Comparison Classical Method of Education and Modern Web-Based Distance Learning System (WBDLS)

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ABSTRACT

This paper will describe the classic and virtual educational methods. This contrast requires implemented samples therefore, the advantages and disadvantages of general methods are taken into consideration.

The field of E-learning, and particularly of instructional design, now has a good history of creating innovative technology-based learning resources through the application of principled development methods. These methods have evolved over half a century or more looking to the roots of instructional design in the wartime work of people. In the last decade, the core practices of educational technology have been facing some severe criticism, particularly from those writing under a neo-constructivist banner. These criticisms primarily reflect epistemological and pedagogical doubts. Some neo-constructivists proclaim an epistemological relativism that refuses to give a privileged status to any one way of 'knowing' the world. Some assert that 'knowledge transfer is impossible': pedagogy needs to support the individual construction of meaning.

We argue that educational technology is facing a new kind of challenge, a new area of opportunity. We use the label Web-Based Distance Learning System (WBDL) as shorthand for this area. WBDLS on one reading, must embrace all areas of learning – kindergarten through higher education, informal learning in the community, home or workplace, training courses in industry, adult education courses, and so on. The term may seem unhelpful, but it does emphasize the need for what might be called collaborative approaches to education which identify and systematically remove damaging discontinuities between different phases or settings for learning.

INTRODUCTION

In the fast changing and strongly competitive business environment we live, a confluence of factors such as the economic globalization and integration, the impact of technological developments, the growing demo for sustainable development and the emerging work systems are having a strong impact on organizations, on society and on individuals.

Advances in Information Technologies (IT) are now one of the major driving forces

of change. IT is essential for competitiveness of other economic sectors, and the basis for trade, services delivery, production, transport, education and entertainment [1]. Information technology is transforming organizations into global networked structures with processes extended through continents creating markets, systems and new perspectives.

The fast evolution of IT is creating huge opportunities, and simultaneously, challenges to organizations and society. Organizations try to respond to the challenges by adapting their strategies and activities and restructuring to align themselves to the new requirements of the changing economy. Information Technologies support distributed systems, computer supported cooperative work, electronic commerce, electronic business, electronic procurement, teleportation, virtual manufacturing, concurrent engineering, and forms of distance education.

Web-based distance education seems to be a contribution to democratization of learning access in particular in the domain we are concerned with, the university continuing education and post-graduated education. However, the new approaches to learning are still at an immature stage. Although some of these approaches exist for several years, there is not yet a clear understating of the way they will evolve and become useful and common practice.

WBDL and Virtual University (VU) concepts are an integrated set of independent providers of education that are integrated to respond to an individual's need. Figure 1 shows the factors to consider. Emerging technologies, frameworks, and applications that can support the WBDL and VU models are discussed later and identify the main technologies to implement the concept.
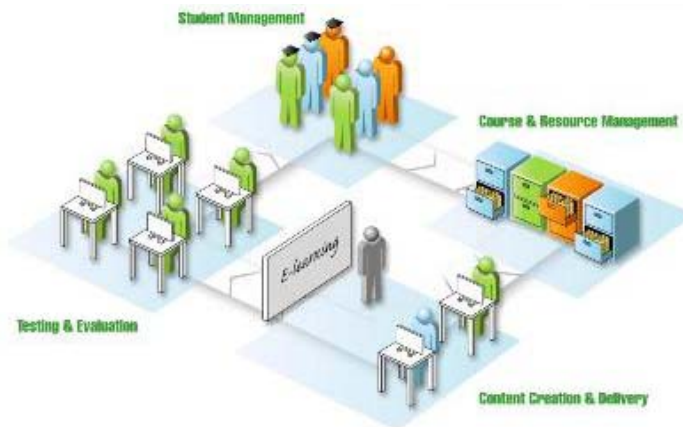

Figure 1 - Classroom – Distance learning Model

HISTORY OF MODERN EDUCATIONAL SYSTEMS (DISTANCE LEARNING)

The birth and development of the electronic educational systems:
- Late 1960's – Digital storage of the first experimental text in computer
- Early 1970's – Presentation of classical literature in the first electronic book (eBook)
- Early 1980's – Establishment of the first electronic library (e-Library) at Columbia University
- Late 1980's – Publication of 26 volume encyclopedia in electronic form

- Early 1990's – Launching of the first electronic reading device by Sony Corporation
- Early 1990's – First experimental classrooms in University of Michigan
- Mid 1990's – Offering the experimental courses in universities of USA, Europe, and India
- 1996 – Offering the first web-based courses
- 1997 – Creation of the Virtual University
- 1999 – Coexistence of the traditional and modern virtual educational systems

FACTORS THAT ACCELERATE THE GROWTH OF DISTANCE LEARNING CAN BE CATEGORIZED AS FOLLOWS:

- Development of communication systems' infrastructure
- Reduction of the price of computers from $100 to $10 during the 1970's to late 1990's
- Increase of the processing speed of computers from $1 to $100 during 1960's to late 1990's
- Emergence of graphical Internet and Worldwide Web (www)
- Development of protocols for hypertexts and hypermedia

GROWTH OF THE NUMBER OF COMPUTER USERS

The number of computer users had a growth rate as shown in the following table, including an estimate for 2005: [1]
- 1993: 13 million
- 2001: 407 million
- 2003: 650 million
- 2005: 1 billion

EXAMPLES OF INTEGRATED SYSTEMS FOR VIRTUAL LEARNING:

The following universities are examples of the leading edge of high education in future. These institutes are pioneers of a movement of Virtual University. All these institutes have a consensus on a central issue that higher education has to undergo a special evolution before it can properly respond to the needs and progressive challenges on the 21st century.

A new system can be envisioned that comprises the following integrated educational systems:

- California Virtual Campus, California State University
- Cardean University
- DeVry University
- Michigan Virtual University
- Object J (software)
- Online National Technological University
- Online University of America
- Southern Regional Education Board, Electronics Campus
- University of Missouri - Kansas City
- Uportal (sharable portal)

- Virtual Media Lab, London University
- Virtual University of Michigan and Virtual Lab
- WebCT
- Western Governors University
- Wollongong University

The methodology of Virtual University dates back 30 years when it was a static system for scientific papers and document exchange. The asymmetric form of distance learning (unidirectional presentation of educational texts as developed in the Cleveland Institute of Electronics) has a 30 year record [2].

Virtual Universities are often formed on the basis of research grants. The unique characteristics of these universities are:

- Utilizing a wide spectrum of communication facilities for teaching and learning
- Hypertext functionality that allows logical connection of the various parts of a text and adds to effectiveness of education.
- Capability and capacity for concurrent and simultaneous access on a global scale.

In Iran's Payam Noor University and Tehran University some steps toward the statically on-line mode of presentation has been made. University of Power and Water already has some modern and superior systems and facilities for distance learning.

Due to the following factors, it can be forecasted that WBDL will rise to a new higher position that attracts particular attention of the public and the authorities:

- dramatic rise in expectations and demand for learning and in particular, higher learning
- limitations of facilities and resources,
- the young generation that forms the dominant part of the population,

A REVIEW OF THE GLOBAL EMERGENCE OF DISTANCE LEARNING SYSTEMS

- Introduction of internet-based courses in existing universities as add-on or complements to the current courses
- More than 400 universities have established the WBDL
- Phoenix University has 92,000 students
- Tamil University in India

EXAMPLES OF ON-LINE EDUCATION

In July 1996 the University of Missouri-Kansas City started its Virtual University project with particular attention to the academic activities via remote communications and computer science. The objective of the project was to build the necessary infrastructure and basis for education but the members of the faculty utilized it for the lectures, presentations, and exercises, and defined it as a compulsory course for all.

- Internet allows for real-time participation as an active member

- Internet is not only a new media that allows a large number of internal interactions but also integrates all other forms of media in a single multimedia
- At the end of 1995, more than 9.5 million Americans had the Internet connectivity, showing a 100% increase over the same figure for 1994. State governments promoted the information networks, many libraries had internet access, and the cost of internet services decreased [3].

EXAMPLES OF VIRTUAL UNIVERSITY

Associated University, the virtual university of the Michigan State University (MSU) was created in 1998 with the following branches:

- Chemical Engineering
- Computer Design
- Law-enforcement Police
- Management
- Judicial Law
- Microbiology
- Management of Water Resources
- Physics and Astronomy

Tamil Virtual University (TVU) was created in 1999 with the objective of serving the Tamil communities of the world, and offers the following branches of service and study:

- Tamil Language
- Consultation
- Tamil Culture
- Linguistics

COMPARISONS OF TRADITIONAL AND COMMERCIAL METHODS

In order to evaluate the performance of the Virtual University in comparison with the real universities, advantages and disadvantages should be identified and measured. Figure 2 details performance measures to evaluate. If advantages outweigh the disadvantages then the VU is a plausible solution and worth recommending.

Figure 2 Element of Distance Learning Systems

The educational activities of a virtual university are based on new approaches to teaching and learning. Two key elements for activating a virtual university environment are:

- Ease of communication between student and teacher and ease of communication among the students
- Individual and group activities and projects to meet the educational goals and objectives.

Other factors that influence the activation of virtual university environment include the educational approaches and viewpoints that shape the methods and means of education and the classroom.

Table 1: Educational System

	System Characteristics	Traditional View (19th and 20th centuries)	Modern View
1	Educational Environment (School and University)	Student goes to the school or university	Educational Environment goes to the student
2	Viewpoint on Teaching and Learning	Individual	Social
3	Motive forces of the system	Rules, Regulations and processes	Standards
4	Structure and Organization	Pyramidal and Hierarchical	Distributed Networks
5	Decision-making	Based on existing theories	Based on the accumulated data
6	Strategy	Top-Down	Bottom-Up
7	Methods(Management/education)	Established	Flexible
8	Source of power and survival	Conservatism	Changeability (harmonious with the needs of society)

Table 2: Central and Emphasized Issues

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Basis and Responsibility	Teacher-centered, teacher is responsible	Student-centered, student is responsible
2	Educational Activities Emphasized	Individual's activities	Group activities, collaboration, participation
3	Overall Emphasis on	Internal factors	External factors

Table 3: Duties and inter-relationships of the teachers and learners

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Learner's Duties	Memorizing prepared material	Management of information and generation of new information and skills in search of knowledge
2	Teacher – Student Relationship	Wiseman–Scholar (transfer of droplets of knowledge from teacher to student at a specific time and location)	An all encompassing group for creation of up-to-date information and skills to satisfy the dynamic needs of the society
3	Teacher's Role	Prime and Sole Player who leads all	Presence in the margin and facilitator of the learning process
4	Society's Role (Parents, Organizations,…)	Unstructured interactions about learning	Continuous Interactions towards Education for All Citizens

Table 4: Courses and the contents of each course

	System Characteristics	Traditional View (19th and 20th centuries)	Modern View
1	Volume of the course materials	Limited and selected	Unlimited and various
2	Learners' share in defining the contents	Nil	Can be a lion's share
3	Production of contents	Mass Production (of books…)	Customization for the masses (tailored to each learner)
4	Learning time spans	Compulsory, high-school and university	Learning from birth to death

Table 5: Tests and Examinations

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Nature of Tests	Replication of the course material as a justification for certificates	Tools to measure progress towards the goals
2	Time of Tests	Year-end or Term final exam	Unlimited and continuous
3	Test Results and Grades	Student's grade in examination	Statistical measures of performance in realizing the goals and objectives
4	Tests of Diagnosis	None or unused	Early warning for those who may fail and flunk

Table 6: Technology

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Use of Technology	Traditional automation	Intelligent educational systems
2	Technology's Role	A Detachable element	Convolved into the system and indispensable

Table 7: Industrial Economy

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Principles and foundation	Seller (educational system) is the determinant	Buyer (learner) is the determinant
2	Commodity involved	Certificate of Graduation	Skills, experience, and knowledge that can be produced and developed
3	Outputs of Educational System	Individual's knowledge, added value to the individual	Quantifiable Knowledge and skills of value in the domain of economy

Table 8: Other criteria

	System Characteristics	Traditional View (19th and 20th Centuries)	Modern View
1	Fruit of the educational system	A lifelong work permit for a specific occupation	Necessary knowledge and skills for a specific job at graduation time with provision of multiple changing of job during the life
2	Creativity via accumulated knowledge	Active in industrial society, with normal rewards, capable of fulfilling the pre-defined undertakings	Creative thinking and management of information creation, with the characteristics of the active individuals in a knowledge-based society

ELIMINATION OF THE NEED FOR TEACHER AND STUDENT TO ATTEND THE CLASSROOM

In Virtual University all communications are via the internet which removes the need for the teacher and students to be physically present in the classroom. Connection of the student or teacher to the Internet would suffice and that is possible from any location. This reduces the need for construction and maintenance of expensive buildings and educational complexes [4].

INDEPENDENCE OF CLASSROOM FROM ANY SPECIFIC TIME

A major feature of the Virtual University is the ability for the student to access the course at the time of his/her choosing. This is particularly advantageous for the employed people attempting to further their education during their free time.

COURSES OF HIGHER QUALITIES

The Internet allows the professor's presentation to expand beyond the lecture format allowing an opportunity to introduce many additional parameters that influence the flow of knowledge. Environmental parameters such as temperature and noise can negatively influence the quality of the classroom. Such parameters are non-existent in Virtual University where the courses are prepared by a team of experts and presented via the modern multi-media channels in a favorable mode. A shortcoming of the traditional classroom is that slow students may not catch up with the speed of the classroom without the opportunity for repetition of the program. In Virtual University the learner can repeat the same course as many times as is required for him to learn thoroughly and completely. This is a factor that improves the quality of education [5].

SUPPORTING A VERY LARGE NUMBER OF STUDENTS IN A SINGLE CLASSROOM

The limitations of space in the traditional classroom may prevent students from access to a course. In the virtual university classrooms can accommodate thousands of students simultaneously.

ON-LINE ACCESS TO DIGITAL LIBRARIES

In virtual university, all digital books and periodicals, research papers, theses and papers are safely available to all students in an on-line mode that is very efficient in terms of time and convenience.

Characteristics of Dynamic books and libraries

- Links to additional resource material
- Capabilities for searching words and expressions
- Availability of related pictures, diagrams and other graphical representations
- Integration of teaching, testing, evaluation, and the design of progression steps
- Internet-based interactions between the student and the teacher
- Integrated educational environment with voice and text and notetaking
- Participation in chat-rooms, group discussions, and forums
- Just-in-time availability of references and bibliographical sources
- Availability of icons, displays, glossaries, and dictionaries

ELECTRONIC RESEARCH IN VIRTUAL UNIVERSITIES

A section of the virtual university web site should be allocated to provide an appropriate research facility and provide a listing of faculty research. Links to research questionnaires, results, statistics, research reports, and analytical reports can all be placed in this section. Visitors of the website can conveniently fill-in the questionnaires and study the latest results. An entry point for research applicants can be provided in this section so that whenever the need arises, the questionnaires can be scanned and the right researchers selected.

ADVANTAGES OF ELECTRONIC EDUCATION IN ENGINEERING

Engineers are under great pressures to become familiar with the latest technologies, electronic business, and commerce. MS and PhD students are often unable to attend scheduled classes due to work, commuter travel, and family constraints. Virtual University has greatly solved this problem by moving all their needs to their preferred study space. Major businesses that expand their branches in various cities in different countries are also faced with the problems of training their staff employees in scattered places. Businesses have welcomed the virtual university solution.

COMPONENTS OF THE WEB-BASED DISTANCE LEARNING

The main topics and components of the distance learning are presented as follows:
- Web-based education (CD and DVD are complementary media tools)
- Virtual Events can take place in a virtual classroom

- Consultation, including teacher/student consultations, inter-departmental communications, and exchange of views with others via email
- Simulation and graphical representation of dynamic systems (such as Java Applets) are a significant part of the Virtual University.
- Work-Groups, for collective efforts in solving problems or group discussions in forums
- Evaluation, for initial selection of the students and for skipping the parts that they are already well versed in.
- Electronic Store through which all needed services are reserved and all payments are made.
- Administration of Education is a subsystem for student records, progress, monitors learning environment

DISTANCE LEARNING CLASSES

Like traditional courses the structure of electronic courses consists of various parts often 12 to 15 or even 16 weeks where the instructor details the delivery time for exercises, projects, and final report. Each course has its own web-page whereby the instructor informs the students of the course specifics, lecture texts, exercises, and supplementary audio-visual objects. The functioning of web as a freely accessible archive is an advantage over the classic methods because students can access their desired web-page at any time. For live lectures, group discussions, or conferring with their classmates, they may have to access the system at a predetermined time. Online facilities for delivery of homework, asking questions, and expressing views on subject matter are possible through these courses. Grouping and collaboration has great pedagogical values and greatly helps the students in advancing their understanding of the material [7].

An advantage of electronic learning is the support of learners in the form of access to further information which empowers them to make decisions on the basis of the received information, the educational program, and their own skills and experiences.

Another advantage is the uniformity of presentations in various repetitions of the program. This makes it possible to utilize the knowledge and experience of the best experts for any specific program. The electronic education can be repeated without any limitation [8]. The advantages of distance learning may be classified as:

Modern Methods (Distance Learning)

- Cost Reduction
- Environmental considerations
- Flexibility
- Downsizing of the organization
- Increased power of supervision and management
- Liberation of instructor's time for their further research and studies
- Accessing unlimited data and information sources

Classical Methods

- Statically traditional education

- Overhead and capital costs for buildings, personnel and the support services
- Environmental pollution due to heating, waste disposal
- Greatly oversized organizations and administrative functions
- Shortcomings of supervision, command and control due to lack of proper means and methods
- Very limited accessibility of sources of data and information

It seems that distance learning can be applied to all branches of learning. First, the learner should have access to a computer whereby he can pursue learning in a variety of methods. He can have the CD or DVD for all lectures, and supplementary audio/video presentations, simulations, graphics and animations. An important point to consider is that the students learn from other students. An investigation of applying the distance learning in all branches of scientific studies seems to be a good idea. However we like to present our recommendations only cautiously. Our advice is to utilize electronic learning as one of the components of the total and complete educational system.

Electronic education is a component for providing educational services at a larger scale and lower costs. We believe that the modern and classic methods need to be integrated in order to achieve the following:

- Generalization of learning for all via individuals participation in specialized programs
- Standardization of academic lectures and presentations in a redesign of course materials and criteria
- Consideration for the needs of industry and economy
- Cost reduction in conducting and participating in courses
- Virtual conferences, forums and symposiums
- Participation of large groups of people in educational programs, thereby upgrading the scientific and technological awareness of the population
- Better utilization of computers in education
- Generalization of searching and browsing at electronic speeds

ELECTRONIC EDUCATION IN STRATEGIC INDUSTRIES (OIL, GAS AND POWER)

Consider the oil, gas, and petrochemical industries wherein electronic education is quite feasible. These industries rely significantly on simulations for training and development of specialists for operations and control of industrial complexes [9]. Safety of operation is of prime importance in the power and energy sector. Distance learning, electronic education and simulations can be utilized to upgrade the knowledge and skills of the operators of these industries. Simulations have a distinct advantage whereby no serious damages will occur.

Table 10 – Web-Based Engineering Programs offered in USA

University	Program
Berkeley at California	Computer-based Information Systems, Long-distance communications, eCommerce, Geographical Information Systems
Georgia Tech, Atlanta	Digital Signal Processing, Mechanical Engineering
Kansas State Univ	Software Engineering
Stanford Univ, California	Artificial Intelligence, Fiber Optics, Wireless Communications
Wisconsin University	Engineering Economy

There are serious challenges to distance learning. Technology is changing continuously. Competition is getting tougher each day. Product life cycles are getting shorter and shorter. The time span for marketing and selling a product is also shrinking. Electronic education must adapt quickly to change [10]. Organizations who see electronic education as a measure for cost reduction and fail to motivate their human resources will not be successful.

TOPICS IN EDUCATIONAL CONTENTS

The important complexity that faces virtual university is its dependence on curriculum authors and developers that are members of traditional universities or employees of some private companies. These authors have their own preferences and policies in preparation of curriculum. Some questions that stem from this situation are as follows:

- What is the curriculum of a Virtual University
- What are the differences between the curricula of the virtual and traditional universities?
- How are the modern views on education reflected in the Virtual University curricula, planning, and execution?
- What are the mechanisms that ensure maximum flexibility in educational services and how do they operate?
- How does the Virtual University respond to the challenges of content preparation?

The dependence of Virtual University on the traditional universities and private educational institutions brings about further complexities that can be summarized in the following questions:

- What are the effects of revenues of the virtual university as its main guarantee of survival?

Although many believe in the advantages of modern approaches of distance learning others support the traditional systems of education. Reports have shown no significant difference between these two systems.

- What is the position and role of the virtual university in the discussions and discourses about quality of technology-based education?
- To what extent is the concept of distributed learning valid and reliable?

The Virtual University insists on the quality of education which places Virtual University in a competitive position among traditional education. Any factor that undermines the quality of education in the eyes of the students can eventually disrupt the virtual university.

- What are the technical standards of the virtual university?
- What are the educational standards of the virtual university?

CONCLUSION

Virtual university can be considered as a first real and serious response to the rising costs of higher education.

- Can the virtual universities realize the hopes for cost reduction in higher education?
  - o Despite the very attractive financial calculations that support the virtual university on paper, many more reliable information, statistics documents and proofs are needed to witness and support the profitability of distributed learning in mass scales.
- How can a virtual university prepare a financial strategy to guarantee its continued operation?
  - o The importance of this question is more visible for a viable virtual university that is not born from and fed by a traditional university.
- Can a combination of the academic curricula and the offerings of the private institution be considered as a successful model for the operation of a profitable Virtual University?

Virtual universities are seeking sources and companies that can reinforce the university in various dimensions. Virtual universities seek joint ventures with publishers of the online books, companies in Information and Communication technology, and private sector companies active in education.

- Can such joint ventures and associations with the private sector strengthen the educational goals and objectives of the Virtual University?
- Do such partnerships and ventures give birth to new clusters of companies and educational groups or are they limited and monopolize trade?
- Does the prospect of partnership in such new companies persuade university professors to positively cooperate with the virtual university?

An analysis of the applications of technology in a society can answer the following questions [11]. These are probably the greatest challenges that face the virtual university.

- What parts, levels, and facets of the modern technology should and could be implemented in the virtual university?
- What technologies can be chosen for implementation

- What are the dictations of the technologies that are used by the learners?

A reasonable solution may be the use of a combination of the traditional and modern methods for the first few years so that everyone gets a fair chance to adapt and adjust to the new technologies and different environment that they create.

- What mix of the traditional and modern methods is feasible and optimal?

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