

Exploitation of the knowledge in business processes. MODEL: Multimedia for Open and Dynamic Executives Learning: An applied Knowledge Management system.

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Abstract

The new challenging business environment recognizes the exploitation of the intellectual capital as a critical business process. Furthermore the need of the modern organizations to utilize their knowledge assets that are employed for the achievement of performance is more than ever well justified. Our paper discusses an advanced KM system called MODEL Multimedia for Open and Dynamic Executives Learning, which is currently implementing under the IST program of the European Commission.

Introduction

Knowledge Management in recent years has been one of the most frequently mentioned terms. The objective to formulate, evaluate and exploit theories and tools in order to set effective processes in business units seems to be in the leading priorities for the digital economy's enterprises. Besides that the management of knowledge assets in business units, incorporates the discovery of knowledge in many levels of the organizational. Products, people and processes define a triptych of analysis(Quinn, Anderson et al. 1996). The market of the knowledge management tools comprises a massive range of solutions that help the capture, the organization, the management and the use of knowledge resources. Nevertheless it has been realized that a vast majority of such systems is just gloss of the knowledge management on its key dimensions. 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 MODEL project idea was generated two years ago when we were trying to evaluate the case study method for IT training through computer-mediated environments. It was evident that the development of a case study efficient to maximize the knowledge delivery required enormous effort, in order to prepare material for executives. Furthermore, training required the development of learning stories or case studies capable to embody different learning materials effectively. Moreover it was clear that the training using ICT' s could offer more than just browsing through a number of html pages or course notes files. The responders of a survey that we were organized in the context of Teletraining Center of Athens University of Economics and Business (www.teleduc.aueb.gr) underlined the necessity to incorporate dynamic features in the training process. From this perspective the MODEL approach is trying to see what happens behind the tools. Since a KM tool for executives training has to be flexible, dynamic and customized, the establishment of variables is a quite important issue.

Model Tool-Set is concentrated on 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 selecting learning processes from a pool of learning processes. 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 construction and delivery.

2. Research context

The development of MODEL tool-set has to be based on extensive research. The specific characteristics of executives as learners as well as the understanding of the business processes in detail, require the analysis of many issues. Additionally the nature of learning is too complex and this challenges the engineering of a system capable of managing the required knowledge. These general ascertainments reflect the multidisciplinary contributions that have to strengthen the technological implications. Knowledge management theory, learning theories (Bloom and Krathwohl 1984), system analysis and design, Data bases, expert systems and web development are namely only a few of the key terms for the efficient implementation of MODEL tool set.

2.1. Value Delivering Learning Processes

Knowledge management literacy is full of similar approaches for the determination of the value chain of knowledge transformation (Butcher and Rowley 1998). Unfortunately this sufficiency of theoretical conceptual definitions has not proved enough to develop practical solutions that can be embedded in the business setting. Our research is based on a clear assumption: Executives training delivers value to executives through a continuum of separate but complementary processes. These processes have to be clearly defined in terms of sub tasks that construct and exploit the learning content. Each of these processes promote the realization of business processes that are knowledge intensive. From this point of view we can distinguish the concepts of learning processes and business processes. A business process is a composition of interrelated tasks that need knowledge in order to be implemented effectively. The components of required knowledge have many sources within business organizations. The identification, the categorization and the transformation in re-usable formats allows the establishment of an effective human resource management mechanism.

The critical question from this perspective is if we can transform the critical knowledge in format that can be used for training purposes in business contexts. The emerging issues of enterprise portals as well as corporate universities base their attractiveness and capacity on flexible and dynamically constructed learning products. A facility like this formulates a new competitive weapon for the modern business organizations. The need for immediate utilization of knowledge capacity under pressure and validity conditions definitely justifies the business value of such a system.

Moreover the learning setting for a system like the one described above is very difficult to be defined. The essential concept of this approach could be the definition of specific learning processes that are capable of manipulating separately or jointly knowledge components. Their combinations model a variety of learning scenarios, which can be used by executives for personal development. Of course the linkage of business processes that incorporate the knowledge and learning processes can be manifold:

- The specification of learning processes appropriate for specific knowledge elements
- The classification of learning processes on levels of different knowledge intensity
- The specification of learning scenarios capable of supporting the executives training for specific business processes
- The dynamic construction of learning products through the employment of specific learning processes.
- The categorization of knowledge components in a hierarchy based on their value dimension

- The proposition of knowledge-business processes / learning processes matrix which specifies different modes for executives training.



Figure 1. Learning Processes: A first variable for dynamic learning environments

Figure one is a first try for the mapping and the definition of such learning processes. The distinction of ten specific learning processes implies different levels of technological requirement and consequently more sophisticated technological supported environments.

Furthermore each learning process is a combination of learning tasks, which jointly structure the learning space for the user. It would be really very interesting to define each of these learning processes in terms of related learning tasks in order to be able to adapt traditional learning content. These learning processes provide the trainer of a Knowledge Management system, the author with constructional pieces that can be manipulated in different manner according to the different types of business processes. Of course it would be a lot more useful if we could incorporate this ability and in the learner's side. Let's think about a Knowledge Management system on which the educational space is dynamically created according to the preferences of the learner or through a discovery of required learning processes. In many projects that we have implement in our research unit (www.eltrun.aueb.gr) we evaluate the need to create mechanisms that would be able to test the executives abilities to discover the knowledge. The evaluation metrics in the majority of the Knowledge Management systems for corporate learning are rather inadequate. The most challenging issue of our research is the detailed analysis of the learning processes from a logical perspective as well as from information required to support the logic and the functions of a Knowledge Management system. Consequently, the detailed analysis of the learning processes will provide an overview of the necessary data elements and procedures. The object-oriented analysis of such a system is not only critical for the success of the research effort but relates the learners' satisfaction directly to the necessary processes and data of the integrated learning environment. The scope of such a system is not only the satisfaction of the learner but the effectiveness of the learning process in terms of perceived value.

Figure two, defines the learning process Analysis as a combination of four relevant learning tasks: Find relevant objects, set interconnections, integrate meaning, and provide new meaning. The Author of the MODEL tool-set in order to use this learning process on a specific executives program that develops has to put effort in various requirements. For example, he has to provide the knowledge base of such a system a number of "relevant" objects such as theories, real world case studies, abstracts, experiments etc, so as to enable the student to find them. Of course this operation is not as easy as it seems, because its object should be accompanied with various metadata that have to be specified. For instance their suitability to support specific learning processes. The conclusion is that each learning task

needs further analysis in order to set the requirements for its technological support in terms of databases, metadata and procedures that manipulate them. Our effort in the current stage of MODEL tool-set development is concentrated on the detailed analysis of each learning processes and the development of a theoretical schema that will be used as a hierarchy based on value.

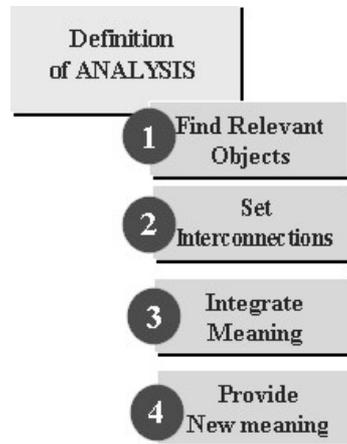


Figure 2. The definition of learning process Analysis

2.2. Learning product

The second variable for the establishment of dynamic MODEL tool-set would be the development of learning products with a different mix of value components in terms of knowledge, attributes etc. These products have to be created dynamically using the technological functionalities of the tool set. The creation of the learning products and their exploitation will be utilised under a customised mechanism on the author and the learner side.

MODEL approach is based on the belief that learning and especially executives learning is a synthetic process that delivers a kind of product, with specific characteristics to its recipients. In addition to that we have to mention that such a product is not only tangible (e.g. a 40-hour content material, or a case study presentation) but also intangible (e.g. incorporates degrees of motivation, interactivity, problem solving capabilities etc). In general, every product due to its characteristics has a value and also usefulness.

In our opinion this marketing based approach can be really a re-designing tool for the executives training. The first implication of this approach is the need for clarifying the term of educational product. We suggest that educational product is a value carrier (driver) that is formed through learning processes that have tangible and intangible value-adding components. The potential capacity of learning product is the full exploitation of the human capital that consists in business processes.

Our belief is that educational product is not only a schematic creation with little application value. Its components incorporate substantial value and furthermore for their creation are required specific processes. This statement potentially defines the learning product as a knowledge management component, in an era that the knowledge is appreciated as a core resource for every organisation. These processes can be described as learning, value creating processes and in MODEL various technological tools can support tool set.



Figure 3. The learning product and its value components

The cornerstone in our methodology is the recognition that an executive training program delivers more than just content to learners. Moreover even though content is critical for the learning process in term of transferred knowledge we defined that the learning product on executives training is a mix of value delivering components. We distinguish six value components for the learning products of a system capable to support executives training: Needs, Knowledge, Motivation Elements, Problem Solving, Team Synergy and Packaging. All of them in cooperation formulate the concept of learning product that has to be constructed and delivered using ICT's in an advanced way. The employment of technology will admit the step-by-step construction of learning product in a two-fold way. From author perspective who is the responsible for the incorporation of learning products ingredients and from executive learner perspective who is going to use the functionalities of the KM system in order to find the appropriate learning products for his/her development and to customize the learning scenarios in a value delivery mode.

Through this approach the MODEL tool-set can be developed further. The Learning products construction on a real business environment has to transform business processes in specific learning products, suitable for learning purposes. On this scenario the installation of the MODEL tool-set will support a role of a Knowledge Executive Officer a man responsible to manage the people who play an important role in specific business processes in order to define the knowledge sources within organization boundaries.

The critical issue from this perspective is to be able to develop a grid on which every business processes could be related with specific learning processes. The new concept describing this transition is the concept of learning template.

2.3 Learning Templates

A first implication of our intention to create a theoretical tool capable to map the relation of a business processes to a mix of different learning processes is a grid that helps the relation of any business process to specific learning processes according to their embodied value. A learning scenario is a combination of learning processes that formulate the educational space for the trainer and the executive trainee. A first approach is presented in figure 4. The two dimensional grid defines four separate quadrants capable to describe four different learning situations. We distinguish four learning situations that are supported by different learning processes:

1. Understanding
2. Meaning creation
3. Process understanding
4. Intellectual Capital Exploitation

The conceptual model implies that every business process could be break down into separate business tasks that can be positioned somewhere on the learning grid. Consequently this approach could be analyzed further in order to specify in a more detailed way the parameters of each learning situation.

The selection of specific learning processes changes the mode for the executives training. The selection of advanced learning processes with increased information transformation requirements enhances the quality of the achieved learning goals. The value delivery through the MODEL system is organized through the employment of specific learning templates. So, the Author of such a system is going to be navigated through an advanced mechanism on which the main role is to choose the learning situation that best fits the trainee needs. Of course the value dimension of such a system is not implying a concrete measurement system of value satisfaction. The intention is to formulate a method on which the trainer would be responsible for the maintenance of all the content material capable of supporting different value levels of trainee exploitation. The difficulty of this ambitious aspiration is the development of a metadata content classification mechanism that will support the classification of the learning content on the MODEL knowledge-content base.

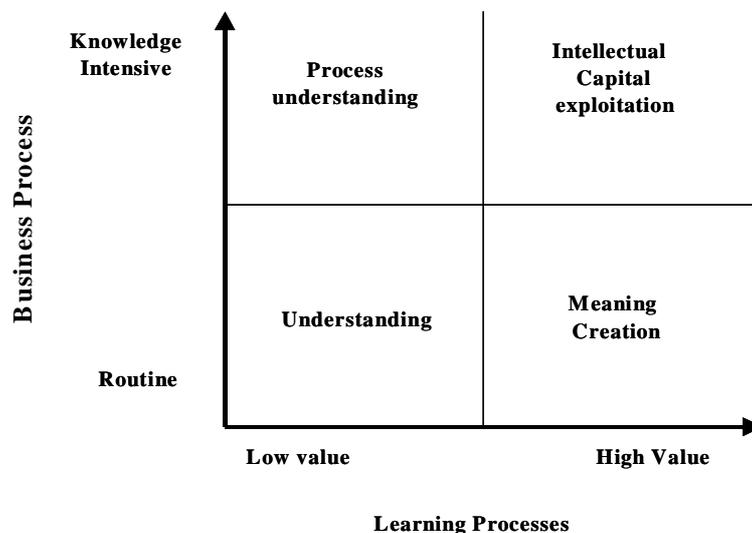


Figure 4. The Business to Learning process grid

The MODEL learning templates from this point of view help the learner to organize the learning process. The aim is not to create predefined content sessions but to establish knowledge discovery mechanisms that potentially involve the participation of co-workers, other executives' knowledge sources from the external business environment etc. The dynamic nature of such a system secures the incremental usefulness according to the selected learning situation for the executives' perspective. The ability of the system to support multiple executives promises various modes of functioning. For example a new hired employee will be follow a learning path within the system, following sequentially a number of learning situations. The diversity of the learning situations is closely related to the responsibility of the business process expert who is going to manipulate the required knowledge components. This scenario becomes more interesting when MODEL tool-set is

going to support the training in various interrelated business processes. In such a situation the learning grid has to be expanded more. The nature of relation among business processes needs a definition. What does it mean the term relation when we refer to business processes? Does it mean that a process creates knowledge necessary for the achievement of another business process? Or that a processes sets the conditions for another. In general we could try to formulate learning situations for interrelated business processes. And for that purpose we would be able to establish learning situations having in mind the need to set complex learning scenarios according to the learning goals that we are trying to achieve.

3. Logical Presentation of MODEL tool set

All the above stated parameters vary the MODEL approach. The desired outcome of extensive research is the preparation of a logic model for the whole system. The dynamic nature of MODEL approach is critical. Our experience from various national and European projects designates the difficulty of learners to adapt in distance or computer mediated environments when the content is static and the learning scenarios predefined. The establishment of dynamic variables is not a simple subject of research. The MODEL tool-set is trying to realize the dynamic feature using the Knowledge Learning Circle that is presented below.

3.1. Generic Knowledge Management approach

In our model for KM implementation six processes form an integrated Knowledge Transformation Mechanism and provide an analytical tool for measuring the value of education. These processes are employed for the creation of the learning products (with the components that just mentioned above) and are labeled with relative verbs: Relate, Adapt, Attract, Engage, Learn and Use.

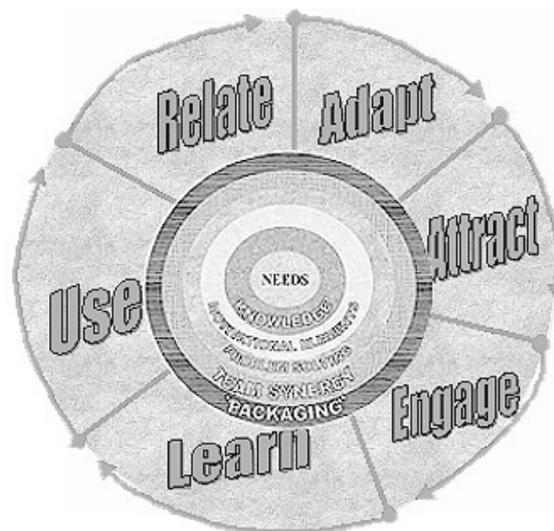


Figure 5. The MODEL KM cycle

Its of these knowledge transformation processes formulate a KM framework that can be used as a guide for the MODEL training strategy. The assumption that executive training has to satisfy a number of conditions such as:

- The relation to specific training needs or problems

- The customization of content according to the discovered needs or the desired learning scenario
- The incorporation of motivation modules able to enhance the active participation of executives to the learning process
- The development of engagement mechanisms, implying more sophisticated learning situation
- The establishment of concrete learning processes efficient to achieve different learning goals
- The development of delivery modes able to support the daily business life of executives

The objective is to improve the quality and the performance of the training effort and to make easier the access to its content. It is really very interesting to expound this fundamental idea in order to set a broader set of issues including the support that technology can provide to them. Our intention is to create a full justification of the technological components that must be employed on a full-integrated KM environment for Executives Learning.

The Table 1 summarizes some of the technological components that facilitate the realization of value creating learning processes. Some of them are

VALUE CREATING PROCESS	TECHNOLOGICAL COMPONENTS
1. RELATE	Needs Assessment Tool (On – Line) Survey tool
2. ADAPT	Knowledge Base Template Base Expert System for Customization Profiling systems
3. ATTRACT	Motivation System Help Modules Multimedia Tools Interactivity Tools Problem Solving
4. ENGAGE	Role Playing Games Business Simulation Tools Interactive Case Studies Presentation Tools Group-ware Tools, Chat Systems
5. LEARN	Feedback Tool Evaluation System Blooms Taxonomy Tool Behavior Analyzer
6. USE	Intranets Integration with Application (EAI) Transfer Tool, Packaging Tool

Table 1. Technological components

Some of the technological components mentioned are very common. But a lot of them need really very sophisticated approach for the achievement of the desired role. For example the Enterprise Application Integration of a system like MODEL with all the other enterprise

applications would be very interesting. The ability of MODEL knowledge base to capture knowledge from other applications and to develop learning components for training purposes is very challenging. Additionally the Behavior Analyzer could be a monitoring system capable to analyze the learners' behavior according to specific learning scenarios.

3.2. Evaluation Criteria

The evaluation criteria of every KM tool set have to be build on the basis of their capability to discover the potential usefulness of the toolset both on individual and team level. Through the dynamic synthesis of different technological capabilities can be a tremendous increase in the knowledge diffusion and furthermore in the capabilities for effective actions. The "smart" organizations of the 21st century must be flexible and capable to create, share, learn and experience knowledge on the individual level. Furthermore on the team level the knowledge must be valued and applied through analytical and synthetic procedures.

The development of assessment procedures is also critical for the KM tool set and of course very critical is the knowledge treatment in a way that enriches the employees job perception. The ability of the KM tool set to utilize knowledge on the direction of improving core capabilities and organizational performance combining individual and team characteristics is the most important view of the whole system. In more detail this starting point of analysis has to take into account more behaviorist characteristics of the human beings or the employees.

The knowledge context, the learning dimension as well as the psychological dimensions of behavior have to be analyzed and to be packed in specific technological facilities of KM tool sets. Of course it would be very ambitious to have the capability to incorporate every aspect of such a generic conceptual model in one technological platform. But it would be very interesting to experiment with modules of technological functionalities that interpret the theory into practice.

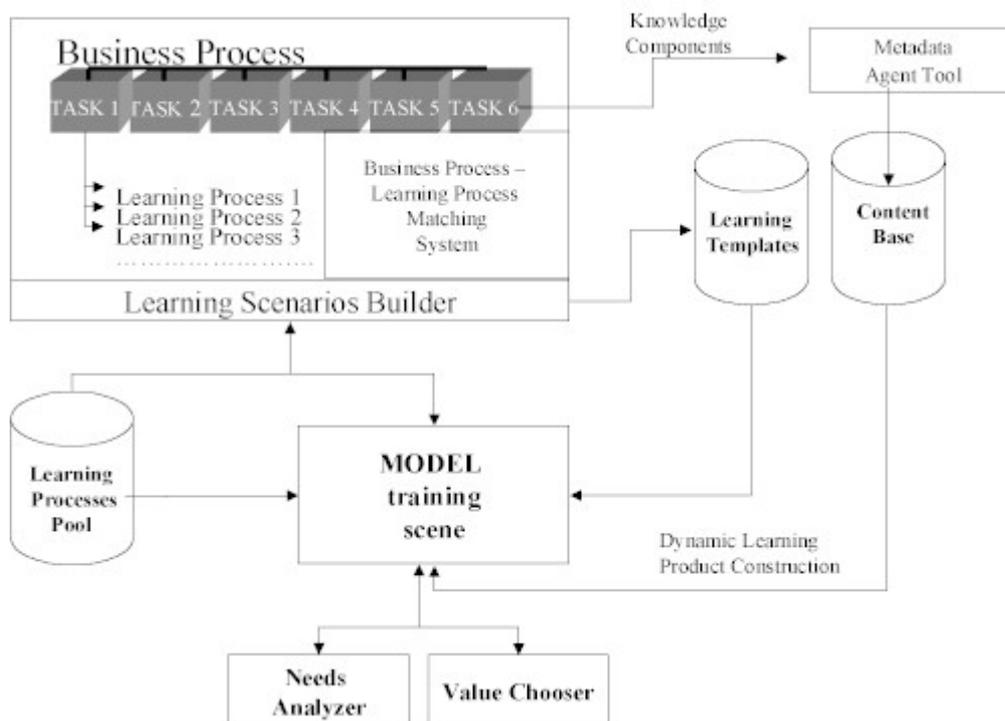
From this point of view some technological facilities on a tool set as MODEL must secure:

- ❑ The customization of knowledge to specific needs
- ❑ The dynamic synthesis of different blocks of knowledge in order to create a new more meaningful and structured frame
- ❑ The management of templates so as to be capable to combine both learning processes and learning objects
- ❑ The evaluation of the learning process through specific metrics
- ❑ The role playing capability through specific learning scenarios
- ❑ The flexible construction of the learning / educational scene while using such a tool. For this reason there must be a concrete mechanism (drag and drop) for the establishment of the educational scene
- ❑ The integration of knowledge management facilities (collection, codification, categorization, metadata application, searching and retrieving) according to standards that must be specified.
- ❑ The establishment of communication mechanisms between trainees and learning objects as well as experts.
- ❑ The application of simulation models of business processes
- ❑ The capability to map, formulate and simulate business processes that are closely related with the core issue of learning scenario
- ❑ An advanced testing mechanism for the absorption of knowledge

- An advanced on-line help facility capable to navigate through the cases material
- The establishment of a scientific knowledge base including sources of knowledge for models, theoretical schemes and learning in general
- A supporting web of links related to the case studies

A more generic approach that must be continuously revised and enriched during the development of MODEL has to analyze more technological aspects as it is presented below. To sum up even though we tried to state a whole framework for KM tool set the most challenging issue is to create a management mechanism of learning templates and evaluation procedures.

3.2 MODEL Overview



The figure 5 provides an overview of MODEL toolset. The presented subsystems are trying to support the concepts that we discuss on a practical way. In the next one year we will put an enormous effort combining the capabilities of Oracle 8i in order to make real all the promising but difficult in the development phase subsystems. The analysis of all the learning processes in detail and their specific description will allow the development of the Learning Processes Pool. This aim to be a dynamic construction that will contribute specific learning scenarios that have to be chosen by executives on a value basis. The Business to Learning Process Grid concept will support the Business to Learning Process Matching Systems that will be responsible for the development of a whole learning scenario suitable for specific business processes. The learning templates will facilitate the realization of the learning scenarios providing the base ground for the incorporation of the learning products. The metadata agent tool will secure the knowledge components management on a systematic way since it is required the establishment of value components for every learning object. This subsystem is really very important for the effective operation of the MODEL tool set because both the learning templates as well as the learning scenarios have to deliver learning products with value components. The executive learner will use the MODEL tool-set specifying the mode of training that best fits to its needs.

Conclusions

The MODEL approach sets a number of research issues that have to be analyzed. The incorporation of dynamic and customized mechanisms that support the executives training has to be based on new concepts. The scientific justification of these concepts is really a challenging issue. The analysis of learning processes in detail, the development of value hierarchies and the establishment of learners profiling mechanisms are the crucial issues for the development of a dynamic learning environment. The need for the exploitation of knowledge in business settings makes the undertaken effort very promising. With no doubt the successful implementation of MODEL tool set will provide new perceptions for the nature of executive training. Furthermore the integration of this system on the human resource department of organizations expands its potential usefulness, as it becomes the major personal and team development tool. Finally the value orientation of the underlying idea has a clear objective: To prove the willingness of trainees to follow specific learning scenarios according to their perceptions for value delivery.

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