels of students. The current emerging trends in relation to the use of e-learning technologies in the UK pointed to the increased use of mobile devices in learning, open education, new educational structures, the customization of e-learning materials or personalized learning coupled with increased research into e-learning. Elaborating further, Dewath (2004) said that in spite of the fact that there is only emerging evidence that e-learning can help to improve attainment and raise standards, the Government is convinced that e-learning is the way to take education and therefore the country at large forward. It is backing this up by investing £1 billion in ICT and e-learning in 2006. The Government does however understand that not everyone shares its belief in the commitment to e-learning. It sees a primary purpose of the consultation and strategy process as being to bring e-learning to the attention of education and industry leaders, and to convince them of its ongoing worth. Thus the Department for Education and Skills (DfES) believes that a strategic and 'unified' approach to e-learning is

necessary because "although there is a lot of e-learning going on already (and the UK is doing relatively well in international terms) it is not the kind of development that individuals or organisations can progress on their own (Dewath, 2004).

C) United States (USA)

Tendencies depicted in the USA points to a broad conceptualization of e-learning. This of course influences policy and strategic approaches to e-learning in the USA. E-learning is conceptualized as instruction delivered over the internet in the World Wide Web or via various technologies. It also refers to a hybrid type of learning or instruction across a distance. Within this framework the forms of e-learning products identified in this study are distance, blended and 100% Web-based programs. The content of e-learning programs in the USA cut across modules that are part of degree courses, stand alone degree programs and supplemental modules. Such programs are orientated both towards the local and international markets.

In terms of philosophy or strategy the USA government has a strategic policy on web-based education. In addition most institutions have their own policies regarding the application of e-learning technologies. Key strategic approaches driving e-learning in the USA are aimed at providing quality educational coursework; different methods of delivering course content and equity. The current emerging trends in relation to the use of e-learning technologies in the USA points to the increased use of mobile devices (e.g. iPod), adoption of highly interactive technologies, increased partnership between universities and corporations for the development of e-learning, standardization of course materials, aggressive marketing and tremendous growth in e-learning technology applications.

The current trends described above relating to e-learning in the USA are reinforced by the National Governors Association Report (2000). The report indicates that currently a lot of measures have being implemented for the development of e-learning in higher educational institutions across the country. In that vein the States are beginning to take advantage of the myriad of options made possible by employing advanced learning technologies, as they develop and expand their capacity to enhance the skills of a workforce preparing for the knowledge society. This is being achieved through delivery systems, expanding capacity, upgrading infrastructure and instructor skills, promoting access, and shaping the regulatory environment. Though many states across the USA are engaged in developing several e-learning opportunities, they also acknowledge the challenges of bringing about such significant transformations across so many systems in such a short period.

GERMANY, UK AND USA:

The need for a sustainable strategy across the three countries.

According to Wilson (2002) developing a broader perspective for e-learning seems to be vital to all higher educational institutions and countries. As the pace of change increases and value-add increasingly comes from knowledge, the need for a sustainable strategy for learning becomes even more critical. In that vein; there is the need for a more comprehensive perspective on e-learning activity within institutions and across countries with the key objective of developing effective ways of managing change procedures and initiatives. In that respect higher educational institutions need a more holistic view of e-learning with clearer objectives and more comprehensive strategies for meeting those objectives.

Findings emanating from this study show a need for change in policies and priorities that can only become more acute as e-learning matures. From the expert opinions there is currently a need for: a) an increased broadband access, which is widely and equitably available and affordable for all learners b) continuous, relevant training and support for educators and administrators at all levels c) new research on enhanced didactical approaches for e-learning, high quality online educational content and sustained funding through government and private initiatives that is adequate to meet the challenges on hand.

Stockley (2004), proposed that the strategic planning elements that enhance the use of e-learning in higher education include: **i) Strategic Plans:** coordinated across institutions, reviewed and revised regularly, integrated and functional. **ii) Organizational Management:** Funding, technology transfer issues, coordinated technical and instructional support, commercialization of instructional content, intellectual property, incentives to develop courses, recognition of the impact of technology on education, teaching effectiveness as a central component in all decisions relating to tenure, promotion and salaries. **iii) Resource Management:** Infrastructure, access to technology, plans for upgrading technology (software and hardware) **iii)Professional Development:** Provision of technical support, instructional support, on-going research, centres for course ware production, collaboration, exposure to successful practice of colleagues, integration of technology in teaching encouraged.

Engelbrecht (2003) citing Rosenberg (2001); Lerner (1999), also proposed an e-learning strategic planning process which involves:

Firstly; fully analysing the current situation relating to the ability to introduce and sustain e-learning initiatives and using the output of such analysis to produce a vision statement. Such a statement is not about how many online courses should be offered or what technology should be used, but rather about how the university, faculty or department will be recognised and valued internally and externally by its clients (students).

Secondly; generate a mission statement to shape the actions needed to achieve the outlined vision.

Thirdly; conducting a series of analyses by examining both the external and internal environments within which the institution operate as well as benchmarking by employing business solutions such as SWOT analysis to determine strengths, weaknesses, opportunities and threats that confronts the e-learning initiative. Such analysis could also take into consideration pedagogical models to appropriately address the concerns of the learner as well as other potential challenges that could be posed by the technologies that will be required to implement e- learning effectively.

Fourthly; on the basis of the analyses, specific strategic suggestions can be forwarded and a plan of action executed to achieve the vision. Intermittently, there will be the need for institutions to evaluate their strategies and make appropriate reviews of their strategic plans in line with evolving changes.

2. E-LEARNING TECHNOLOGIES

From the analysis of reports that detail out the activities of e-learning across the three countries it is an established fact that polices at the national levels of the countries have continued to reduce computer/student ratios and provided teacher training in ICT. Funding instruments to support the purchase of equipment (i.e. computers, projectors etc) have been put into place. Some higher educational institutions are using virtual learning environments, but the evidence suggests that they are not widely used. At present, the main policy focus seems to be on increasing numbers of computers, with replacement as a secondary market. (Study of the e-learning suppliers' "market" in Europe Report, Sept. 2004). In relation to the prevalent e-learning technologies, trends across the three countries are therefore discussed below.

A) Germany

Based on the review of reports and expert interviews the prevalent e-learning technologies currently being used across higher educational institutions in Germany are: i) Commercial systems like Blackboard and WebCT ii) Open source systems i.e. Sudip, ILIAS iii) Moodle iv) e-mail, PowerPoint v) Sytrex vi) Learning Space vii) WebTycho viii) EverLearn and x) ITOS

B) United Kingdom(UK)

Based on the review of reports and expert interviews the prevalent e-learning technologies currently used across higher educational institutions in UK pointed to diverse categories of tools and technologies which are: i) WebCT, Blackboard ii) Moodle iii) Student

portals iv) Shared forums, Wiki's and blogs v) MNET referencing technologies vi) Online whiteboards vii) Conferencing tools like First Class viii) Lambs and x) Web2 technologies

C) United States (USA)

Based on the review of reports and expert interviews the prevalent e-learning technologies currently used across higher educational institutions in USA pointed to diverse categories of tools and technologies which are: i) Blackboard, WebCT ii) Breeze iii) Open source soft wares iv) E-mail v) Video, Pod casting, Streaming audio and vi) Internet/ Broadband cable internet.

Which Technology is Best?

The prevalent technologies employed across the three countries depict a diverse landscape. However in terms of which technology is the best, according to Riedling (1999), although technology plays a key role in the delivery of e-learning, educators must remain focused on instructional outcomes, not the technology of delivery. The key to effective e-learning is focusing on the needs of the learners, the requirements of the content and the constraints faced by the teacher. Typically this systematic approach will result in a mix of media, each serving a specific purpose. In addition to the prevalence of technologies; there is the need for both instructors and students to feel comfortable with the tools of the information age (Peek and Dorricoh, 1994, cited by Riedling, 1999). Thus, institutions should not select technologies because they exist but also think of how e-learning activities may vary based on the phase of e-learning entered into and the technologies available to assist and support learning and institutional delivery.

3. E-LEARNING TECHNOLOGY APPLICATIONS

A) Germany

E-learning technologies are applied in different ways across higher educational institutions in Germany according to findings emanating from this study. Applications mentioned are as a shared workspace to download and upload files, learning management to distribute documents accompanying seminars and to support self-regulated learning.

B) United Kingdom (UK)

Findings from this study indicate that e-learning technologies are applied in different ways in the UK. Specific applications mentioned are as communicative ways for online discussions, support group work, virtual conferences, simultaneously shared functions, link to websites, support collaborations, organize assessments and to deal with external markets.

C) United States (USA)

In the USA e-learning technologies are applied in different ways. Specific applications mentioned are to provide instructional presence and feedback, create discussion through discussion boards, provide assessments, support collaborations, enable students to publish their knowledge, and support problem solving for example through the use of 3-D environments.

Concluding; one issue that comes up in terms of applications of e-learning technologies is that the literature and many e-learning practitioners and educators tends to deal with e-learning applications of technology and traditional classroom applications of technology separately. However many of the goals, techniques, and actual uses of technology overlap across the two domains and will probably do so to an even greater extent in the near future (Riedling, 1991). It is therefore imperative that the applications of e-learning in both settings are guided by the appropriate "good" practices to facilitate the use of e-learning in higher education.

4) DIDACTICAL/PEDAGOGICAL APPROACH(S)

The status of the market for content for higher education use is still very immature and its potential growth strongly correlates with public policy decisions. There is a widely held view that there is a need for high-quality and pedagogically sound resources, which have not yet been met either internally or by the market. There is strong encouragement to teachers to create internal markets in content. Even where ideological positions differ, it is generally accepted that in order to develop pedagogically sound, curriculum related and contextually relevant resources, teachers need to be involved in their creation. However, providing teachers with the skills, time and resources to do so remains a huge challenge which some believe is unrealistic - not least because behaviour demonstrates that few teachers are driven to spend time developing resources, ensuring they are interoperable and re-usable and sharing them freely (Study of the e-learning suppliers' "market" in Europe Report, Sept. 2004). In relation to the didactical approaches trends across the three countries are discussed below.

A) Germany

Findings from this study indicated that the didactical approaches used in e-learning programs in Germany are not uniform. Approaches mentioned are collaborative learning processes**,** hierarchical form of teaching**,** competency based education and mixtures of blended learning conception. But; despite the diverse kinds of approaches used the indication was that they fitted into the educational philosophies of other countries. Of course there were other opinions pointing to no real pedagogical approaches being employed.

B) United Kingdom (UK)

Findings from this study indicated that the didactical approaches used in e-learning programs in the UK are not uniform. Approaches mentioned are modular approach to teaching, seminar based teaching, resource based learning, collaborative learning, constructivist approach, problem-based learning and enquiry-based learning. But; despite the diverse kinds of approaches use they fitted into the educational philosophies of other countries.

C) United States (USA)

Findings from this study indicated that the didactical approaches used cut across both standardized and non-standardized didactical approaches. Approaches employed are modularized instructional units and constructivist learning. But; despite the diverse kinds of approaches used they fitted into the educational philosophies of other countries.

PEDAGOGICAL APPROACHS:

The need for innovation in learning across the three countries

According to Nesbit & Winne (2003) commenting on self-regulated inquiry with networked resources; the way that learners interact with knowledge resources in both individual and group settings is changing qualitatively as a result of continual improvements in the technologies that are being employed to support such learning processes. Currently many e-learning offers make available collaborative settings in which participants in the learning activity are able to access digital resources through wireless, broadband connections, chat forums, web search engines, learning object repositories and digital libraries. On the other hand it raises critical questions about how existing designs for e-learning activities should be revised, extended or supported with different tools to promote such collaborations. For instance, Nesbit and Winne, (2003), raised the question whether a ready access to factual information limit practice with reasoning processes that may be naturally induced in less information-rich environments where participants in learning construct bridges across their knowledge gaps in other to make meaningful derivations? The main line of thinking that emerges from the question raised by Nesbit and Winne is how e-learning products can appropriately adapt to the opportunities and challenges presented by the new multimedia information environment in other to promote the long-term development of metacognitive and cognitive learning strategies (Schunk & Zimmerman, 1998), epistemological beliefs (Schommer, 1994), and other competencies that enhance the overall learning outcome of students.

Currently; there remains a consensus that e-learning has tended to reproduce those traditional models of learning that are based primarily on knowledge transfer, rather than embrace the opportunities offered by more innovative, learner-centred models based on

constructivism, collaborative learning, whereby learners create knowledge through the processes of assimilating information, solving problems and interacting with others. (E-learning, designing tomorrow's education report, 2004). Further there is a general consensus that technology offers both the impetus and the opportunity to vastly improve learning performance but without a vigorous, dynamic research base there is the likelihood that we will miss the opportunity to advance the use of e-learning technologies. According to the Web-Based Education Commission Report (2000); currently the deficit experience in the lack of in-depth research into pedagogical issues has been the result of the lack of adequate funding for educational research, often educational research does not support enhanced learning performance and not accessible to instructors or easily translated into practice.

Currently; the highest forms of knowledge-building today are those that come through collaboration and sharing of what are known, similarly, research on learning will need to draw on specialists in neuro-cognition, behavioural and biological sciences, educational practitioners, designers, and technology developers to create the applications that carry research findings into the classroom. Within this framework Farrell (2001), described the emergence of standardised instructional design processes which he describes as learning objects. Learning objects can be described as:

> "The competencies to be achieved, skill and knowledge outcomes, lesson plans, assessment items and learning resources. They can exist in a variety of forms such as books, articles, people, Web sites, images, audio and video pieces. They can be stored in databases and used, reused, aggregated as desired or re-purposed by learners, teachers and course designers for their own particular purposes, thus moving us towards a "learning on- demand" environment."
>
> (Farrell, 2001)

In that perspective such objects can be employed across various delivery models such as print, CD-ROM or Web-based. This implies that the application of common standards will enable these learning objects databases to be available to any organisation that shares the same standards. Farrell, (2001) citing Porter, (2000) indicates that a consortium of more than 600 institutions has already established a task force to identify the standards for this initiative.

Raising issues about learning objects, according to the E-learning, Designing Tomorrow's Education Report (2004), currently there is a dominance of US/English content. This places a demand for developing e-learning content that supports cultural and linguistic diversities across Europe, Asia, South America and Africa. This requires that more content needs to be produced in different languages especially where English is not the main medium of expression to reflect the cultural and linguistic diversities of different countries. This of course raises the need for

"interoperability, standards and specifications". Currently standards and specifications relating to e-learning are fragmented across higher educational institutions and their applications do not sufficiently address the semantics of learning. Those involved in the production and distribution of digital e-learning content currently face a significant number of problems. For instance it is often the case that content creation tools from different vendors are not only "*functionally disparate"* but in most cases not "*interoperable",* that is, where users can use tools, produced by different vendors, to support the same process. Also, the learning objects produced using such technologies cannot be combined. This often frustrates efforts aimed at sharing and re-using educational content and consequently leading to unnecessary duplication. In that vain the development and adoption of a worldwide standards for tools and learning objects, describing how they fit together "*semantically"* and not just "*syntactically",* could be a key objective for the countries of the world in the years to come (E-learning, Designing Tomorrow's Education Report, 2004).

Consequently; this brings to fore the importance of localisation of learning objects in view of the number of different languages and cultures that they may cover. Often this is not simply a question of translation, but of adaptation of the whole learning approach. Usability is also an issue throughout the content creation chain, although a modular approach could be used to help mitigate this. It also calls for the involvement of content users in the creation process. Further, it also calls for addressing the gaps in the market, finding ways to build fragmented lesson plans into full courses, fully developing the promise of postsecondary educational opportunities on the Web, and assuring quality in this new environment (Web-Based Education Commission, 2000).

5) IMPACT AND LIMITING FACTORS

Impact

E-learning has been hyped as one of the fastest growing, knowledge-based domains that have a very strong transforming influence on higher education all over the world (Sloman, 2001 cited by Scottish Enterprise Report, 2002). Currently, it is in its infancy in many countries, however, having reached nothing like the penetration and degree of sophistication that it has achieved in the USA in particular, where as recently as June, 2001, the market for e-learning content and services was expected to double in size every year, reaching approximately $11.5billion by 2003. By 1997, nearly 50% of US universities were offering some form of online distance education (National Center for Education Statistics, 1999, cited by the Scottish Enterprise Report, Sept. 2002). Evidence emanating from this study also suggests a strong impact of e-learning on higher educational institutions in the UK in playing a critical role in the

government agenda of "massification" of higher education. In Germany the trend points to an increased level of initiatives directed at making e-learning an integral part of higher education. But according to Kerres and Nübel (2005), traditional universities in Germany opened up much fewer offers for online courses than it was assumed earlier though students have incorporated the use of digital technologies into their daily learning activities to a great extent. This is partly because with distance studies, there is one German peculiarity that has lingered to date. The FernUniversität is the only university that has been authorized by agreement of the Länder to offer university level programs with Bachelor and Master Degrees in distance education. This is why there are still only a few institutions that offer full study programs. Nevertheless, the FernUniversität also has reluctantly picked up the options of Internet-based learning so far.

Barriers/Limiting factors

Notwithstanding the level of impact that e-learning has made across the three countries potentially many higher educational institutions face three key obstacles in their developmental progression towards the extended use of e-learning: **1)** for most universities a primary limiting factor is to move e-learning away from individual initiatives into becoming a component of mainstream education, as a result of the lack of a coherent and comprehensive management approach in combination with a degree of resistance to change. **2)** Most academic staff lacks knowledge concerning the potential of e-learning and new ways to use it. **3)** A shortage of high quality e-learning teaching material. This is a natural consequence of the generally still-immature stage of development. In relation to the issues raised above the current trends of impact and the limiting factors across the three countries are discussed below.

A) Germany

So far findings emanating from this study point out that though the level of impact of e-learning has increased significantly over the years, however, it has not been on a large scale in terms of improving higher education capacity, on the role of faculty members and improving student learning outcomes. In the meantime e-learning has been credited with improving the media competency of learners and some teachers, provided a better insight into courses, provided a variety of possibilities to deliver on campus teaching and helped bring about change in pedagogical conceptions.

Notwithstanding the impacts made so far, the full potential of e-learning has not been realized in Germany courtesy of varying limiting factors which are: i) the lack of supporting structure politically and organizationally ii) the lack of individual knowledge and understanding among management of higher education institutions iii) the limited media competencies of the

faculty members iv) scepticism about e-learning among faculty members v) the lack of sustainable funding and research vi) the lack of incentives for teachers to use e-learning vii) the lack of support services viii) limited broadband applications and x) the lack of comprehensive didactical frameworks for e-learning programs.

Elaborating, Kerres and Nübel (2005) indicated that in terms of strategy, the practical approach in Germany to disseminate multimedia and internet into institutes of higher education focused on spending a lot of money on technical equipment. Consequently, German higher education institutions were by and large and in comparisons with other nations technically quite well resourced by the late 1990s. However the concept of technology as a means of creating added value in the crucial processes of research and education was little developed. On that basis the implementation of digital media into teaching could hardly create a clear value to learning and education partly because a sustainable integration was still lacking in many cases. The reasons included the lack of technical and didactical support as well as no overall concept for the creation of local or regional competency, support, or service structures (Commission of the Federation and the Länder for Educational Planning and Research Promotion (BLK), June 2002, cited by Kerres & Nübel, 2005)

B) United Kingdom (UK)

Findings emanating from this study points to the fact that generally e-learning has impacted strongly in boosting higher education capacity in the UK. However there is a mixed picture in terms of impact on faculty members as well as improving student learning outcomes. Meanwhile e-learning is still seen as having played a great role in improving the learning experience of students, enabled far more people to engage in higher education and reduced the burden on faculty members in managing the learning process. However, critical factors that have limited the full realization of the potential of e-learning in the UK are: a) limited staff resources and staff time b) limited budget c) the lack of knowledge on ICT tools d) lack of sound pedagogical skills e) lack of innovation, experimentation and research f) failure to manage change g) lack of tutor awareness and understanding h) Institutional structure and processes and i) the constraints of IT infrastructures.

C) United States (USA)

According to the Web-Based Education Commission Report (2000), growth has been dramatic for e-learning. For instance approximately 84 percent of four-year colleges were expected to offer distance learning courses in 2002, up from 62 percent in 1998. Today U.S. colleges and universities offer more than 6,000 accredited courses on the Web. In 2002, 2.2 million students were expected to enrol in distributed learning courses, up from 710,000 in 1998.

While traditional site-based institutions are adding distance learning courses to their offers, new players are exploiting the burgeoning demand for online educational courses and programs. Thus e-learning is seen as having provided greater learning opportunities for students, enabled institutions to expand the geographical reach of their programs and improved student learning. However, the picture on the extent of impact on faculty members has been mixed.

Notwithstanding the impact made so far, an array of limiting factors serve as a barrier to its overall effectiveness. Such factors include among others a) resistance of faculty to teaching online and lack of faculty time b) attitude of administrators c) connectivity or the lack of high speed connectivity d) quality of online programs e) how to conduct assessments in online education f) digital divide or access to broadband g) cost of tuition h) stigma with online learning i) money, resources and leadership and j) lack of technical support. According to the National Governors Association (2000); the current challenges that limit the development of e-learning across the various states in the USA are likely to increase as they begin to address emerging issues within e-learning. These issues entail reaching those on the other side of the digital divide more effectively; restructuring public postsecondary systems to eliminate duplication now that previous barriers of geographic distance among jurisdictions have been vastly reduced and assuring consumer protection, quality of content and programs in this dynamic environment without stifling innovation.

IMPACT AND LIMITING FACTORS OF E-LEARNING:

Need to address the concerns of faculty members across three countries

Examining the extent of impact of e-learning across the three countries one key area that has raised a lot of concern is the extent to which faculty members are willing to embrace e-learning and tap into its potential to benefit the teaching and learning process. Factors such as the limit of time, support and lack of incentives have been mentioned as accounting for this. But O'Neill, Singh, and O'Donoghue (2004) citing McFadzean (2001), indicated that the implications of e-learning for faculty members are significant and should not be overlooked by institutions implementing such programmes. For instance, in the implementation of e-learning programmes, higher educational institutions are placing a demand for a change in the role of faculty members. This implies a change in traditional teaching and learning skills in favour of a new model of effective teaching in order to derive maximum benefit from e-learning.

On the issue of the lack of faculty time, O'Neill, Singh, and O'Donoghue (2004) citing Moore (2000) raise a key point that empirical research into the lack of faculty time and increased workload points to mixed findings. For instance two studies conducted in 2000 which looked into the time taken to teach a course online compared with teaching it in a traditional classroom

produced contradictory results. The findings of the first study were that distance faculty members experienced a reduced workload, (2.7 hours per student compared to 3.2 hours in a traditional course). But findings of the second study was that, faculty members needed nearly twice as much time to teach an online course compared with a traditional course. In another study conducted by the U.S. Department of Education (2002); Statistical Analysis Report on Faculty workload and Technology Use; compared faculty members who did not use e-learning and those who used e-mail or course-specific web sites. Those who used e-learning generally reported working more hours per week on average, spending more time on research activities, and spending less time on teaching activities and office hours. The contradictory findings presented above could partly be explained by the many differences between the various studies such as the subject, student's educational backgrounds and the mix of technologies. These factors thus limit their generalizability, though it brings to fore the fact that many factors contribute to the issue of faculty time and workload. This also further implies that there is the need to examine cases on an individual basis to identify those variables which contribute to the workload as well as contribute to the success of the course (Moore, 2000 cited by O'Neill, Singh, and O'Donoghue, 2004). There is also the need to provide faculty members with sufficient time and resources to ensure that e-learning programs are suitably developed and implemented to meet the needs of students. Further, the transitions into the use of new instructional approaches need to be managed effectively to ensure that faculty members are adequately supported.

6) FUTURE TRENDS/ SCENARIOS

Anticipated future trends in the next 5 years across the three countries covered the anticipated technologies, trend of technology applications, anticipated impact, strategic options for overcoming obstacles, and implications for international knowledge transfer. Details across the three countries are discussed below.

A) Germany

Qualitative data emerging on Germany in relation to technologies anticipated in the next 5 years points to the increased application of technologies such as Open source software, Moodle, Social software, Cyber media, Micro Fabrication, Automated feedback board, Mobile technologies, Web2.0 tools, Electronic tools such as voting systems, Smart boards and Open collaborative tools such as Blogs. In that vein the trend of technology applications in the next 5 years points to the replacement of certain local face-to-face based offers by e-learning, central learning management systems (CLMS) across higher educational institutions, the development and availability of more authentic learning, more offers which aim at mobile learning, added on

enhancements in terms of quality and increased possibilities to provide learning materials on the university homepages.

In terms of the anticipated impact of e-learning in the next 5 years the expectation across Germany is that with increased funding there could be a sustainable integration of e-learning across higher educational institutions, increased subject specific impact where curriculum will be especially fitted to individual learning needs resulting in more decentralized learning and increased consolidation of e-learning. It is also anticipated that university continuing education will profit a lot from e-learning however there is the risk of decreased impact should funding continue to decrease as is currently the case. In lieu of that some of the strategic options that could be employed for overcoming the limiting factors in the next 5 years include among others increased pressure on policy makers to pay more attention to e-learning in higher education, a differentiated field for funding options, the institution of qualification programs for faculty members that sets out e-learning competencies as a specific job requirement, frequently conducting systematic evaluations, the development of institutionally based strategies, extra incentives for teachers and increased emphasis on pedagogy than technology. This is expected to produce a positive benefit of increased mobility and transferability as well as a growing international market field resulting from the increased use of learning units.

This of course has practical implications for international knowledge transfer. This include increased international co-operation or more opportunity to exchange knowledge, increased competition, widespread transfer of reusable objects, merging between private offers and offers of higher educational institutions as well as an increased need to internationalize curricular and communication medium. However; according to Lepori and Succi (2004) in the German context, the development of e-learning is mostly motivated through social reasons which is to offer opportunities to students who cannot attend regularly higher education institutions. This rationale was for example the basis for the creation of the FernUniversität Hagen and some distance education opportunities. On the contrary, this model makes the expansion of existing universities and off-campus institutions quite difficult. This is based on two main reasons: firstly, these institutions are largely stuck to a traditional model of universities, where direct contact between teachers and students is considered to be quite important. Secondly, in a situation where student fees are very low, there are almost no incentives to access new markets, since this would entail additional costs. In this regard most e-learning initiatives have a fragile economic base. Thus the development of course materials within this sector is possible only to the extent that there is additional funding from new media programs at the state or federal level.

Thus for many higher educational institutions in Germany e-learning doesn't represent a strategic project though there are several institutions that have some interests in maintaining e-

learning as innovative experiments and as separate offer for new students. Within such thinking frame there are indications that in the future e-learning could be successfully adopted in the post-graduate sector of higher education. However it is my impression that in order for these future trends to become reality, suitable institutional and organizational arrangements will be critical for the use of e-learning, especially in a country like Germany where the higher education sector is not strongly marketed and thus business opportunities are limited (Lepori and Succi, 2004).

B) United Kingdom (UK)

Qualitative data emanating from the UK in relation to technologies anticipated in the next 5 years points to the increased prevalence of technologies such as Hand held devices (e.g. iPod, MP3 player), Wiki's, blogs**,** Synchronous collaboration tools, Modelling tools**,** Open source tools**,** Web-based technologies (e.g. web-based forms of video-conferencing) and Digital interactive TV. In that context the trend of technology applications in the next 5 years points to the use of electronic voting systems to promote interactivity, supporting small group learning, e-portfolios, the development and sharing of re-usable objects between institutions and staff, more modelling tools that put more learning design in the hands of teachers, the adaptation of open source software to institutional needs, expansion of user generated content and more subject specific applications.

In terms of the anticipated impact of e-learning in the UK over the next 5 years, with an increased overseas competition it places a demand for the improvement of quality of e- learning in the UK. Also that e-learning will be completely absorbed into teaching and learning provision of higher education, that there will be an increased impact on individual institutions across different potential outcomes, stronger institutionalization of e-learning, a reasonable degree of rejection of e-learning among certain courses, widening participation in higher education and the development of new assessment methods. However with all these optimistic anticipations there is the need to adopt the appropriate strategic options to deal with any anticipated obstacles. In lieu of that some of the strategic options proposed for overcoming the limiting factors in the next 5 years entail increased support for innovation in teaching and learning**,** teacher training, increased funding for quality of teaching**,** need for innovative tools**,** workforce development oriented "e" strategies, sharing, developing the awareness and expertise of faculty members, developing persistent strategic approaches and making barriers in structure and processes more enabling.

In terms of future scenarios there is an expectation in the UK for an increased use of hand-held devices, personalization through personal technologies, increase in informal learning environments, shift of power from providers of technology towards teachers and learners, stabilization, rationalization and institutionalization**,** widespread usage of VLEs resulting in a

scenario whereby e-learning will become a natural part of pedagogy, integrated into general approaches to teaching and learning. This of course holds an enormous set of implications for international knowledge transfer in terms of increased economies of scale, sharing of courses and increased teaching, increased quality and quantity level of educational materials, increased communication across institutions, increased discussion on pedagogies and quality assurance, learning from the mistakes of other countries, opening up of institutions to new approaches to teaching, adjustment of national politics to international concepts and increased adaptation as a result of the recognition of differences in cultures.

C) United States (USA)

Qualitative data emanating from the USA in relation to technologies anticipated in the next 5 years points to the increased prevalence of technologies such as Moodle, Freeware, Whiteboard**,** Open Source tools**,** Intelligent tutoring systems**,** Video based presentations or lectures, Pod casting and asynchronous technologies (e.g. discussion forums). In that context the trend of technology applications in the next 5 years points to the use of fewer packaged management tools and more freedom in design**,** digital objects, course laboratories**,** workforce development, increased versatility in functions of tools with more personalization.

In terms of the anticipated impact of e-learning in the next 5 years, indications are an expansion of the recipients of education services which is contingent on political and economic factors, increased scrutinization of e-learning, more penetration of e-learning in higher education, increased institutionalized support for the development of online courses, diffusion of broadband tied directly to the continuing growth in e-learning, the emergence of a truly virtual classroom**,** better tools and increased faculty participation. However with all these optimistic anticipations there is the need to adopt the appropriate strategic approaches to deal with any anticipated obstacle. Such options entail the provision of support and incentives for faculty**,** more training, education, information, and more awareness, expected increase in government subsidies and a co-ordinated national effort to take advantage of e-learning**,** promoting understanding at the administrative level of higher educational institutions, increased technology diffusion and financing for higher education as well as increased research into e-learning.

In terms of future scenarios in the next 5 years the expectation in the USA points to an instilled student-centred instructional design, enhancement and widening of student participation in higher education, wider adoption of e-learning by institutions, increase or a capturing of market share**,** increased faculty acceptance of e-learning**,** prevalence of open source software more multimedia and individualized learning. This of course holds an enormous set of implications for international knowledge transfer in terms of making higher education available to

all people across boarders, internationalization of instruction, internationalization of digital objects and course repositories, emergence of global type education, huge gains in communication not just quantity but quality and more opportunities to improve the educational system across the world. However international knowledge transfer could be limited by cultural differences and ingrained traditions of higher education that works for each country.

FUTURE TRENDS ACROSS THE THREE COUNTRIES

Technology and application trends.

Based on the scenarios depicted across the three countries, technology and applications trends points to an increased level of sophistication and flexible application of e-learning technologies. According to the Web-Based Education Report (2000), the promise of widely available, high quality web-based education will be made possible by the anticipated technological trends demonstrated across the three countries that could lead to important educational applications over the next two to three years. It mentions the following technological trends:

a) Toward greater broadband access and better data packet handling capabilities. For learners this will mean a richer delivery of content than today's delivery of simple text. It will enable richer interactive environments.

b) Towards pervasive computing in which computing, connectivity, and communications technologies connect small, multipurpose devices, linking them by wireless technologies. It is much cheaper to build cellular relay stations than lay miles of cable. Wireless solutions may enable underdeveloped and remote areas to quickly take advantage of the Web via wireless phones, two-way pagers, and handheld devices.

c) Towards digital convergence: merging the capabilities of telephone, radio, television, and other interactive devices. In this context television is expected to be significantly enhanced by conversion to digital transmission. Through this increased capability, stations can offer dramatically enhanced programming by "datacasting" a wealth of supplementary information to accompany the regular broadcast. This may include course materials, software, and reference guides delivered via text, video, or audio formats. Direct satellite connections to the home offer another pathway for rich content.

d) The establishment of technical standards for content development and sharing.

Another trend points towards mobile learning. According to Kim, Mims & Holmes, (2006), the benefits of using mobile wireless technologies in higher education are enormous. For instance since wireless PCs have the same capabilities and functionalities as wired- PCs, students and faculty can enjoy the same capabilities and functionalities with their wireless computers as they do with their wired PCs. Kim, Mims & Holmes (2006) citing McKenzie (2001), Galbus,

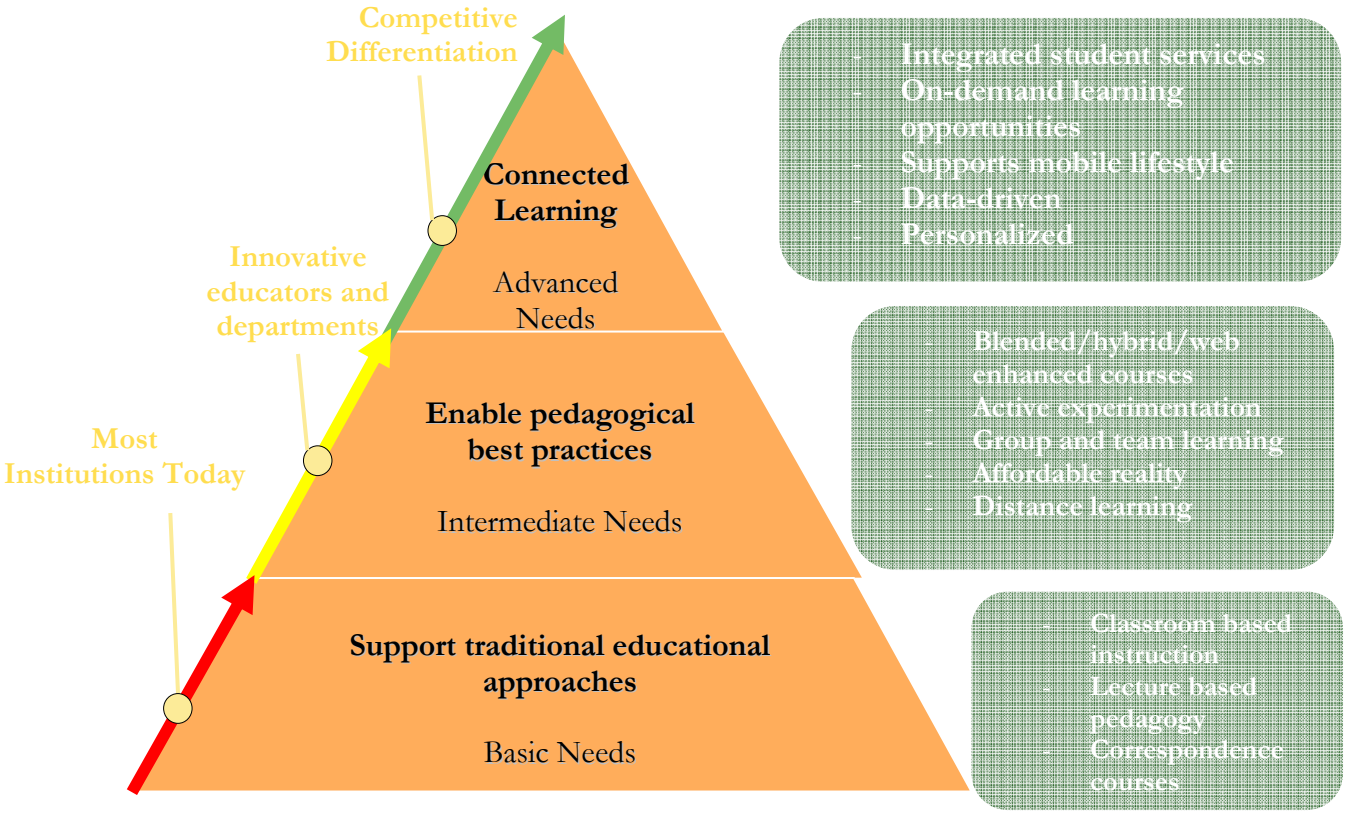
(2001); Rzewnicki (2004) identified additional benefits of using wireless computers for teaching and learning; (a) Ease of movement, (b) Relaxed fit, (c) Strategic deployment, (d) Low profile, (e) Flexibility, (f) Cleanliness, (g) Convenience, (h) Simplicity, and (i) Speed (j) Less expensive and (k) Enhanced communication and collaboration.

However, one must look at the challenges of mobile wireless technologies before adopting and using them. Among many issues, security issues may be more crucial than other issues. At the current stage of mobile wireless technologies, there is virtually no security feature. Such doubts lead to slow adoption of mobile wireless technologies in business sectors in which many transactions are involved. Regardless of security issues on mobile wireless technologies, more higher education institutions, however, are beginning to adopt and use them because the main purpose of their usage is to provide a mobile-learning environment (m-learning) to both educators and learners (Kim, Mims & Holmes, 2006).

Education Evolution Enabled By E-Learning

Based on trends and future scenarios depicted for e-learning technologies, its applications, didactical approaches, impact and limiting factors as well as their overall influence on international knowledge transfer it is my anticipation that the e-learning landscape across the three countries and internationally will be going through a period of evolution or transition as depicted by Bamberger's (2003) model of education evolution which he developed based on Maslow's (1943), hierarchy of needs framework. According to the model, most institutions will be evolving from the basic needs level (where most institutions are today) of e-learning usage which is characterized by supporting traditional educational approaches to the intermediate needs level (level of innovative educators) that enable pedagogical best practices**.** It is also expected that higher educational institutions who currently find themselves at the intermediate level may be evolving towards the advanced needs level (competitive differentiation) which is characterized by connected learning that facilitate integrated student services, on-demand learning opportunities, supports mobile lifestyle, data-driven and personalized. The evolution enabled by e-learning is depicted below:

Figure 10: Model of Education Evolution



Adapted from Bamberger, R.H, 2003; Developed based on Maslow, A. (1943). A theory of human motivation. *Psychological Review*, 50, 370-396

International knowledge transfer via e-learning

According to Jef Van den Branden & José Lambert (1999), Open and Distance Learning (ODL) is much more than a didactic or technological issue. On the basis of contemporary approaches to culture, it is both an agent and a barometer of culture: culture influences the appearances, models and contents of ODL, but is influenced itself as well by the ODL phenomenon. The ambiguity of culture typically emerges when looking at language. Transnational delivery of e-learning programs may be hindered by the multilingual societies of the world. It is therefore advocated that language policies be replaced with language management, which is applied in a creative way.

According to the Scottish Enterprise Report (2002), the nature of the e-learning being transferred, which is, the conceptions and forms has a direct influence on the success of such transfer. Hence there is the need to make a distinction between e-learning products (content), e-learning processes for organizing and delivering (the technological infrastructure and services) and e-learning as a medium of learning which is the person-embodied features (Kedia & Bhagat, 1988 cited in Scottish Enterprise Report, 2002). It is usually argued that the process and person aspects of a technology are more difficult to transfer across nation boundaries (Kedia & Bhagat, 1988 cited in Scottish Enterprise Report, 2002). In the case of people-embodied factors problems

of language, history, level of economic development, workforce skills, etc., are factors that are embodied in technology and which influence transfer across national boundaries.

In that vein the Scottish Enterprise Report (2002) citing IVETTE (2000) indicate that specific factors that are likely to influence the transfer of e-learning are language and educational philosophy. It was their argumentation that for instance, in countries such as the US, rationally-based, behaviourist and cognitive approaches to learning tends to dominate education and training. Such approaches are strongly rooted in the individualist nature of USA culture (Bhagat, Kedia, Harveston & Triandis, 2002; Hofstede, 1998; Sirevag, 1999 cited by Scottish Enterprise Report, 2002) and its highly rational business system (Ferner, 2000), which treat knowledge as a commodity to be transacted in a marketplace, rely heavily on treating knowledge as a product which has to be transferred and view individuals (the usual basis for analysis), as rational information processors who are motivated to learn through principles of conditioning and reinforcement schedules. They argue that whilst such approaches, though still relevant, in the educational philosophies of European countries like UK and Germany, they are not so deeply rooted or dominant. Rather constructivist learning theories and approaches to learning that see knowledge created through social practice are more likely to inform European (UK and Germany) knowledge production and learning (Martin, Pate and Beaumont, 2001; Reynolds, Caley & Mason, 2002 cited by the Scottish Enterprise Report, 2002).

Within this context it is argued that, though knowledge transfer enabled by e-learning across countries is influenced by national governments internal institutional factors also play a critical role. This implies that at the institutional level, the cultural differences between the transacting institutions will definitely influence such transfer. Consequently this calls for putting in place the necessary international transfer enabling mechanisms such as Government intervention through programmes, information sharing, newly-created institutions, such as virtual universities or alliances. Accordingly, the outcome of a study, "Studies in the Context of the E-learning Initiative: Virtual Models of European Universities 2004", has highlighted some key preconditions for partnerships that foster international knowledge transfer and collaborations to succeed: **a)** The involvement of management, together with a clear strategy concerning how the partnership is connected with and will be included in the general activities of the universities. **b)** The individual chemistry is crucial. All partners involved must therefore know each other, and it is important to have an extensive information-sharing stage in which all the partners must commit themselves to the project. **c)** The university partners should have similar internal structures and charter models. This means that they will recognise and understand the associated internal procedures and possible problems. If the structures are dissimilar, it is important to think through how the differences will affect the project. **d)** A clear partnership strategy and a sound

knowledge of the market is a precondition too. For instance, the level of quality and ambition must be agreed. Some institutions aspire to become world champions, while others are more pragmatic. Systematic analysis of the skills needed to develop and implement the various aspects is also required. **e)** It is essential to have a sound business model which makes clear who is going to be doing what and who is responsible for what. **f)** A business model must achieve a sound balance between focusing on the administration of the resources of the project on one hand, and the pedagogical and content issues on the other. The partnership and business issues tend to absorb a lot of attention at the risk of diminishing the importance of the educational considerations. **g)** Finally, the staff needs to feel that the initiative is necessary, and this should be backed up with incentives for them to participate. The involvement of senior staff indicates commitment and priority.

IMPLICATIONS OF STUDY:

Policy and Strategy

On the basis of analysis and study conclusions, PLS RAMBOLL Management (2004) (Studies in the Context of the E-learning Initiative: Virtual Models of European Universities 2004) has generated the following recommendations that are targeted at the different levels involved in higher education, namely:

Firstly; **International level:** This revolves around the facilitation and dissemination of experiences and good practice. Many universities lack inspiration from other universities that are undergoing a similar process or which have experienced some of the same challenges. This calls for an increased effort internationally to share experiences.

Secondly; **Country level:** It is crucially important that e-learning integration in universities should be labelled as a key priority at the national level, and those strategic goals and objectives should be clearly defined. Whether these are set out in a strategy targeting e-learning in universities or are integrated into broader strategies that for instance cover the entire field of higher education or the knowledge society is of subordinate importance.

Thirdly, **Institutional level:** It is an established fact that the possession of an e-learning strategy is a key driver for the integration of e-learning as a normal learning delivery tool in higher educational institutions. It is therefore my suggestion that higher educational institutions develop specific e-learning strategy or integrate such strategies into their general university strategy. In doing so it is worth noting that there is no ideal e-learning adoption model. The adoption and institutionalization of e-learning must be in consonance with the overall aims of the institution and be directed at supporting them appropriately.

E-Learning Technologies: Bridging the Digital Divide

The focus of this study, Germany, UK and USA can be said to be in the category of "digitally advanced" countries. It is however worthwhile to bring the benefits and potential of e-learning technologies to bear on other countries who currently have a low level of ICT infrastructure. For instance, Naidoo (2001), said though ICT makes it possible for many potential learners in many parts of developing countries including remote and rural areas to have access to education, such access is very limited. This is as a result of a number of technological constraints. For example; Africa has approximately 12% of the world's population, but only 2% of the global telephone network. Telephone density is less than two lines per 1000 people. These figures become even more startling when compared with Asia (48 per 1000), America (280 per 1000), Europe (314 per 1000) and high-income countries (520 per 1000) (Darkwa and Mazibuko, 2000 cited by Naidoo, 2001). The situation in Latin America indicates huge disparities. In the mid-1990s, few people in South America owned a computer or had access to the Internet. The changes have been dramatic over the last few years. Now 35 million Latin Americans own PCs and 20 million use the Internet, but the poor have been largely left out of this development. In Brazil, for example, 72% of the 7.7 million Internet users are from the wealthiest fifth of society, with only 8% coming from the poorest fifth. (Margolis, 2001 cited by Naidoo, 2001).

Further, one needs to emphasize that both developing and developed countries have responded in different ways to these and other constraining factors to virtual education for instance by redefining the nature and function of learning venues that enable virtual education (Naidoo, 2001). This is because practices that might have been successful in Germany, UK or the USA may not necessarily be successful when transported amass to other countries. This calls for in-depth research into the development of appropriate strategies, technologies and applications to facilitate such ventures. In the context of that it is worth pointing out that "Access" is more than getting one's hands on a computer, or simply connecting to the Internet. Access must be convenient and affordable. It must offer a user the opportunity to find and download complex, content-rich resources. The technology that supports access must be where the learner is located and be available whenever he or she needs it (Web-Based Education Commission, Dec 2000).

The issue for developing countries is not one of direction but of readiness and scale. The question that comes up then is when a nation can or should start investing in e-learning? If e-learning represents a significant element of the future of higher education, then it becomes imperative for a nation or an educational institution to obtain the relevant experience and practice in e-learning thereby increasing its competitiveness. On the other hand ignoring the influence of e-learning could be detrimental (Naidoo, 2001).

Pedagogy: The Need for Innovation in Learning

Generally, findings from this study points to a lack of in-depth research into pedagogical aspects of e-learning. There is therefore the need to establish a pedagogical base for the effective use of e-learning. We need a vastly expanded, revitalized, and reconfigured educational research, development, and innovation program built on an understanding of how people learn as well as how new tools support and evaluate learning gains. This calls for an in-depth educational research, which focuses on using long-term, longitudinal studies as well as aggregated short-term trials supported by technology and directed at enhancing performance in learning (Web-Based Education Commission, 2000).

Professional Development: Enhancing faculty participation

Training helps faculty members transform lifeless equipment into useful tools. Creating high-tech technologies without adequately training or providing technical support to faculty members is likely not to produce any results. Further, faculty members are the key to the effective use of web-based tools and applications, but first they must become skilled at using them themselves so that they can effectively carry out the function of guiding instruction as well as shaping the instructional context in which the Internet and other technologies are used. It has generally been argued that it is the instructor's skill at effectively using these technologies, more than any other factor, which determines the degree to which students learn from their online programs. In that context there is every need for instructors to be comfortable with technology, able to apply it appropriately, and conversant with new technological tools, resources, and approaches.

On the other hand one can argue that basic technology training alone is not sufficient. This is because the ability to use technology for non-instructional purposes does not necessarily translate into the competency to use technology to support student learning. Currently many instructors lack a clear conception of effective classroom uses of technology in their subject area. Thus professional development represents the critical ingredient for the effective use of technology in the classroom (Means, 2000 Cited by Web-Based Education Commission, 2000). Professional development here implies much more than just acquiring basic technology skills but extends to developing a vision built on the understanding that technology is a tool that can offer solutions to age long teaching and learning problems. It is the growing understanding that comes with confidence to "think with technology" in order to approach old problems in new ways. In that respect change is necessary on two fronts: in the preparatory (pre-service) education of faculty candidates, and in the continuing (in-service) education of those already in the education profession.

RECOMMENDATIONS FOR FURTHER RESEARCH

Clearly, the state of activities as reflected across the three countries depict in one way or the other an increased level of activity in the promotion of e-learning. On the other hand as Germany, the UK and USA and other countries continue to build on their e-learning foundations the following questions arise for further research and consideration:

1.) **Policy and Strategy Related:** Based on findings in this research it is my recommendation that the management of innovation, the sustainability of solutions, and how to increase the receptiveness of university managements towards innovation need to be researched into. Also whether duplicative and costly programs be restructured in the light of students' increased access to high-quality content that may come from out-of-state providers? In addition there is the need to research into what incentives may be needed to stimulate private-sector participation in e-learning courseware development and application in countries where the level of private involvement is practically non-existent or relatively small scale?

2.) **Technology and Applications Related:** Based on findings in this research it is my recommendation that further research into how to increase the user-friendliness of tools is crucial. Also; though the development of mobile wireless technologies has been mentioned as a trend in the next 5 years and seems to generate a considerable amount of excitement among educational technology experts partly because it results in shifting the academic environment from traditional settings to mobile learning (m-learning) settings, that increasing numbers of higher educational institutions will be offering courses applying such mobile technologies as alternative to teaching and learning tools, it appears that there is lack of academic research on the development and use of such technologies in the higher education setting. It will therefore be appropriate that future research work aim at promoting the enhanced use of m-learning.

3.) **Pedagogical and Didactically Related:** There is a need for research into e-learning pedagogies and the pedagogical interactions between the students and their teachers/tutors. Also; how to develop a 'social infrastructure' for e-learning which; ensures that students do not too easily drop out; How to use virtual learning environments to create more effective learning settings. In addition, the lack of knowledge about the risks and consequences of taking particular approaches to e-learning also need to be researched into. Further how countries and institutions can promote the integration of the best content and delivery from both the public and private sectors to increase access to state-of-the-art e- learning by potential students across the world needs to be considered. Finally, there is the need to research into how countries and institutions can best pursue quality control and assurance in e-learning development and delivery and at the same time not limiting innovation and participation of new providers.

4.) **Impact Related:** Findings from this research points to the fact that e-learning has improved higher education capacity. However the issue still remains that there is absolutely little or no data to back such claims. The lack of availability of data also makes it difficult to generally evaluate the impact of e-learning on faculty members and student learning outcomes. It is therefore my recommendation that empirically based systematic evaluations be conducted to unearth the overall impact of e-learning across these spectrums to serve as a basis for estimating the cost-effectiveness and potential of e-learning.

5.) **Barriers Related:** Scattered pieces of information exist that outline some of the barriers currently confronting the effective application of e-learning across the three countries. This therefore calls for a comprehensive research into potential barriers to e-learning both at the national and international levels.

6.) **International Knowledge Transfer Related:** This study considered the implications of current trends of e-learning, anticipated future trends and how they are likely to impact on international knowledge transfer. In that context several issues came up that requires further consideration. It is therefore my recommendation that further research be conducted to examine such factors that enhance or serve as a barrier to international knowledge transfer so that the appropriate techniques could be developed at the international level to facilitate such transfers.

CONCLUSION

From the review of reports and expert interviews one can say that the e-learning picture across the three countries is not the same. For instance adoption patterns among higher educational institutions in the U.S.A are different from those in Germany. However the UK increasingly demonstrates patterns which are somewhat similar to the United States. Thus it is my impression that the scale of adoption and applications across all facets of higher educational institutions in Germany in particular has been relatively slower as compared to the UK and USA. Of course this has to be considered in the context of the unique higher educational system in Germany and its specific historical orientation.

Another distinguishing factor is the high level of private involvement in promoting the use of e-learning specifically in the United States. Another impression that emerges from this study specifically relating to Germany is that though there were a lot of Federal and State government level initiatives aimed at promoting the use of e-learning in higher educational institutions in Germany in the last 5 years, currently funding for this sector is decreasing. Compared to the UK, the impression was that government funding for the sector is currently on the increase and targeted at promoting good practices across the institutions to avoid the

situation in the past where large scale funding initiatives did not produce the much expected outputs with the trail of failed projects.

On the adoption of e-learning technologies, currently the three countries are making frank efforts at adopting e-learning technologies. It is my impression that commercial technologies such as WebCT and Blackboard have a high level of adoption in the UK and USA compared to Germany. The increased use of Moodle is evident in Germany. However across the three countries there is fairly a high use of institutionally developed technologies and applications which may not be necessarily prevalent on the international market. In terms of pedagogies difficulties exist in transferring US-based e-learning contents to non-Anglo Saxon countries, and vice versa because of differences in historical, cultural and philosophical approach to learning and working.

In the final analysis, having reviewed the state of affairs across these three countries my ultimate conclusion is that higher educational institutions across the world can no longer ignore the inherent potential of e-learning. Advanced ICTs in the form of computers, the Internet and hand-held devices have become an unalienable part of higher education. But the central question that remains is how effectively these technologies could be employed to assist the teaching and learning process. This of course depends to a large extent on the need to develop appropriate e-learning strategies that do not only enhance the use of technology to deliver flexible learning for students but also look into important pedagogical issues that surround the delivery of e-learning. Consequently; as access to these advanced technologies continues to improve by the day it is expected that competition between higher educational institutions and countries in taking advantage of the potential of e-learning will largely depend on the quality of learning delivered.

LIMITATIONS OF STUDY

In this study I have attempted to address the initial questions concerning the current trends in relation to the use of e-learning technologies and its application in higher educational institutions across the three countries as well as the anticipated future scenarios. The findings have particular policy and practical implications for the three countries as well as the international higher educational market.

A review of national and international reports across the three countries as well as inputs derived from expert interviews provided an interesting set of trends and scenarios for further research. On the contrary I must acknowledge that the reports that served as the basis of my quantitative data may not be necessarily representative, nor do they represent cause and effect relationships. This is because the current trends of e-learning in the UK, Germany and USA are quite difficult to view in a holistic manner. Notwithstanding; one can say that what they portray are sets of tendencies that offer the basis for descriptive comparisons across the three countries.

Further, though one may not be in a position to question the depth of knowledge of the experts, one must still acknowledge under the theoretical framework of social construction of technology that the opinions expressed by the experts may be partly subjective, influenced by their unique cultural experiences and background, thus one must be careful in generalising their opinions since their experiences may be relative to the context within which they operate.

Finally, the constraints of time might not have permitted me to thoroughly consider a wider array of reports across the three countries. It is my hope that any future research in this perspective could wholly focus in an in-depth way on a thorough review of available documents in order to arrive at an appropriate conclusion.

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APPENDIX- I
Address List of Interviewed Experts- Germany

No.	Name	Date Interviewed	University
1	Prof. Henning Pätzold	3rd Aug-06	Technical University, Kaiserslautern Dept. of Educational Sciences Tel: +49 (0)631 205 4555 Email: paetzold@sowi.uni-kl.de
2	Dr. Thomas Hülsmann	4th Aug-06	Carl von Ossietzky University of Oldenburg. Center for Distance Education Tel: +49 441 798 3288
3	Prof. Manuela Pietrass	4th Aug-06	University of Munich & Universität Bundeswehr, Munich. Faculty for Education Tel: 089-6004-3102/3119 Manuela.Pietrass@unibw-muenchen.de
4	Dr. Matthias Nückles	7th Aug-06	University of Freiburg Dept. of Educational Psychology Tel: ++49 (0) 761 203 3000 nueckles@psychologie.uni-freiburg.de
5	Prof. Michael Kerres	14th Aug-06	University of Duisburg-Essen Chair of Educational Media and Knowledge Management Tel- +49 203 379 2434 michael.kerres@uni-duisburg-essen.de
6	Prof. Theo Bastiaens	22nd Aug-06	FernUniversität in Hagen Institut für Bildungswissenschaft und Medienforschung Theo.Bastiaens@FernUni-Hagen.de Tel: 0049 -2331/987-2812
7	Prof. Frank Fischer	9th Oct-06	University of Munich Faculty of Edu. & Psychology Leopold Str. 13, 80802, Munich.
8	Prof. Dr. Thomas Köhler	6th Sept-06	Technische Universität, Dresden. Fakultät Erziehungswissenschaften Tel: 0049 351 463 39 627 email: Thomas.Koehler@tu-dresden.de
9	Dr. Bernhard Ertl	25th Aug-06	Universität der Bundeswehr Fakultät für Pädagogik Tel: (089) 6004 3096 Email: bernhard.ertl@unibw.de
10	Dr. Birgit Gaiser	5th Oct-06	Knowledge Media Research Center Tübingen Tel.: ++49 (0)7071 979-347 E-Mail: b.gaiser@iwm-kmrc.de

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No.	Name	Date Interviewed	University
1	Prof. Harvey Mellar	21st July 2006	University of London London Knowledge Lab email: h.mellar@ioe.ac.uk Tel: 44(0) 1483570182
2	Prof. Mike Sharples	13th July 2006	University of Nottingham Tel: 44 1212 47 62 13 email: mike.sharples@nottingham.ac.uk
3	Prof. Rosemary Luckin	19th July 2006	University of London London Knowledge Lab Tel: +44(0)1273508812 Email: r.luckin@ioe.ac.uk
4	Prof. Diana Laurillard	17th July 2006	University of London Chair of Learning with Digital Techs. Email: D.Laurillard@ioe.ac.uk Tel: 44 2077632162
5	Tony Churchill	2nd Aug. 2006	University of Leicester Educational Developer Tel:44 116 223 18 76 E-Mail: tc40@leicester.ac.uk
6	Prof. Gilly Salmon	2nd Aug.2006	University of Leicester Professor of E-learning & Learning Technologies Tel: 34 966 8649 78 E-Mail: gilly.salmon@le.ac.uk
7	Prof. Don Passey	3rd Aug. 2006	Lancaster University Department of Educational Research E-mail: d.passey@lancaster.ac.uk Tel: 44 212 221 75 62
8	Dr. David Gray	5th Oct.2006	University of Surrey Head of Executive Programs School of Management GUZ 7XH Tel: 44 1483689754 E-Mail: D.E.Gray@surrey.ac.uk
9	Prof. Lawrence Hamburg	16th Oct.2006	The Higher Education Academy Assistant Director Mobile: 44 7917348237
10	Andreas Meiszner	27th Oct. 2006	Open University Institute of Education Technologies Walton Hall, Milton Keyes MK7 6AA, UK Email- andreasmeiszner@gmail.com Tel: 49 4040109982

Address List of Interviewed Experts- USA

No	Name	Date Interviewed	University
1	Prof. Lauren Cifuentes	7th Sept-06	Texas A&M University School Of Education Phone: (979)845-7806 Email: laurenc@tamu.edu
2	Prof. David Whale	25th Aug-06	Central Michigan University School of Education E-Mail: whale1de@cmich.edu 989.774.7167
3	Dr. Gary Bitter	13 th Sept-06	Arizona State University Technology Based Learning & Research E-Mail: bitter@asu.edu Tel: 480 946 7269
4	Prof. M. Wronkovich	23rd Aug -06	Ashland University School of Education mwronkovich@aol.com
5	Brain Newberry	25 th Sept-06	California State University, San Bernardino. Tel: 909 537 7630
6	Prof. Betty Hubschman	25th Aug-06	Florida International University Adult Education/HR Development bhubschman@mail.barry.edu 305-899-3724
7	Prof. Theresa Franklin	28th Aug-06	Ohio University Educational Studies Tel: 740.593.4561 E-mail: franklit@ohio.edu
8	Prof. Mike Rogers	7th Sept-06	University of Georgia Associate Director michael.rogers@usg.edu 770/979-6721
9	Prof. Roger Dannenberg	20 th Sept- 06	Carnegie Mellon University School of Computer Science Tel: 412 268 38 27
10	Prof. Anne M. Hoag	29 th Sept-06	The Pennsylvania State University Associate Dean for Undergraduate Education and Outreach College of Communications http://annehoag.com Tel: 814 863 05 26

APPENDIX- II
Interview Questions

Que1 **Q1. Policy & Strategy**

a. In your professional view what is e-learning?
b. Which forms do e-learning products take (e.g. Distance learning, 100% web-based, blended, etc)?
c. How will you describe the content of current e-learning across HEs in your country (e.g. Part of studies, Supplement to a course, continuing education courses etc)?
d. Are such programmes oriented towards local or international markets?
e. What is the main philosophy or strategy behind e-learning in your country?
f. What are the current emerging trends in relation to the use of e-learning in HEs in your country?

Que2 **Q2. E-Learning Technologies/Tools**

a. Which are the prevalent e-learning technologies/tools in use in HEs in your country at the moment?
b. Which ones do you anticipate in the next 5 years?

Que3 **Q3. Technology Applications**

a. In which specific ways are these technologies /tools applied?
b. Do you envisage a change in the trend of applications in the next 5 years?

Que4 **Q4. Didactical Approach**

a. Do the existing e-learning products make use of a uniform didactical approach(s)? What are some of the approaches being employed?
b. Do you think such didactical approaches fit into the educational philosophies of other countries?

Que5 **Q5. Impact**

a. To what extent has e- learning become part off and improved capacity in the last 5 years (i.e. On the delivery of HE education nationally & internationally, Role of faculty members, Student learning outcomes)?
b. What do you anticipate in the next 5 years?

Que6 **Q6. Limiting Factors**

a. Which factors are currently hindering the effective use of e-learning by HEs institutions in your country to meet national and international educational needs?
b. Which strategic options are available for overcoming these obstacles in the coming 5 years?

Que7 **Q7. Future trends**

a. What do you think the future (next 5 years) will look like for e-learning?
b. What are the implications for international knowledge transfer?

APPEXDIX III
FREQUENCY OF CODE

Code -ID	Position	Parent Code	Code	All Coded Segments	Creation Date
2	1		Q1Policy and Strategy	0	05.01.2007
1	8		Q2 E-learning Technologies/Tools	0	05.01.2007
11	11		Q3 Technology Applications	0	05.01.2007
12	14		Q4 Didactical Approach	0	05.01.2007
13	17		Q5 Impact	0	05.01.2007
18	20		Q6 Limiting factors	0	05.01.2007
21	23		Q7 Future trends	0	05.01.2007
28	26		Q8. Extra Input	11	08.01.2007
3	2	Q1Policy and Strategy	a.e-learning definition	30	05.01.2007
4	3	Q1Policy and Strategy	b. e-learning products	30	05.01.2007
5	4	Q1Policy and Strategy	c. current content	30	05.01.2007
6	5	Q1Policy and Strategy	d. local or international market orientation	30	05.01.2007
7	6	Q1Policy and Strategy	e. main philosophy or strategy	30	05.01.2007
8	7	Q1Policy and Strategy	f. current emerging trends	30	05.01.2007
10	9	Q2 E-learning Technologies/Tools	a. prevalent e-learning technologies/tools	30	05.01.2007
29	10	Q2 E-learning Technologies/Tools	b. anticipation in next 5 years	30	10.01.2007
15	12	Q3 Technology Applications	a. specific ways	30	05.01.2007
16	13	Q3 Technology Applications	b.change in trend in next 5 years	30	05.01.2007
26	15	Q4 Didactical Approach	a. approaches employed/uniformity	30	06.01.2007
25	16	Q4 Didactical Approach	b. fit into other educational philosophies	30	06.01.2007
27	18	Q5 Impact	a. positive impact	30	08.01.2007
17	19	Q5 Impact	b. anticipation in next 5 years	30	05.01.2007
19	21	Q6 Limiting factors	a. current hindering factors	30	05.01.2007
20	22	Q6 Limiting factors	b. overcoming strategies in next 5 years	30	05.01.2007
22	24	Q7 Future trends	a. next 5 years anticipation	30	05.01.2007
23	25	Q7 Future trends	b. international knowledge transfer	30	05.01.2007

ATTRIBUTES OF CODED SEGMENTS

Textgroup	Textname	Creation Date	Number of Coded Segments
U.S Interviews	A1	05.01.2007 22:41	18
U.S Interviews	A2	05.01.2007 22:41	18
U.S Interviews	A3	05.01.2007 22:42	19
U.S Interviews	A4	05.01.2007 22:42	18
U.S Interviews	A5	05.01.2007 22:43	19
U.S Interviews	A6	05.01.2007 22:43	19
U.S Interviews	A7	05.01.2007 22:43	18
U.S Interviews	A8	05.01.2007 22:44	19
U.S Interviews	A9	05.01.2007 22:45	18
U.S Interviews	A10	05.01.2007 22:45	19
Germany Interviews	G 2	05.01.2007 23:09	18
Germany Interviews	G 4	05.01.2007 23:10	19
Germany Interviews	G 5	05.01.2007 23:10	19
Germany Interviews	G 8	05.01.2007 23:10	19
Germany Interviews	G1	05.01.2007 23:09	18
Germany Interviews	G10	05.01.2007 23:11	18
Germany Interviews	G3	22.01.2007 12:50	18
Germany Interviews	G6	05.01.2007 23:10	19
Germany Interviews	G7	05.01.2007 23:10	18
Germany Interviews	G9	05.01.2007 23:11	18
U.K Interviews	U 6	05.01.2007 23:08	18
U.K Interviews	U1	05.01.2007 22:52	18
U.K Interviews	U10	05.01.2007 23:08	18
U.K Interviews	U2	05.01.2007 22:52	18
U.K Interviews	U3	05.01.2007 22:53	18
U.K Interviews	U4	05.01.2007 23:01	18
U.K Interviews	U5	05.01.2007 23:02	18
U.K Interviews	U7	05.01.2007 23:02	19
U.K Interviews	U8	05.01.2007 23:08	18
U.K Interviews	U9	05.01.2007 23:08	19

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