

A KNOWLEDGE MANAGEMENT MODEL STUDIE CASE: CEIDIS ULA

Beatriz E. Sandia Saldivia and Ana C. Muñoz García

*Coordinación de Estudios Interactivos a Distancia, Universidad de Los Andes
Nucleo La Hechicera Edif. de Ingeniería Nivel Patio ala sur, Mérida, Venezuela
bsandia@ula.ve, anamunoz@ula.ve*

Keywords: Knowledge management, Interactive distance education.

Abstract: Knowledge management is one of the priority areas of study, both at the organizational level as in the technology. It is because of the importance of knowledge as an asset for government organizations. Universities, whose business is closely tied to the creation and dissemination of knowledge, are not unknown to this trend and give special attention to the development of knowledge management mechanisms, such as priority research and development. Knowledge management is an essential part of university management. This knowledge management should be reflected in all academic fields, especially in the processes being undertaken for the implementation of interactive distance education or virtual programs. This article presents a knowledge management model, based on the organizational model for the Coordination of Interactive Distance Education (CEIDIS) of the Universidad de Los Andes, Mérida, Venezuela, which has the responsibility to give methodological and technical support to the processes of learning and distance learning using information and communication technologies (ICTs).

1 INTRODUCTION

Currently, because of the importance of knowledge as an asset for government organizations, knowledge management represents one of the priority areas of study, both at the organizational level as in the technology. The management of this resource, as valuable and important, requires great effort by the part of organizations. Universities, whose business is closely tied to the creation and dissemination of knowledge, are not untied to this trend and give special attention to the development of knowledge management mechanisms, such as priority research and development.

Knowledge management is an essential part of university management. A significant portion of its business is aimed at employment of professors and researchers responsible for the generation and dissemination of knowledge. Moreover, traditionally the libraries of academic institutions focus on knowledge management. This knowledge management should be reflected in all academic fields, especially in the processes being undertaken for the implementation of interactive distance education or virtual programs.

This article presents a knowledge management model, based on the organizational model for the Coordination of Interactive Distance Education (CEIDIS), an academic unit within the Universidad de Los Andes, Merida, Venezuela, which has the responsibility to give all the technical and methodological support to the processes of learning and distance learning using Information and Communication Technologies (ICTs). This activity implies the management of knowledge in the area of interactive distance learning education, as well as the organization that carries out such management. CEIDIS reports directly to the Academic Vice President and serves all the faculties and areas of the Universidad de Los Andes.

2 KNOWLEDGE MANAGEMENT

Knowledge may be viewed from several perspectives (1) a state of mind, (2) an object, (3) a process, (4) a condition of having access to information, or (5) a capability (Alavi et al. 2001). The perspective on knowledge as a state of mind focuses on enabling individuals to expand their personal knowledge and apply it to the

organization's needs. A second view posits that knowledge can be viewed as a thing to be stored and manipulated (i.e., an object).

Alternatively, knowledge can be viewed as a process of simultaneously knowing and acting. The process perspective focuses on the applying of expertise. The organizational knowledge must be organized to facilitate access to and retrieval of content. This view may be thought of as an extension of the view of knowledge as an object, with a special emphasis on the accessibility of the knowledge objects. Finally, knowledge can be viewed as a capability with the potential for influencing future action (Alavi et al., 2001).

Organizational knowledge creation involves developing new content or replacing existing content within the organization's tacit and explicit knowledge (Pentland, 1995). Through social and collaborative processes as well as an individual's cognitive processes (e.g., reflection), knowledge is created, shared, amplified, enlarged, and justified in organizational settings (Nonaka, 1994). This model views organizational knowledge creation as involving a continual interplay between the tacit and explicit dimensions of knowledge and a growing spiral flow as knowledge moves through individual, group, and organizational levels.

Four modes of knowledge creation have been identified: socialization, externalization, internalization, and combination (Nonaka and Takeuchi, 1995). The socialization mode refers to conversion of tacit knowledge to new tacit knowledge through social interactions and shared experience among organizational members (e.g., apprenticeship). The combination mode refers to the creation of new explicit knowledge by merging, categorizing, reclassifying, and synthesizing existing explicit knowledge (e.g., literature survey reports).

The other two modes involve interactions and conversion between tacit and explicit knowledge. Externalization refers to converting tacit knowledge to new explicit knowledge (e.g., articulation of best practices or lessons learned). Internalization refers to creation of new tacit knowledge from explicit knowledge (e.g., the learning and understanding that results from reading or discussion).

Knowledge management refers to management of intangible assets that generate value for an organization. These intangible assets are related to processes associated to the recruitment, structuring and transmission of knowledge. The knowledge associated with a person and a series of personal skills becomes on wisdom, and finally knowledge associated with an organization and a series of

organizational capabilities becomes on the Intellectual Capital of this organization.

Thus, organizations have the knowledge of the organization or intellectual capital and this allows them to develop their essential activity. The knowledge resides in the system of processes that gives as results the materialization of the goods or services.

Brooking (1997) says that the concept of intellectual capital has been incorporated to define the set of non-material inputs, and that in the information age is defined as the main asset of the third millennium organizations.

The Intellectual Capital of an organization, according to Brooking (1997) can be divided into four categories:

- Market assets: related to the knowledge about the market.
- Intellectual properties assets: referred to the know-how, to the secrets, copyrights, patents, design rights, trade and services.
- Assets focused on the individual: these are the qualities and skills that make up the human being and that make it what it is.
- Infrastructure assets: referred to technologies, processes and methodologies that make possible the organization function.

On the other hand, Steward (1997) defines intellectual capital as "knowledge, information, intellectual property, experience, which can be used to create value." This author makes a very important point which is that that compares the intellectual capital with the collective brain power. Steward divides the capital into three elements: human capital, structural capital and customer capital.

To Edvinsson and Malone (1997), intellectual capital is divided into human capital, structural capital, customer capital, organizational capital, innovation capital, and capital process. For Euroforum (1998), the intellectual capital is composed of: human capital, structural capital and relational capital.

In general, the value of intangible assets of an organization is found in the management of their knowledge, either tacit knowledge of employees acquired according to its preparation, training and know-how or the explicit knowledge that is in the forms of done in the organization such as procedures and processes, among others.

This article takes as a reference model according to Munoz, A., Schults, S., and Omaña, T. (2006) in

which intellectual capital is composed of human capital, structural capital and relational capital.

The **Human Capital** is formed or characterized by the human resources involved in the production or organizational support process (training, skills, and personal qualities, among others).

The **Structure Capital** is what makes up the information managed in the process, which enables these people to increase their training or skills to perform their tasks.

The **Relational Capital** is the information that comes to relations with the outside of the organization.

Of the union of these three stands emerges knowledge. In the way that the organizational structure will facilitate communication between people and information, it will be created an environment of knowledge.

This environment of knowledge is conditioned by a number of elements such as the quality of human resources, the ability to manage information and the ability of the organizational model to implement and integrate the appropriate tools, techniques and methods, as well as interact with the external environment.

The Figure 1 illustrates the value of an organization according to these components of intellectual capital.

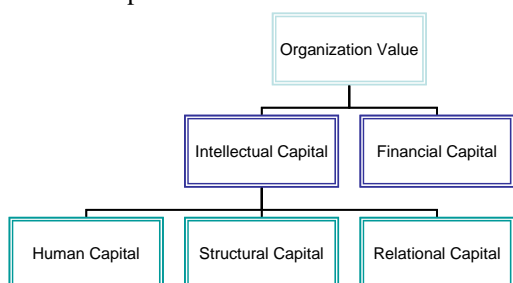


Figure 1: Organization assets (Muñoz, A., Schults, S., and Omaña, T., 2006).

2.1 Knowledge Management Process

According to the Knowledge Research Institute (2000), knowledge transfer takes place in four stages:

1. Identify existing knowledge in the organization.
2. Create new knowledge.
3. Capture and store knowledge.
4. Organize and transform knowledge.

To achieve knowledge transfer, Belly, P. (2002) mentions three key practices:

1. Create information memory where each individual, in the organization, documents the steps that take place to achieve the goal. That is, each member has its own operating manual; it's about moving to the conscious the efforts that are made unconsciously.
2. Create media or communication systems to transmit the information deposited. It permits that everyone can access that information and transform it into knowledge.
3. Design activities and procedures to ensure that the knowledge were built and put into action. This is to ensure that the system is working properly and it is becoming a habit. This is what is known as a knowledge-based organization.

The processes for the CEIDIS knowledge management model are based on the processes of the organizational model described below.

2.2 CEIDIS Organizational Model

The CEIDIS organizational model implanted since February 2007, has being followed the organizational modelling method developed by Barrios and Montilva (2004). This model, as Sandia (2007) comprises, presents:

CEIDIS goals model: based on the mission of the Coordination of Interactive Distance Education (CEIDIS), this model defines and represents the specific objectives through the hierarchical structure. These goals describe the intentions that contribute to achieving the mission of the institution and determine and justify the processes, activities, actors and roles that employ CEIDIS.

CEIDIS processes model: defines the various processes involved in CEIDIS, as well as the functions and activities carried out by different actors. Besides defining the CEIDIS organizational structure involving sub models actor / role, role / activity and objects that cover all business processes. The CEIDIS organizational structure, indicated in Figure 2, is a horizontal (in line or staff) and consists of a set of roles composed of a coordinator, an administrative support unit, methodology and didactic unit, development and production unit, technical support unit, and research and training unit. In turn, each faculty has the support of interactive distance studies satellite units (EIDIS).

The Administrative Support Unit is responsible for the planning, organization, coordination and supervision of administrative

activities of CEIDIS. It is also responsible for the budget execution and control, procurement of inputs, materials, equipment, applications and manages contracts for maintenance of equipment and software, among other functions.

The Methodology and Didactics Unit is responsible of everything related to the design of content, media and educational resources, as well as counselling, care and support to teachers, mentors, facilitators in the implementation and use of instructional media for teaching-learning activities on interactive distance, virtual or online educational programs.

The Development and Production Unit is responsible for all matters relating to the development and production of content, media and educational resources on the Web.

The Research and Training Unit implements the activities related to research in the area of educational technology, assessments tools and learning management platforms, as well as the training, care and support to teachers, mentors, facilitators in the implementation and use of the platforms.

The Technical Support Unit is responsible to provide, operate, manage and maintain the technological platform and its automated services, managing the resources (network systems, computers, servers, desktops, video and Internet services, Web pages, user lists, email and other information services). It also provides technical assistance to teachers, mentors, facilitators and students to the best use of these resources.

research and training. Each of these processes is described in general, on the following.

Coordination process: plans, organizes, coordinates and supervises the management of CEIDIS. As well, it is responsible for the promotion and generation of agreements and alliances for interactive distance education.

Methodology and didactic process: its function is the design of content, media and educational resources, as well as counselling, care and support to teachers, mentors, facilitators in the implementation and use of instructional media.

Development and production process: is responsible for all matters relating to the development and production of content, media and educational resources on the Web.

Technical support process: is responsible to provide, operate, manage and maintain the technological platform and its automated services.

Research and training process: is responsible for carrying out activities related to research in the area of educational technology, assessment tools and learning management platforms.

Administrative support process: together with the Coordination is responsible for supervising the CEIDIS administrative activities.

EIDIS Faculty process: is responsible for giving support in all the Universidad de Los Andes faculties where they are conducting distance education studies. This thread is a smaller replica of all the CEIDIS processes.

3 CEIDIS KNOWLEDGE MANAGEMENT MODEL

The CEIDIS knowledge management model is based on the knowledge management model proposed by Munoz, A. Schults, S., and Oman, T. (2000). There are three essential components of CEIDIS intellectual capital shown in Figure 3. This intellectual capital is made up of the organizational structure, culture, leadership, mechanisms of learning, the attitudes of individuals who work in CEIDIS, the capacity for teamwork and all those intangible factors that make up the organization.

- **The human capital:** composed of knowledge, skills and attitude of each individual who work in the CEIDIS units. Moreover, in this human capital are taken into account the profiles and quality of work of teachers and students who participate in the processes of the organization.

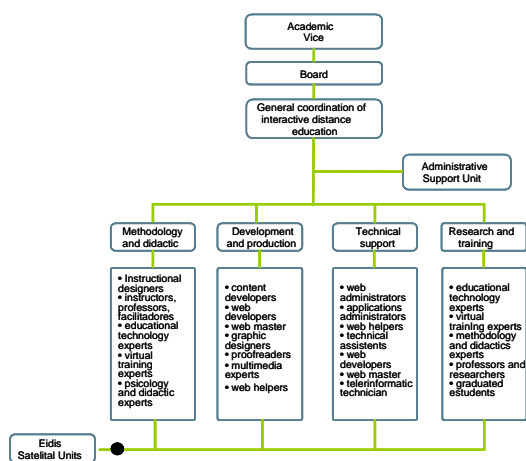


Figure 2: CEIDIS Process Model (Sandia, 2007).

There are six major processes: coordination, administrative support, methodology and didactic, development and production, technical support and

- **The structural capital:** is the corporate memory, institutional or organizational made up of the CEIDIS organizational structure, their operating manuals, information systems, and the information and communication technologies to support the process of teaching and learning, as well as the innovation and development in the distance education area, among others.
- **The relational capital:** composed of relations with third parties in terms of advice to teachers and students, alliances and agreements with other entities and customer services.

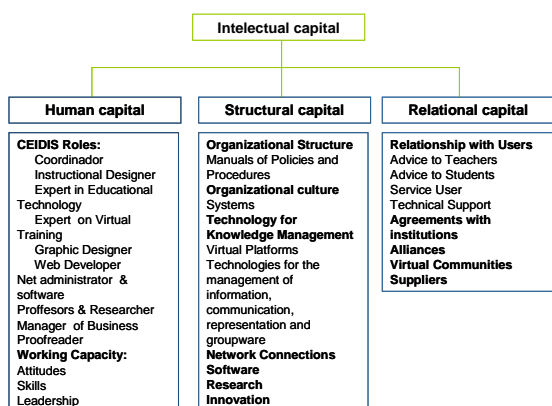


Figure 3: CEIDIS Knowledge Management Model.

3.1 CEIDIS Knowledge Management Processes

In CEIDIS, knowledge is generated from three main processes: the methodology and didactic process, the development and production process and research and training process. These processes are hold with the technical support necessary to carry out the knowledge management activities.

The processes of knowledge management in CEIDIS are already provided by the existing knowledge in the organization, by the capture and storage of the knowledge, and finally by the organization and transformation of that knowledge.

Currently, the existing knowledge in the organization is made up of the courses and contents stored in the CEIDIS database, as well as the projects implemented with their blogs. This allows reviewing and evaluating the successes and mistakes made during its development and in this way can be defined standards to execute new projects.

There is an organization memory, which through an organizational scheme established in a database

server, each individual, who works at CEIDIS, documents the procedures or steps to achieve the objectives of the established processes. In addition, blogs are carried out in which each individual employee records his personal activities.

The procedures for carrying out the activities are based on the CEIDIS manual of roles and procedures. This handbook describes the processes, activities to implement in each process, as well as the procedures required in each activity and the roles that run the different activities.

CEIDIS also has a database where are registered the students and teachers who are served by.

On the other hand, knowledge is generated in CEIDIS also through agreements and alliances intra- and inter-institutional. These agreements with other higher education institutions and other entities with experience in the distance education area enrich and allow transforming the existing knowledge in order to achieve quality in the processes executed in CEIDIS.

Various media or communication systems have been designed to transmit the information stored in the CEIDIS databases, and everyone can access that information and transform it into knowledge. Regularly, it is performed information exchange among the CEIDIS units which allows the planning and operation information to flow between all members of the coordination. This allows sharing information, and that everyone has access to that information and transforms it into knowledge. This ensure that the knowledge gained have been incorporated into the organization and put into action.

The Figure 4 shows the main knowledge-management processes that take place in CEIDIS and how they are interrelated.

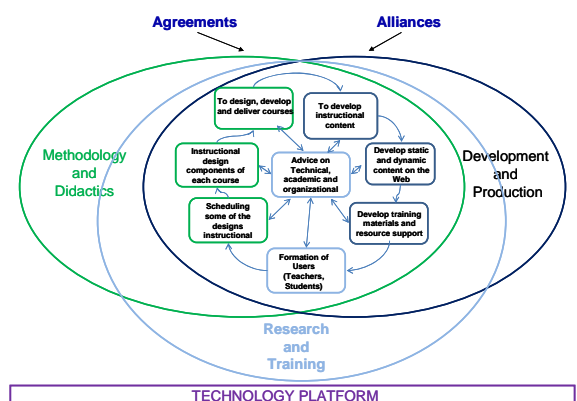


Figure 4: CEIDIS Knowledge Management Process.

4 CONCLUSIONS

The CEIDIS knowledge management model comprises three main processes: methodology and didactic, development and production and research and training, supported by the technological support process.

The interrelationships of these processes generate knowledge, as well as the capture, storage, and finally the organization and transformation of that knowledge.

Currently, the CEIDIS knowledge management model is being implemented in its different phases: The capture and storage phase is implemented through actions such as information record (activities, planning, operation and monitoring) in each of the units that conform CEIDIS, as well as projects that take place in (Career of Law, TSU levelling Forest program, Levelling Engineering program, Graduate Computer program, among others.).

The organization and transformation phase is executed through the implementation of the knowledge management project, which includes the following activities:

- Implementation of policies and procedures manuals that serve as a guide for action and how to conduct the process.
- Definition of technological tools that support the interaction and updating of knowledge between the different groups that conforms CEIDIS (based on the organizational model).
- Definition of activities and procedures to ensure that the knowledge were built and put into action.
- Setting standards for measuring quality of activities and effectiveness in production.

It is important to mention that, actually, the process functions in CEIDIS are being executed according to the organizational model, and they are being evaluated throughout a validation and evaluation project following the Capability Maturity Model Integration (CMMI). For measuring quality of processes, according to CMMI, there are three dimensions in which the organization should focus to improve its business processes: people, processes and methods and tools and equipment, where the processes are those that describe the behaviours of the organization. Those are closely related to the knowledge management model that would be implanted.

REFERENCES

- Alavi, M. and Leidner, D., 2001. *Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues*. MIS Quarterly Vol. 25 N° 1, pp. 107-136. March 2001
- Barrios, J. y Montilva, J., 2004. *A Methodological Framework for Business Modeling*. In Montilva, J. et al. (Ed.), *Sistemas de Información e Ingeniería de Software: Temas Selectos* (pp. 131 - 146). Mérida, Venezuela: Centro de Estudios en Información.
- Belly, P., 2002. *Paso Previo a la KM*. (En línea) Consultado el 25/08/2008 http://www.bellykm.com/art3_cape.html
- Brooking, A., 1997. *El Capital Intelectual*, Paidós Empresa, Barcelona.
- Edvinsson, L. y Malone, M. S., 1997. *Intellectual Capital. Realizing your company's true value by finding its hidden brainpower*. Harper Collins Publishers, Inc. 1ª ed.
- Euroforum, 1998. *Medición del Capital Intelectual. Modelo Intelect. IUEE*. San Lorenzo del Escorial. Madrid.
- Knowledge Research Institute, 2000. *Knowledge Transfer Process* http://www.krii.com/downloads/Kn_Transf_Process.pdf
- Muñoz, A., Schults, S., y Omaña, T., 2006. *Modelo de Gestión de Conocimiento para los Institutos Universitarios de Tecnología en Venezuela*. Gerencia Tecnológica Informática. Vol 5. N° 12.
- Nonaka, I., 1994. *A Dynamic Theory of Organizational Knowledge Creation*. *Organization Science* Vol 5 N° 1, pp. 14 - 37.
- Nonaka, I., and Takeuchi, H., 1995. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York.
- Pentland, B. T., 1995. *Information Systems and Organizational Learning: The Social Epistemology of Organizational Knowledge Systems*. *Accounting, Management and Information Technologies* Vol 5 N° 1, pp. 1-21.
- Sandia, B., 2007. *Modelo Organizacional y de Gestión de Formación Flexible Basada en Entornos Tecnológicos para la Universidad de Los Andes*. Trabajo de investigación conducente al Diploma de Estudios Avanzados (DEA). Universidad de Las Islas Baleares. Islas Baleares, España.
- Steward, T.A., 1997. *La Nueva Riqueza de las Organizaciones: EL Capital Intelectual*. Granica. Buenos Aires.