Introduction

The concept of the Virtual Organisation arose around 10–15 years ago. The topic of virtual organization brings together theories about the nature of work in the information age, the organization of social behavior, and the role technology plays in the evolution of social structures. Authors such as Goldman, Nagel, and Preiss (1995) and Davidow and Malone (1992) argue that virtual corporations are here to stay.

With information processing and telecommunications networks continuing to expand, corporations that use these technologies to their full potential will succeed, and in the process raise the standard for competition higher than traditional forms of organization can achieve. Virtual corporations are motivated by the economic realities of the information revolution to organize their patterns of relationships around goals or interests that complement those held by other actors regardless of location.

Than a new concept came about Information processing which is a value-added activity, which means corporations can profit by making virtual organization possible and profitable for others as well as themselves. Davidow and Malone (1992: 38) provide the example of American Airlines’ SABRE reservation system. SABRE makes money for American by providing more information about its customers to members and by giving customers faster response and more choices.

In virtual organization, the work needed to meet a given goal is divided between various other entities based on the perceived competencies of the other actors involved. The information processing made possible by computer microprocessors can be a core competency, and the ability to access information from anywhere via computer networks makes many non-proximate others available for partnerships.

Davidow and Malone (1992: 7-8) describe the distinguishing characteristics of a virtual corporation as a focus on change, being customer-driven and managed, and the presence of highly skilled
workers working in a collaborative climate. Virtual corporations succeed when they develop relationships with their clients that last three to four product generations and include a broad variety of services related to a product.

Goldman et al. (1995: 87) agree with these characteristics and build on them, proposing a structure defined by the alliance of distinct core competencies distributed among discrete entities. To be successful, argue Goldman et al. (1995), each firm must focus on achieving world-class excellence in one area. Market success follows from opportunistic alliances with other firms to design, manufacture and market a product in a given niche. By building a virtual web (Goldman et al., 1995: 221) of relationships with other corporations, including competitors, suppliers, and clients, a corporation enables itself to efficiently and effectively pull together the resources needed to develop and deliver profitable solutions to client problems.

By integrating their complementary core competencies, virtual corporations can reap the benefits of interdependence - reduced overhead, increased profits, greater commitment from members and customers, an increased array of opportunities for future collaborations (Goldman et al., 1995; Davidow and Malone, 1992).

In their books, Goldman et al. (1995) and Davidow and Malone (1992) alternate between the terms virtual corporation and virtual organization, using both to refer to an entity.

However, by describing virtual organization as a noun these authors reify the idea of the virtual organization as object at the same time that they define it as a corporate entity nested in a continually shifting pattern of cooperative relationships that swiftly capitalizes on opportunities for new products and services. Instead of reifying the pattern’s participants as the constructs of interest, the focus should be on the processes that make the patterns possible and change them over time. The theoretical focus of this paper, therefore, is on relationships rather than the entities in relationships. The patterns of relationships are not the outcomes of individual characteristics but evidence of the processes by which corporate and individual success is achieved and maintained.
To move beyond description to explanation, the focus of research on virtual organization must shift from the static entities called virtual organizations to the fluid process through which positive outcomes are achieved.

The strong motivation for the formation of VO’s in industry is the need to reduce costs – this was the driving factor that saw the drive towards collaborations in Western Australia. The economic idea is that costs can be saved if partners with complementary expertise work together towards some common objective. In particular, the infrastructure costs of a group of small units are likely to be much lower in total than the corresponding cost to a large organisation.

**Virtual Organization**

**The Virtual University**

- A **virtual university** provides higher education programs through electronic media, typically the internet some are bricks-and-mortar institutions that provide online learning as part of their extended university courses while others provide courses only online. They are regarded as a form of distance education.

- The infrastructure of the virtual university which is on the Internet is the technology that makes possible telelearning, telebanking, telereporting, teleshopping and telemedicine without leaving one's home.

- Distance from any place is no longer a limiting factor. It does not matter where the university is physically located and learners in any country can as easily access courses from the global virtual university as they can from their neighborhood university. In fact
as Internet access increases, for people who are housebound, in hospitals or at work or are travelling, it offers an invaluable alternative access to educational opportunities.

• Courses designed for distance education in this century were based on print technology and conventional postal systems. They have the same faculties, curricula and value systems as a virtual university as they have as a conventional university.
• In the case of national universities, what constitutes a degree programme, who can teach and how, is legally defined by the country that supports the university through taxation.
• Curricula were set in stone and it took years to bring in changes. Inevitably, national universities as virtual universities promulgate the national culture.
• This was acceptable and successful in the industrial age. But in the knowledge society, it creates problems for global education that is multilingual and multicultural in the future.
• What distinguishes a virtual university is that it uses the Internet that allows mass as well as individualized educational opportunities. But it is more complex than that.
• The Internet is a strangely dynamic environment that changes the nature of access to knowledge and hence the very nature of higher education.
• Knowledge is no longer based on the scientific paradigm, fixed and an end in itself. We need to learn how to process new 'knowledges' from multsource, in dynamic ecological infrastructures and environments.
• The challenge is to design the kind of university will be needed for skills that are yet to emerge, such as addressing global issues of environmental degradation, pandemics, biotechnology and genetic modification Virtual universities on the Internet opens up choice in content as well as learning styles, and provided there is access to the Internet, equity of opportunity becomes an achievable ideal.
• Costs have always been a determinant to access to technology. An education system is said to be efficient when an optimum balance is found between minimizing the costs and maximizing the effects/quality. This is distance education that uses future online technologies, because of its reach and the ensuing reduction in unit cost. The same transmission technologies can reach one or two students or hundreds or thousands. Significant studies on costs of conventional universities and virtual universities have been conducted by Researchers (Rumble, 1997; turoff, 1996; butcher and Roberts, 2004).

• Their conclusion is that virtual universities using ICTs are significantly less costly than conventional building-based universities, and as the cost of technology falls, it is suggested that virtual universities will become even more affordable.

• We are only at the beginning of technological transformations on the Internet and indications are that as new clusters of technology such as Hyper Reality become available, a global virtual university will emerge that would serve not only the English speaking world, but will be multilingual.

• Online education, virtual education is essentially learner-centered. Perhaps the professional group that faces the greatest challenge in this new education environment are teachers. No longer is the teacher the sole repository of knowledge; no longer is he or she the sage on stage.

• As education becomes virtual, learner-centred and available anywhere, anytime, teachers would need to change their roles and become instructional designers, knowledge brokers, knowledge navigators and knowledge mappers assisting learners to apply dynamic knowledge to solve real life problems, which increasingly are becoming global in nature. Learning becomes a collaborative activity between teachers and learners and the nature of knowledge itself negotiable.
• The virtual university will prepare people for global skills that they will need in the 21st century. Skills in instructional design are critical to facilitate instruction on the Internet. Teacher retraining will become critical.

• Whereas conventional universities are geared to the study of what is known and what is knowable, virtual universities address the unknowable in order to prepare people who can shape the future. For example it will address intercultural communications, teletranslation for multilingual learning, e-commerce, disaster communications, management, Internet education and issues of globalization itself.

• Global virtual universities reflect a new paradigm of higher education and so they will need to foster a strong research culture. Methodologically it will be orientated toward action research and futures scenarios and encourage international and multicultural team research approaches to explore issues from multiple perspectives.

Why become virtual?
Winston Churchill observed that 'future empires will be empires of the mind' implying the centrality of knowledge. Universities are assuming virtual dimensions to respond to a set of real world global issues in the dawn of the 21st century. The pressures of rising enrollments and increasing fiscal constraints, and the inability of currently designed university systems to address the increasing bifurcation of society into the information rich and information poor are significant impetus for universities to go virtual.

• The increase in the number of tertiary students in most countries is in part because more school leavers are going on to further
education but it is also due to the growing number of adults and particularly women returning to the educational system.

- Home to nearly half the world's students, the demand for higher education in Asia is rising in proportion to living standards. According to IDP Education Australia, this number is predicted to rise from 17 million in 1995 to 87 million by 2020 especially in China and India. The modern university cannot cope.

- China will be unable to supply the 20 million university places required to meet the needs of its growing economy, and by 2015 India will struggle to supply 9 million places that will be needed. Therefore e-learning solutions are gaining popularity (ROWE 2003).

- The population of India has grown from 300 million in 1950 to a billion mark in 2000. The demand for university education has far surpassed the capacity of traditional state funded universities, and availability has been largely confined to the urban areas. Yet, only 7% of the eligible population enrolls for graduate level study as compared with 50% in the developed countries (Gupta 2003).

- The reasons are similar to those that gave rise to distance education as a viable mode of learning in the 1950s and 60s, the inability to physically attend universities because of distance, transportation costs, gender discrimination and equity where education was not regarded as desirable for women and girls.

- Malaysia's UNITAR (Malaysia) which is the region's first virtual university was created in 1998 is seen as the key to turn Malaysia into a fully industrialized country by 2020 (Retrieved 14 April 2004). Courses and programmes in UNITAR are fully recognized by the Ministry of Education and its students are eligible for loans. UNITAR recognizes the need for a 'campus', echoing the importance of social aspects of education, and are currently working on this.
• Indonesia's first virtual university, Bankit University Teledukasi (IBUTeledukasi) began enrolling students in 2001 (See further information online: IBUTeledukasi Indonesia).

• The African Virtual University, an online university funded by the World Bank began operating in 1997 and now has 31 learning centers at partner universities in 17 African countries. In 2003, 23,000 Africans were enrolled in courses such as journalism, languages and accounting, and the goal for the next five years is to expand the network to 150 learning centers in 50 countries, offering four-year degree courses in computer science and business studies available in 2004. (Retrieved 20 April 2004)).

• Furthermore, the United Nations launched the Global Virtual University of the United Nations University (GVU) in 2003, an online school that will focus on sustainable development and the needs of the developing world. Comprising of a network of universities, including some from Ghana, Uganda and South Africa it will be headed by the UN Environmental Programme with Norway's Adger University as the core partner, and will offer common diplomas and joint degrees (Retrieved 20 April 2004).

• Similarly, The Commonwealth of Learning that embraces 54 mainly developing countries is currently working on developing The Virtual University of the Small States of the Commonwealth.

• The modern university developed in response to the requirements of the industrial society and was enabled by the railways. The virtual university is emerging in response to the needs of the knowledge society and is enabled by the Internet, the communication tool of globalization.

• Traditionally, universities were considered repositories of knowledge where learners, teachers and researchers were committed to academic enquiry for the creation and application of knowledge.

• Networks of scholars serving national economies, universities were embedded in the prevailing paradigm of social ecological realities,
and generally, were elitist, based on national needs and heavily subsidized by governments through taxation.

• To survive in a fast changing future, all societies face massive demand for lifelong learning especially at tertiary level. As knowledge becomes capital in a knowledge society complementing or replacing land and labour as units of exchange in the industrial society, universities are re-inventing themselves, and with the commodification and commercialization of knowledge on the Internet, face new challenges as trade in higher education services becomes a significantly profitable industry according to WTO's GATS (General Agreement on Trade Services) that includes education as a service industry.

• Businesses seek to build on their traditional objectives of making products and profits, and rapid advances in information and communications technology have demanded intrinsic changes in how organizations operate, their values, paradigms and their core business.

• The core business of universities is the creation, dissemination and application of knowledge to domains of enquiry, (problems) remains the universals of a university, and is key to improving performance and productivity and the attainment of social justice.

• The challenge is that at the same time, the university finds itself competing in a free global market in the education business.

• The idea of a market where teachers and learners can trade is not new. It is the medium in which it takes place that is new.

• All education since time began is in the neo-Vygotskyian sense, the simple interaction between teacher, learner, knowledge and problem and are basic components of any university paradigm no matter the episteme or country.

Universities as Communications Systems
A Virtual Roundtable (2000) involving four experts in the field including Jaron Lanier concluded that the e-learning revolution 'is not about computers; it's about communication. Where there is intergenerational discourse' (Training 2000, pp. 64, 66).

Communications systems are concerned with the storage of information over time, the transmission of information over space, and the processing of information to create new knowledge (Tiffin and Rajasingham, 1995).

In the university context, these functions translate into the role of libraries and in the heads of teachers as repositories of knowledge, and the transmission technology/media in a classroom to disseminate new knowledge as teachers help learners to apply knowledge to problems. How are these functions carried out in virtual universities? This article looks at some differences between how conventional universities and virtual universities will maintain their core business with integrity in the future.

**Creating Knowledge**

The creation of knowledge is the *raison d’etre* of universities as institutions engaged in research. In these postmodern times and liberal economies, applied research with tangible measurable outputs funded by industry and hence tagged are favoured by cash-strapped modern universities, over basic research as a process of enquiry and search for new knowledge with less tangible outcomes.

**How do universities foster research environments to add to the corpus of world knowledge?**

University research today is increasingly being commercialized. Postgraduate students are a source of cheap labour for industry and business, and universities that are government subsidized can undercut
research institutes. In a highly competitive environment where universities compete with each other for students and enrolment-based research funding, and as government subsidies diminish, for universities short of resources, external commercial funding of research becomes attractive. However, the more research is commercially funded, the more it ceases to be a public good, open to critique and scrutiny that legitimizes research.

**What is knowledge in a university?**

Is it what is in the library, in a department, in a course of study, or in the head of an academic? Knowledge resides in all these. In the first universities in Greece and India, people sought knowledge with the guidance of teachers. In the medieval theology-based university, knowledge was divine and ultimately unknowable and one tried to understand it with the help of teachers and books. In the modern university based on scientific rationalism, knowledge becomes discoverable, quantifiable and formulaic and something that can be purchased or captured. The idea of 'knowledge capture' appears to have its roots in 'expert systems', computer programs which can be used to respond to a domain of problems by mimicking human experts. While explicit knowledge in the form of texts, films, paintings or music manuscripts lends itself to be captured and managed as knowledge management courses and software are introduced. Where academics are engaged in the creation of new knowledge that is implicit as it gestates in their heads, it is proving to be fuzzier and more elusive than first imagined. Super expert knowledge machines are yet to emerge (Tiffin and Rajasingham 2003).

Knowledge is always abstract whereas problems to be solved in real life are concrete. Furthermore, in an interconnected, multicultural and multilingual world, new kinds of 'knowledges' emerge as societies seek solutions to problems from their own cultural milieus. To remain sustainable and relevant, the future virtual university must respond appropriately.
Preserving knowledge

The Library as the repository of knowledge has always been regarded as the engine of the university. The first real evidence of something that could be regarded as a university comes from what we know from the later writings of the school Pythagoras founded at Crotona in Southern Italy in 518BC and from the Pythagoreans we can trace a continuous tradition of Greek scholarship that lasted up to the final sacking of the great library of Alexandria in AD640 (Dewdney, 1999). A gap known as the Dark Age of between four and five centuries ensued before the first medieval university.

The library of Alexandria may have held up to 700,000 texts in the form of papyrus rolls and here in one place was the accumulated written knowledge of the ancient civilizations of the Mediterranean and the Near East, and the best minds of the day and those seeking answers to the great problems of geography, mathematics, science and philosophy were drawn to it. Teachers and students from all over the known world travelled to Alexandria because that was where knowledge was. As the production of information/knowledge grows exponentially, so does the cost of printed texts and its storage space. Consequently, university libraries are increasingly turning to electronic storage-databases, CD-ROMs, and access.

Now we have the World Wide Web, the world's largest library ever known, available to anyone with Internet access. With the advances in multimedia, virtual reality, Hyper Reality, artificial intelligence and so on, the WWW has the potential to solve library access problems of the developed and developing world. However the Web as a chaotic, if democratic tool has its own set of problems because it was not specifically designed to be a university library. It is growing so vast as a giant, indiscriminate hyper textual dump that searching it and evaluating what is found becomes increasingly difficult. Herein lies a major challenge for teachers in a virtual university as they move from being sage on stage to guides and information mappers.
Processing and transmitting knowledge

This involves the teaching/learning axis, where from a neo-Vygotskyian perspective, teachers help learners to apply knowledge to problems in culturally appropriate ways. Most of all, university teachers teach students how to critique and learn, and students learn to learn. A communications activity, the processing of information into knowledge that can be applied is enabled by communications and information technologies. In the modern university, teachers and learners came together using transport and building technologies, the infrastructure of the industrial society. In the future, universities would need to use the Internet, the defining infrastructure of the emerging knowledge society for this process.

As the Internet further disseminates the sources of production and distribution of knowledge allowing global connectivity, education on the Internet will by definition be virtual and global in scope, not to replace the modern university, but will provide an alternative, complementary learning space for lifelong learning opportunities.

Socialization is a critical part of education and at universities it requires a high order of socialization where communication and collaboration between teacher and learner, as well as between learners is critical to become aware of other ways of seeing, and not insist on our own single-minded ways of perceiving (Tehranian, 1996). The socialization that takes place in a multimediated environment of a classroom is not easily replicated in a virtual class because technology for communication using all five senses is yet to emerge.

What are the antecedents of the virtual university?

1. The Virtual Class

- Roxanne Hiltz coined the term 'virtual classroom’ for the use of computer generated communications 'to create an electronic
an analogue of the communications forms that usually occur in a classroom including discussion as well as lectures and tests' (Hiltz, 1986, p.95).

- In a long-term action research programme which began in 1986 to conduct what we called a virtual class where students communicated with computers linked by telecommunications.

- We used the term 'class' in the sense of an interactive instructional communication function between teachers and students and between students and the term 'virtual' in the sense of existing in effect, but not in fact, and hypothesized that learning could be effected by means of computers interlinked by telecommunications without the physical facts of classrooms, schools, colleges and universities.

- We assumed that education delivered in this way would not be analogous to conventional educational practice, but would be modified by the new information technology and take new forms and that in time this would include fully immersive computer-generated virtual realities.

- A class need not necessarily be synchronous and the people in it form a virtual network independent of place (Tiffin and Rajasingham, 1995).

- The virtual class is the core system of a virtual university where teachers and learners communicate using ICTs to replicate the communications functions of a conventional class.

- In the 1990s the Internet enabled the virtual class, but in the next decades, we can expect to see new and more sophisticated clusters and new generations of technologies that are emerging, such as Hyper Reality.

- This will allow text and place-based universities and virtual universities to function in tandem allowing the creation and application of new knowledges using text, aural and three-dimensional modes appropriate to the new multilocal cultural ecologies. We are looking at a paradigm shift.
• Blagovest Sendov (1986) suggested that our basic problem is "not how to introduce computers into education, but how to build education in the presence of the computer”.

• The conventional classroom is a multimediated environment where learning occurs through all five senses, but primarily through writing and speech.

• However, at this time of the society of the 'spectacle' where our agendas are increasingly set electronically by television, the Internet and the World Wide Web, the processing of images and making semantic sense of visuals that we are increasingly being bombarded with become critical skills.

2. A Hyper Class (HC)

• The Hyper Class is based on Hyper Reality (HR) a technological platform developed by Nobiyoshi Terashima (1996). Hyper Reality intermeshes physical reality and virtual reality allowing people who are physically present in different places to meet as telepresents to work together on a common task.

• Terashima’s idea is a spatio-temporal field of communication that makes connection not only between the real and virtual, but also between artificial intelligence (AI) and human intelligence. This foreshadows the potential use of AI in education, for example, avatars as just in time tutors (JITAITS) suggested by Tiffin and Rajasingham (2001).

• An important concept in a HC is a coaction field conceptualised by Terashima (2001, pp. 9-12) where students and teachers in a conventional classroom can synchronously interact for the purpose of learning with students and teachers in other universities, possibly in other countries.

• The Hyper Class is where real and virtual dimensions of students and teachers intersect on the monitor providing a common field to reconcile the learning that is local with learning that is global in order to understand the subject from multiple perspectives of other
cultures than one’s own (Tiffin and Rajasingham, 2001, pp. 110-125).

- A Hyper Class is a natural seamless inter-relating of virtual people, virtual objects and virtual settings with real people, real objects and in real settings.
- The Hyper Class will address the cultural aspects of learning as groups of people interact at a cognitive level, modelling and modifying learning objects in three dimensions via information technology from their own physical reality, instead of as in virtual reality, having to work with learning objects created and embodying the cultural perspectives of the creators.
- Terashima (Email, 12 June 2004) is developing a Windows version of the HyperReality platform that easily exists on a PC sometime in the next decade. Like Hugh Lofting's Push Me Pull You in the animal menagerie of Dr Seuss, we will be challenged by this technology that will confront us and not go away.

**Examples of Virtual Universities.**

1. **UNESCO Virtual University.**
2. NALANDA Virtual University
Nalanda Virtual University

Courses

- Chandrayaan - 1
  - India's first mission to the moon
  - Includes a rich heritage of knowledge
  - Names of the Revered Rishis of India

Nalanda University

By: Gurjot Kaur

PGDM

IGSM