E-LEARNING EVALUATION CRITICISM. THE MULTIDIMENSIONAL DYNAMIC E-LEARNING MODEL.

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ABSTRACT

The e-learning industry in recent years faced a tremendous development. The technological capabilities of modern tool-sets expand from off-line to on-line solutions covering a wide spread of learning needs [1], [2]. Nevertheless the requirements of modern business units seem to diversify from training seminars to corporate learning portals implying a desired reinforcement of capacities for effective actions. Academic institutes such as universities have to adopt their traditional approaches in the modern setting. The e-learning initiative both in corporate and academic environment defines new ways of improving performance.

This paper discusses the experiences from Greek, European and international projects, related to e-learning in Corporate and Academic environment. The objective is to reveal the necessity to formulate dynamic learning environments capable to be customized according to learner needs. The research effort is concentrated in the definition of variables that will enhance the value justification of such systems and will realize the modularity of a value creating e-learning environment.

KEYWORDS

E-learning, Knowledge Management, Corporate Learning Portals, E-learning Pedagogy, Knowledge Management Architectures

INTRODUCTION

The establishment of e-learning systems within business settings or academic institutions is something like fashion. Many models, many different types, many markets, many interest groups, different degrees of satisfaction and many users looking for customized solutions [3]. Unfortunately the e-learning market is not as mature as we would prefer in terms of effective solutions, advanced functionalities and learning standards.

The analysis of the e-learning market in Europe as well as in USA is not only difficult but it has to be based on issues closer to effectiveness than to population increase. In most of cases the virtual universities, the e-learning systems base their functionality on a simple browsing mechanism accompanied with a section of web links and a few on-line quizzes. In other words which is the value of such a system when in most of cases the employment of the ICT's is limited on the print button of browsers.

We could state that these systems secure the growth of the so-called distance-learning marketplace in Europe even though the learner satisfaction from such a system is very limited. A critical question is can we enhance the learner satisfaction on an e-learning system or his first impression will be negative.

The mass of integrated e-learning platforms seems to be unable to support different degrees of value delivery[4]. They seem to construct their powerfulness over common characteristics that in general simulate the traditional way of teaching. So a number of critical questions emerge:

1. Does e-learning differentiates from the traditional learning?
2. Can we define concrete ways of content enrichment in virtual environments, which add value in traditional learning content and support dynamic learning settings?
3. Can we justify theoretical foundations that prove the different value layers of learning efforts?
4. Can we test the ability of learning environments to support different educational goals through the employment of different learning processes?
5. Can we develop learning environments capable of supporting the intellectual capital exploitation both in academic and business environment?
6. Finally but not least, can we formulate a framework that will support the Enterprise Application Integration in a manner that will take into account the learning needs of business units? In other words can we define an application layer within business Intranets that will establish knowledge management architecture?

In this paper we analyze the potential usefulness of common e-learning platforms such as Blackboard and WebCT, and we try to set an evaluation framework for e-learning employment focusing on the demanding issue of dynamic learning environments[5].

Our conclusions are pursuing to reveal the underlying issues at the development of effective learning solutions that in many cases demand the multidisciplinary contribution of proposed methodologies.

PROJECT CASES

Our research unit (eLTRUN, www.heltrun.aueb.gr) in the past three years has participate in the design and development of e-learning systems both in European and International level. Furthermore the willingness of the European Commission to support the expansion of e-learning through specific programs like IST, Leonardo Da Vinchi, Socrates, EUMEDIS, Go digital, eEurope, etc force our research to concentrate on the parameters that secure or promote the effectiveness of e-learning implementations.

In parallel the realization of the need to utilize e-learning solutions gaining experiences from knowledge management theory formulate a two-fold approach: The analysis of e-learning from knowledge management perspective.

For this scope we understand the necessity to research on the linkage between the efficiency of e-learning systems and the capacity of knowledge management mechanisms to provide a core component for e-learning. But even though the capacity of modern systems to manage the knowledge effectively in terms of data management mechanisms we concluded that something more was missing on the puzzle of effectiveness. The analysis, the specification and the formulation of a concrete e-learning pedagogy [6] in terms of learning processes, learning styles, learning modes and learning motivation parameter [7].

The previous work related with our research has to do with various e-learning projects implementation. In the following section we provide a synopsis of the projects as well as the major conclusion from their implementation and pilot run.

The **Teletraining Center of Athens University of Economics and Business** (www.teleduc.aueb.gr) was implemented in order to provide a pilot e-learning system capable to support the delivery of four seminars all over Greece, covering topics such as electronic commerce, statistics and marketing. The technological infrastructure includes servers, digital cameras and three of the most popular e-learning platforms such as WebCT, Lotus Learning Space and Blackboard. At the pilot run of e-learning system a number of students enroll at the section of the e-commerce seminar hosted on the WebCT server.

The first analysis of a survey conducted having as a sample the students of the e-commerce seminar provides useful recommendations:

First of all it was more than clear evident the need to enhance the functionalities of the system with dynamic ways for the construction of learning content. The limitation of the e-learning platform to support students in different modes than sequential browsing of learning modules was a major disadvantage. More over the inability to provide mechanisms that would facilitate the exploration of knowledge according to specific learning needs was pointed out as a learning obstacle.

From teacher's perspective there was a major difficulty at the reconstruction of learning material since there is a limitation in html pages linking. Additionally the content management constraints the creativity and doesn't support flexible learning scenarios. Finally the absence of learning templates or content templates proves a lack of learning orientation for the whole platform of WebCT[8].

The GEM consortium (**Global Master in Electronic Commerce-** http://www.heltrun.aueb.gr/gem) is an international network of business schools sharing a common curriculum in e-commerce at the master's degree level. The global character of the program is ensured through the official cooperation of the best business schools and universities in Europe and North America, all experienced in research and education in e-commerce. The program has received the endorsement of the European Commission and G7's Information Technology group.

The founding members of the GEM consortium include:

- Athens University of Technology and Business, Greece
- Copenhagen Business School, Copenhagen, Denmark
- Erasmus University, Rotterdam School of Management / Faculty of Business, The Netherlands
- Georgia State University, Atlanta, Georgia, United States of America
- Norwegian School of Economics and Business Administration, Bergen, Norway
- University of Cologne, Cologne, Germany

The development of an e-learning facility was considered from the members of the consortium as a vital process of the whole master program and for this reason there was an extensive research on the capabilities of the integrated platforms to support the whole approach. Finally the consortium decide to use the Blackboard as the technological infrastructure for the development of distance courses. The Athens University of Economics and Business undertake to develop the e-technology course for e-commerce master program.

The first semester that the course was delivered provide a number of very useful comments from trainers and professors of the course. The major difficulty of the learners was the inability to find the appropriate learning content according to their previous experiences on the field. The inability of the system to diagnose the learners needs and to deliver the learning content that would cover their needs was pointed out. The sequential linkage of the learning modules was also limited the flexibility of the system. The separate learning modules were provided to the executives' learners through the classical session's method. This approach seemed to be of low value for the learners.

The **MODEL IST (Multimedia for Open and Dynamic Executives Learning)** project is an innovative approach pursuing the development of a dynamic learning environment capable of managing effectively the knowledge in business units.

The MODEL approach is trying to define a new market of knowledge management solutions and tools. We could describe it as a niche market that facilitates the development of competencies and the exploitation of the human capital.

The core competencies in the modern organizations are constructed through vital business processes that in general provide a web of interconnections among people, knowledge resources, customers, tasks and evaluation standards. The major observed problem in the current situation is the absence of knowledge management systems that increase the re-usability of knowledge for training purposes. The executives training is mainly accomplished using executives' seminars and various workshops with reliance on not clearly defined quality standards. Moreover most of business units suffer from their inability to support new hired employees according to the specific characteristic of core business processes and business environment in general. The cost for training a new employee is superlative and increases if we take into account knowledge oriented and not routine business processes. In other words we have an exponential increase for the cost of training or learning when the subject of the training is more value creating. The development of a tool that would be able to manage effectively the required knowledge for the comprehension of knowledge processes is the objective of our research effort. The major research questions derived from our intention include:

- The knowledge delivered on executives training programs is something taken for granted or it incorporates synthesis of well-defined value components?
- Is there a simple learning scenario that best fits to the business process training?
- Can we distinguish learning processes that enhance and facilitate the knowledge delivery on an advanced system for executives training?
- Can we categorize these learning processes on a hierarchical way using a value metric? For example, can we distinguish learning processes on a value delivery basis allowing building learning scenarios of different difficulty and value?
- Can we analyze the logic of such a system and distinguish technological components? And is there any direct relation between the implementation of each component to the learning process that supports?
- Can we embed dynamic characteristics to the whole system based on the nature of the knowledge components and the diversity of learning processes.
- On a more abstract way can we create theoretical concepts e.g. conceptual maps or grids that could directly link business processes types with learning scenarios?

MODEL tool-set systematically pursues to answer the above questions. The overall objective is to justify the necessary components of a KM system that will be able to support the development of executives in business environments and not only. Such a tool will be able to support Training Departments of Organizations, Corporate Universities, Distance Learning Programs, Universities, Learning portals etc. The scope of such a system is the capacity to create customized learning spaces according to specific dynamic characteristics of knowledge.

The underlying idea of the development effort is to create flexible, customized and powerful learning settings for executives. The embedding of dynamic features in technological learning environments has to be justified from a value adding perspective [9]. In other words we have to understand that the technological infrastructure for the delivery of learning content is not oriented exclusively to the sequential reference of learning modules usually in html format or PowerPoint slides. It has to be clear that the information highways of distance learning have to deliver more in terms of content and functionalities.

To sum up in the MODEL project the aim is to create a knowledge management mechanism for the enhancement of organizational learning in modern organizations. Issues like case studies development, templates, problem solving capabilities as well as technological considerations will be addressed. Model Tool-Set is concentrated in the hidden value of learning

processes that support executives in their personal and team development. This issue is very different from the traditional case-study method approach: It tries after an analytical consideration of learning issues to set an integrated environment that can be customized on the basis of selection learning processes from a pool. In other words the MODEL Case Studies Creation Process has to follow a concrete definition of learning processes appropriate for specific knowledge intensive tasks. The combination of these processes formulates the MODEL customized environment that best supports the case study content delivery.

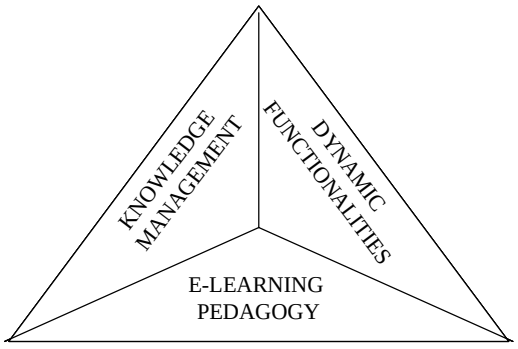
Each combination sets a different template of learning scenarios that incorporates potential capacity for skills development. From the user perspective of MODEL tool-set we can provide a number of customization approaches.

In the Leonardo Da Vinchi project called e-LEARN we investigated the capability of WebCT to support English language courses for public sectors executives in collaboration with Linguaphone.

Finally the project ESWL (Educational space without limits) set a postgraduate master course available to the students of three master programs in Greek Universities with the use of WebCT. All these projects and extensive research has reinforce our approach for e-learning. The major components of our approach for e-learning effectiveness and evaluation are presented in the following section.

DYNAMIC LEARNING CONCEPTS

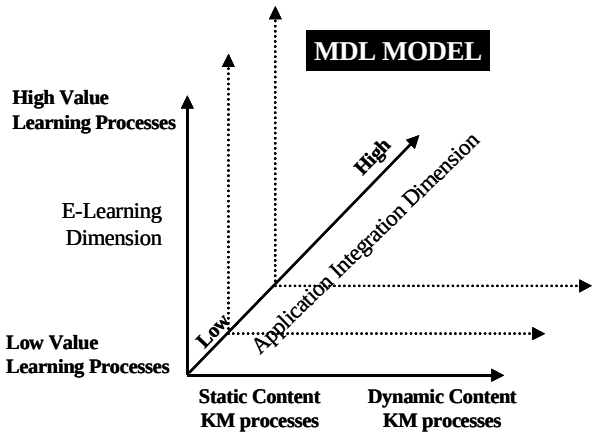
The e-learning concept can be really treated as a technological advancement with advantages and disadvantages. The ability of the information and communication technologies to realize its various components formulate a wide range of applied informatics. On this continuum of available technologies we have to incorporate intelligence in order to enhance its



performance and efficiency.

The common practice to buy an e-learning platform, to adopt content or to buy content and to deliver on 24-hour basis the learning material to various learners has a justification: It provides an easy way to claim your presence on e-learning irrelevant the absence of mechanism that exploit the value diffusion for the learners and the trainers.

Our approach is setting or is currently researching the ability of a three-dimensional model to expand the traditional considerations for e-learning importance. The Multidimensional Dynamic Learning (MDL) Model is based on three complementary dimensions:



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- The Knowledge Management dimension
- The e-Learning dimension
- The application integration dimension

Each of these describe in synopsis detailed considerations that confront the e-learning platforms such as knowledge management systems with embedded e-learning pedagogy and capacity of dynamic integration with other crucial business applications. To be more specific we will use three explanations for the three dimensions of MDL model.

The **Knowledge Management Sophistication** summarizes the ability of the e-learning platform to manage learning content in various formats, to re-use learning modules and to support knowledge management processes such as knowledge creation, knowledge codification, knowledge transformation and knowledge diffusion.

The **E–Learning Dimension** stands for the ability of an e-learning system to construct effective learning

mechanisms and learning processes that support the achievement of different educational goals. With no doubt this dimension incorporates issues like learning styles, learning needs, learning templates as well as learning specification settings.

The **Application Integration Dimension** summarizes for the e-learning platforms the capacity of collaboration with other business applications in order to obtain learning content from real business operations. This dimension seems to be the less detected on the common e-learning platforms and this causes a number of gaps for the effective implementation of e-learning systems. The critical issue of insufficient content in many situations is due to the inability of the organizations to establish a knowledge generation mechanism through the operation of information systems that support the most important business processes. Because in general, the e-learning systems in corporate environments can play the role of the most significant intellectual capital exploitation mechanism. [3], [10].

With the use of the MDL model every e-learning platform can be positioned somewhere on MDL cube.

More over this analysis with the three coordinates can be analyzed further. First of all by defining the scales for every dimension implying specific value metrics or different modes.

This work is really very challenging and the experiences gained from the implementation of the projects can contribute important guidelines. The generic dimensions of the MDL model incorporate various issues that need explanation.

For example the e-learning dimension and the emergence of high and low value learning processes demand a well justified way of differentiation. Our research work in this field relates with the distinction of various learning processes that suppose to be different in terms of delivered value to the learners. Each learning process has its own learning cycle, a continuum of learning tasks that reveal and exploit the learning content. Currently we have define ten different learning processes that have a different value in terms of learners satisfaction and learning content exploitation: Analysis, Synthesis, Reasoning, Judging, Problem solving, Collaboration, Simulation, Evaluation, Presentation and Relation.

These ten learning processes define a pool of learning processes capable of supporting different learning modes. Accordingly to our research work an e-learning platform must support such a pool in order to provide dynamic ways of constructing the learning scene for every learner.

The availability of these learning processes in the majority of the currently dominated e-learning platforms seems to be inadequate. In most of the cases this learning dimension is misunderstood or expertly missing. The critical question is whether can we gain effectiveness from an e-learning system if the employed technologies does not support sophisticated learning goal hierarchies?

The Knowledge Management Sophistication Dimension of MDL model is also critical. The majority of e-learning platforms do not support mechanisms that would enhance the re-usability of learning content. The enormous efforts that have to be paid in order to redesign learning content or to adopt traditional content for e-learning purposes burdens the effectiveness of these tools.

Our model, claims that the KM sophistication dimension is exploited enough when there are established knowledge processes that manipulate dynamic content. The re-usability of content and the support of high value learning processes presuppose the presence of an advanced KM subsystem capable to categorize, to enrich and to integrate various learning objects. Consequently the enrichment of learning content with various metadata is necessary for the application of dynamic learning. Very few learning platforms can nowadays provide metadata to the learning content and when this is applicable there is no a mechanism that allows the data mining of relevant learning objects from the learning warehouse system that manages the learning content.

Finally the **Application Integration Dimension** is also very critical. The micro cell of any e-learning system has to be enriched very frequently with new learning content. In business environment this requirement is forced from the demanding business need for immediate and valid knowledge utilization. The current situation is very disappointing concerning the realization of the integration between e-learning systems and vital business applications. The development of learning content for business specific processes demands a whole development cycle with unclear quality standards. Many e-learning experts provide their expertise in order to develop the required learning material. But lets think about a module on an e-learning system that would be able to run together in background of business applicaions and to capture critical events from learning perspective. For example a screen-shoot, an important report, a table, and other business specific elements with more or less value for the achievement of the various business processes.

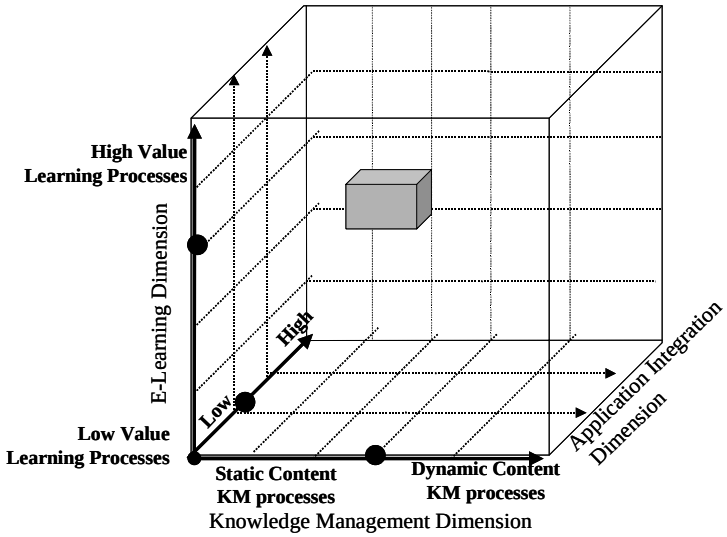
MDL CUBE PRESENTATION

The Multidimensional Dynamic e-Learning Model provides an analytical tool that can be used in order to

position every e-learning system. The three dimensions of the model imply different degrees of delivered value. So from this point of view the MDL cube represent the whole e-learning utilization value. Potentially our exemplar for e-learning in business or academic environment delivers the maximum value when all the dimensions are satisfied to the maximum allowed scale.

The specific position for every e-learning platform has to be justified very clearly. Our research effort in this stage is concentrated on the limitation and the specification of the scale on every dimension. The establishment of such a system will allow the specification of e-learning modes. For example the three coordinates for every valid position on this cube will imply specific technological capabilities as well as learning scenarios. The selection of each mode and its implementation will of course require different levels of budget and effort. The most advanced e-learning systems positioned on the upper right corner of the cube will realize full e-learning solutions in terms of integration, knowledge management capabilities and effective learning.

Of course the most advanced e-learning cubes need advanced capabilities of information processing.



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PAPER CONCLUSION

The MDL model approach sets a method for the evaluation of any e-learning platform. Of course the presentation of the method on this paper was limited due to the length limitation. The whole approach of MDL cube MODEL is supported by a number of accompanying frameworks and theoretical concepts, which in collaboration enhance the scientific justification.

The development of a system that will realize the upper right layers of the cube is currently our research priority. Of course the required modules need extensive justification and creative work. We believe than in one's year time we will be able to launch international an integrated e-learning knowledge management system with the characteristics that we mentioned on this paper. The refinement of our approach is a continuing process and will be supported by a number of new projects that we are going to propose in Greek and European Commission programs.

We are looking forward in collaboration, as we understand that this ambitious e-learning system has to be based on teamwork covering a wide range of multidisciplinary contributions.

THE PRESENTATION INFORMATION

The PowerPoint presentation file will be available for the IMSA 2000 attendees the next day of the conference at the following URL:
http://www.heltrun.aueb.gr

In our presentation there is going to be a concentration in the MDL model from a technological perspective since the limited space of this paper couldn't be enough for detailed technological analysis.

Contact Information:

Our research unit ELTRUN is interesting in collaboration with other research units, universities, distance learning organizations and technology providers for participation in projects (IST, EUMEDIS, Leonardo Da Vinci etc).

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