RIDU REVISTA DIGITAL DE INVESTIGACIÓN EN DOCENCIA UNIVERSITARIA

TEACHING EXPERIENCE

Strategic Elements of Organizational Knowledge Management for Innovation Case: Agrometeorology Network

Elementos estratégicos de la gestión del conocimiento organizacional para la innovación. Caso: red de agrometeorología

Elementos estratégicos da gestão do conhecimento organizacional para a inovação. Caso: rede de agrometeorologia

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ABSTRACT. This teaching experience seeks to propose an organizational knowledge management model for the training program developed by the Agrometeorology Department of the National Institute for Agricultural Research (INAI, in Spanish) of the State of Anzoátegui, Venezuela. The problem solution protocol deriving from the application of learning cycles, TADIR (Translation, Analysis, Design, Implementation and Revision), was used. An array of different ways to promote activities, tasks, results, and products generated by the project was established before, during and after the execution in an easy and complete manner. The population was also made aware of the advantages of agrometeorology and its importance for the agricultural development of the country. The results of this research can be made directly or indirectly available to the same organization or any others who wish to take the challenge of contributing to the transformation process the country is undergoing.

Keywords: education, knowledge management, innovation, learning.

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RESUMEN. Esta experiencia docente tiene como objetivo proponer un modelo de gestión del conocimiento organizacional para el programa de capacitación desarrollado por el departamento de agrometeorología del Instituto Nacional de Investigaciones Agrícolas (INIA) del estado Anzoátegui, Venezuela. Se utilizó el protocolo de solución de problemas, derivado de la aplicación de ciclos de aprendizaje, denominado TADIR (Traducción, Análisis, Diseño, Implementación y Revisión). Se estableció la diversificación de las formas de promover las actividades, tareas, resultados, productos generados por el proyecto, antes, durante y posterior a su ejecución, de manera fácil y completa, así como la conciencia en la población sobre las bondades de la agrometeorológica y su importancia para el desarrollo agrícola del país. Los resultados de esta investigación pueden estar al servicio de la misma organización de manera directa e indirecta y de otras que quieran asumir el reto de contribuir al proceso de transformación que vive la nación.

Palabras clave: educación, gestión del conocimiento, innovación, aprendizaje.

RESUMO. Esta experiência docente tem como objetivo propor um modelo de gestão do conhecimento organizacional para o programa de capacitação desenvolvido pelo departamento de agrometeorologia do Instituto Nacional de Investigações Agrícolas (INIA) do estado de Anzoátegui, Venezuela. Utilizou-se o protocolo de solução de problemas, derivado da aplicação de ciclos de aprendizagem, denominado TADIR (Tradução, Análise, Desenho, Implementação e Revisão). Estabeleceu-se a diversificação das formas de promover as atividades, tarefas, resultados, produtos gerados pelo projeto, antes, durante e após a sua execução, de maneira fácil e completa, assim como sensibilizar a população sobre os benefícios da agrometeorologia e sua importância para o desenvolvimento agrícola do país. Os resultados desta pesquisa podem ser usados pela própria organização de maneira direta e indireta e por outras que queiram assumir o desafio de contribuir ao processo de transformação que vive o país.

Palavras chave: educação, gestão do conhecimento, inovação, aprendizagem.

It is basically from the 21st century on that there has been considerable development in the technological area, globalization processes and general information systems, which not only become evident in the evolution of societies, but also in organizational models, representing an opportunity to contribute to the renovation of ideas that allow for the development of a new type of organization in line with today's problems (Becerra & Gallego, 2010; Oliveros, 2012).

Precisely, when the term knowledge management is established, it is associated to the concept applied in organizations, which seeks, in principle, to transfer the existing knowledge and experience among its members, so they can be used as an available resource for others in the organization (Correa, Jiménez & Segura, 2008).

In this aspect, knowledge management implies—in a very wide sense—the techniques to capture, organize, and keep the employees' knowledge, and so transform it in an intellectual asset to provide benefits and share them. Therefore, this management applied to organizations regarding the creation and dissemination of information may be described as the systematic process of detecting, selecting, organizing, presenting and using information in order to optimize the achievement of objectives and tasks, making it sustainable over time (Albornoz & Kreimer, 1990; Oliveros, 2012).

Today, knowledge is the great issue in all settings, be they academic, scientific, social, cultural or business related and, specially, in those concerning information sciences, the huge amount of information available on any aspect that may interest men and its growing accessibility, thanks to technological tools to connect to it, has become an issue to reflect upon for the different agents in charge of the knowledge problem.

It is precisely because of this that knowledge should not be understood merely as the knowledge generated by scientific research, but also include every human elaboration, conceptual or material, that supposes human development around the experiences that lead to the discovery or command of the world for humanity's sake.

Different contributions in this area indicate that it is not enough to have access to great amounts of documentary information. It is necessary, also, that individuals can and know how to process such information Becerra & Gallego, 2010; Pérez, 2002; Rodríguez, Araujo & Urrutia, 2001). It is useless for any organization—university, research department, institute, etc.—to have individuals with talent and knowledge if the latter is not applied in the organizations.

Figure 1 shows the most relevant aspects in the organizational learning process; this process in Knowledge Management, also known in its development stages as "corporate learning" or "organizational learning," has mainly three objectives which are fundamental: the first entails identifying, collecting and organizing the existing knowledge; the second, facilitating the creation of new knowledge; and the third, consolidating innovation through the reuse and support of people's skills through organizations in order to achieve a better business performance (Davenport & Prusak, 2001; Martin Fernández, 2001).

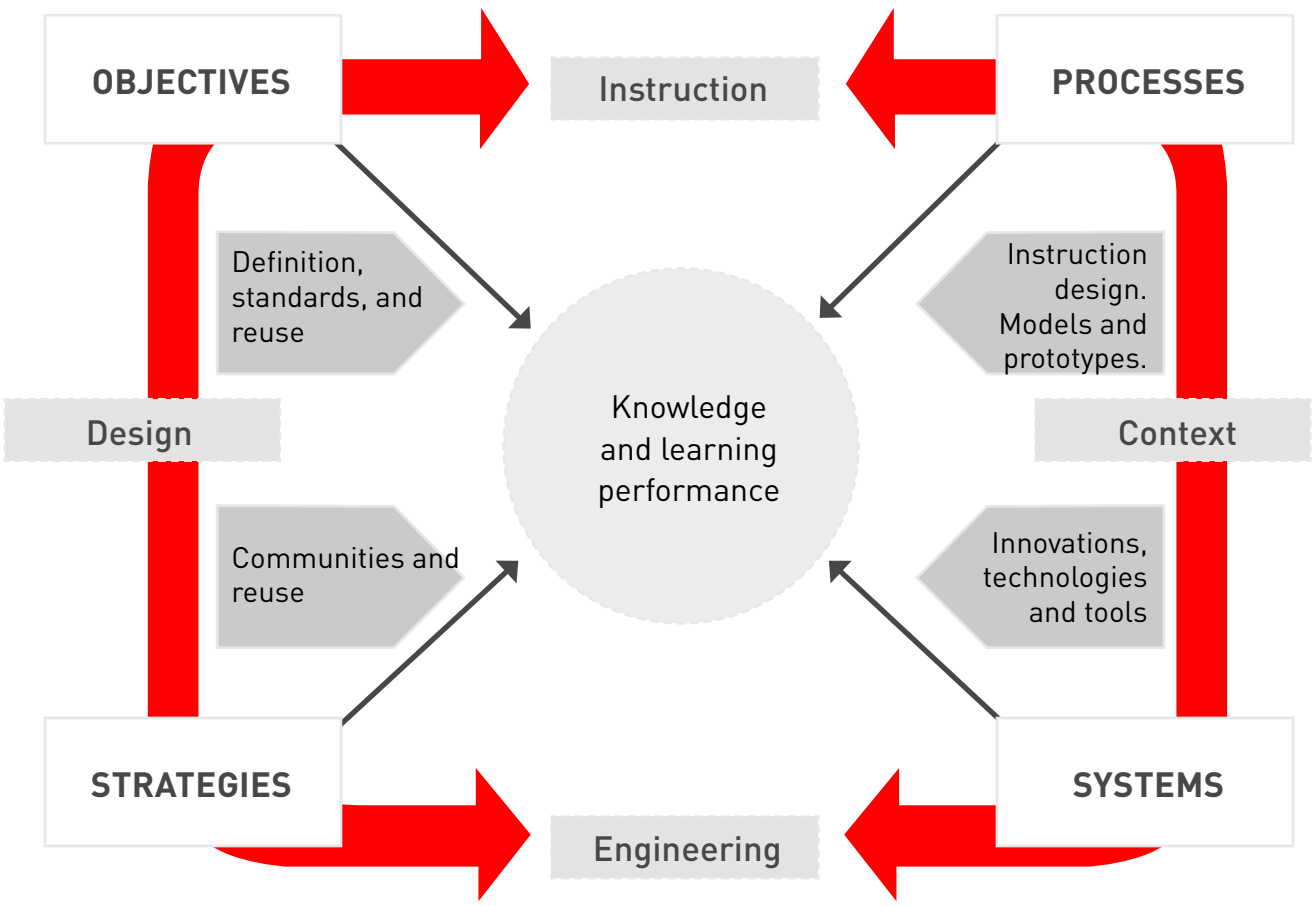

Figure 1. Relevant and influential aspects in organizational learning. Adapted from Gestión de Instituciones Educativas Inteligentes. Manual para gestionar cualquier tipo de organización (p. 34), by E. Martin Fernández, 2001, Madrid: McGraw-Hill. Copyright 2001 by McGraw-Hill.

The transference of knowledge (an aspect of Knowledge Management) has always existed as a process in organizations. In an informal manner, through discussions, sessions, reflection meetings, among others, and in a formal manner, through learning, professional training and educational programs.

In Nonaka and Takeuchi's (1995) version, knowledge management gains new dimensions in as far as it is about making the business become an agent that creates knowledge and learning. Likewise, these authors trigger a theoretical leap in conceiving that knowledge management is part of an epistemological theory with philosophical and sociological consequences.

In this order of ideas, the concept of knowledge management has grown richer and has transformed rapidly in the last few years. First linked to business administration theories, it then little by little revealed itself as a more complex idea linked to an emerging knowledge and information society. At the same time, it took an epistemological turn that established the need to rethink a new way to produce and disseminate knowledge in current societies (Rodríguez et al., 2001). On the other hand, it became evident that educational management was closely linked to knowledge management.

Knowledge management can then be provisionally defined as an epistemological, organizational and managerial approach, which aims at valuing and taking advantage of the creation and transmission of knowledge in any type of organization (companies, schools, hospitals, unions, universities, cooperatives or non-profit organizations).

Generally, documents from human organizations where information, knowledge and consequently learning intervene, contain evidence of the new and references to the already known (published), which should be accessible, useful and understandable to users, in contexts comprising multiple topics, times and capacities. According to Nieminen (2001) this makes storing knowledge possible (knowledge storage).

The foundations to provide citizens of the nation with all the knowledges, techniques and strategies oriented towards agrometeorology, knowledge rescue and agricultural planning for its application in the community are established under the guidelines of the Simon Bolivar National Project (2007 - 2013). This seeks to strengthen the organization's level, aiming at its training to share the learning obtained with other members of the community and, therefore, be able to enrich the people ideologically, keeping its governability.

Interested in the exchange of multiple readings on the evolutionary change of the scientific paradigms towards the materialization of a better quality of life, the agrometeorology service carries out research, training and diffusion activities in order to make the contribution to society's comprehensive development more visible through these three key collective actions, as tangible results reached together with the communities of South Anzoategui, generating responses that are stronger and stronger in the face of agricultural problems and contributing with greater options for training, in agreement with the requirements of the social reality of the region.

Under these circumstances, the purpose of this experience is to generate reflections to consider the department of agrometeorology a potential space (not easily replaceable) to address the challenges associated with technological innovation in terms of knowledge generation and transmission, capable of reinventing new virtual landscapes in coexistence with the traditional social, scientific and academic structures that offer both individual and group cognitive possibilities.

DESCRIPTION OF THE DEPARTMENT OF AGROMETEOROLOGY

The objective of the departments is to generate, process and transmit agroclimatic information from the weather station located at El Tigre in Anzoategui, with the purpose of making it available to users, including undergraduate and graduate students from different universities, technological institutes and national training programs in agrifood, environmental management, social management and integral education, researchers, technicians, public and private institutions, agricultural

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producers, professionals in different areas linked to environmental work (environmental planners, engineers, architects, teachers) and public in general. The services offered include:

a) Weather data (precipitation, evaporation, schedules, daily, monthly and annual)
b. Exploratory data analysis (EDA) through the statistical program Infostat (median, variance, standard deviation, variation coefficient, kurtosis, asymmetry, maximum and minimal values, percentiles and quartiles) and the presence of atypical values.
c. Weather information for research project planning and agricultural development, agricultural insurances support, sanitary work design, disaster alert and prevention system.
d. Guided visits to the weather station with pedagogical purposes, emphasizing each one of the meteorological instruments found in the station.
e. Advice linked to agroclimatic and environmental characterizations of the oriental region.
f. Specialized bibliography (publications, weather bulletins, books, etc.)
g. Educational and training courses and events in the field of agrometeorology and its relation to other areas such as soil management, agroecological crop management, grass and fodder evaluation, animal safety and management and agricultural production systems.

DESCRIPTION OF THE CONCEPTUAL MODEL OF ORGANIZATIONAL KNOWLEDGE MANAGEMENT

To begin the experience, the concept of strategic knowledge management, from recent date (1995) was established. Its origin responds to a process that starts with the issue of Competency-based Management and the development of ICTs to create competitive advantages in economies which tend to focus on knowledge and learning (Peluffo & Catalán, 2002; Romero, 2005). Based on this point, Figure 2 represents the three main perspectives considered in the study, as well as the attention focus.

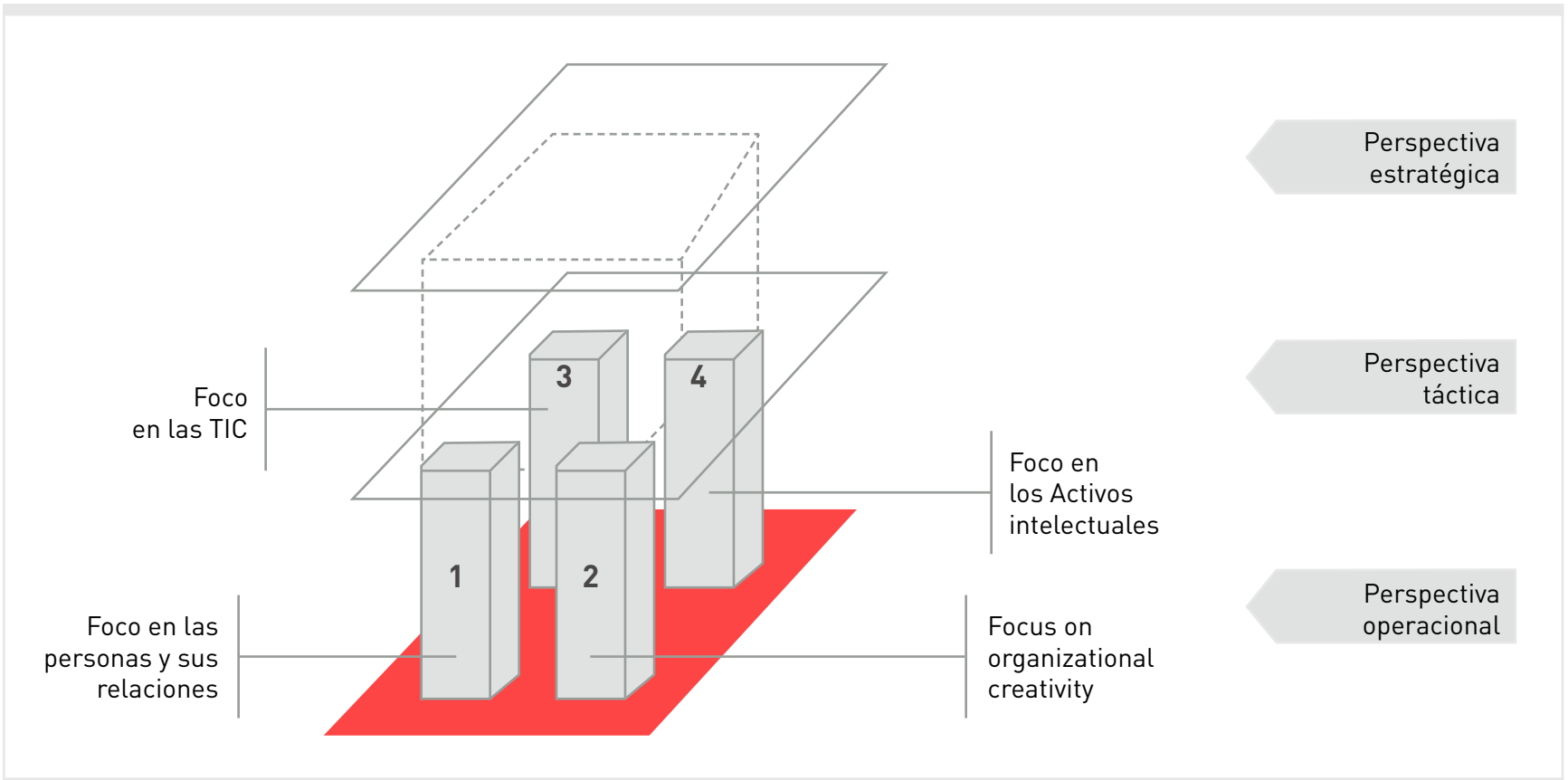

Figure 2. Focus areas for a Knowledge Management strategy. Adapted from *Introducción a la gestión del conocimiento y su aplicación al sector público* (p. 12), by A. M. B. Peluffo *and* C. E. Catalán, 2002, Santiago de Chile: Instituto Latinoamericano y del Caribe de Planificación Económica y Social – ILPES. Copyright 2002 by United Nations.

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Obtaining solutions to problems in human learning systems requires the construction of conceptual models with three ingredients: a theoretical framework, a logistics scenario and a solution protocol which integrates and makes them work (Barojas, 2002).

First, it is worth mentioning that the theoretical framework allows for the understanding of beliefs, ideals, concepts, attitudes and values of the members of the learning community involved in the solution of the problem and the context in which this is defined. Second, the logistics scenario is comprised by such community's operational conditions and principles, and refers to the human, material and technological resources it has, as well as to the practical skills that make its functioning possible. In this sense, the solution protocol refers to the procedures considered relevant to give response to the problems of interest in the learning community.

Barojas and Dehesa (2001) and Duval (1993) propose a problem solution protocol derived from the application of learning cycles where natural, technical and formal languages intervene, as well as different registers of semiotic representation, such as texts, symbols, formulas, models, outlines, curves, graphics, tables and codes.

This protocol is named TADIR, in explicit reference to the initials of the five stages that compose it (Barojas & Pérez, 2001): T-Translation, A-Analysis, D-Design, I-Implementation and R-Revision The first four stages (TADI) define the cognitive dimension of the protocol and serve in the construction of the conceptual model required to obtain the solution, while the fifth (R) refers to the metacognitive dimension and helps in the evaluation of the solution obtained (see Table 1).

Now, according to Nonaka and Takeuchi (1995), in knowledge creation and management it is convenient to consider that knowledge can be of two types: tacit (T) and explicit (E), so four possible ways of conversion between Tacit and Explicit can be established. In agreement with the above, the creation of organizational knowledge goes through the following five stages: first, sharing tacit knowledge (socialization: from Tacit to Tacit); second, creation of concepts (externalization; from Tacit to Explicit); third, justification of concepts (internalization: from Explicit to Tacit); fourth, constructing archetypes or models and finally, obtaining crossed knowledge (combination: from Explicit to Explicit).

For this study, the application of the TADIR protocol in the training of undergraduate students in the field of agrometeorology, an activity that belongs to the subproject is described: Technology and information development and transference based on agrometeorological research, supported in the strengthening and extension of the agrometeorological network in the state of Anzoategui.

Figure 3 shows the model combined with organizational learning, which served as a basis for the study, putting emphasis on the perspective of change addressed in the study of a series of theoretical contents that imply a certain type of relation between organizational learning and organizational change.

APPLICATION OF THE ORGANIZATIONAL KNOWLEDGE MANAGEMENT MODEL IN THE DEPARTMENT OF AGROMETEOROLOGY

Now, to orient the organizational knowledge management, four goals and the criteria to determine that each one of the goals be reached were established, thus strengthening educational or training processes, as observed in Table 2.

To determine the fulfillment of the goals previously indicated, two criteria were estab-lished: the first is related to the qualitative aspect, by observing the implementation of knowledge management mechanisms; the second criterion is related to the quantitative aspect when implying some kind of production such as reports, thesis or papers. Then a summary of the solution proposed is presented by applying the TADIR protocol to the student population who participated in the events developed by the service.

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Table 1
Description of the TADIR Protocol and its Application in Human Learning Systems (Barojas, 2003)

STAGE	DESCRIPTION	APPLICATION
Translation	The statement of the problem is usually written in everyday language (natural), so it is rephrased in the language of the corresponding discipline.	It seeks to provide an answer for: who integrates the learning community in charge of the problem solution?, in which transformation activities are they involved?, with what purposes?, in which topics? and with which resources?
Analysis	All assumptions required for interpreting and constructing the problem solution are made explicit, taking into account the models and theories which are relevant.	It seeks to describe the main factors that explain the functioning of the system and point out which are the connectivity objectives, restrictions and conditions.
Design	An outline or conceptual diagram showing the line of reasoning is proposed. This includes the concepts, arguments, evidence and demonstration to use the problem solution.	It proposes a graphic representation of the elements in the cognitive space of the solution which refers to three transformation activities. (1) educational research with the aim to understand the critical factors and the operational principles, (2) development to make things work efficiently as planned, with quality and success, and (3) communication relates to the emission, reception and interpretation of messages.
Implementation	The path stated in the Design is put into practice, including definitions, criteria, and other information and procedural elements necessary to solve the problem, using natural, technical or formal languages.	Use of monitoring and control mechanisms to put the problem solution into practice. The monitoring mechanism is defined in terms of the so called "21st century skills": alphabetization, inventive thinking, effective communication and high productivity (NCREL, 2000).
Revision	All and every previous stage is considered to detect possible conceptual errors, wrong or erroneous assumptions, wrong calculations, results obtained under conditions that prove to be inapplicable or inadequate. The answer obtained is compared with that expected to reconsider the problem.	Each one of these transformation activities is considered a subsystem for which its meaning is defined, and the corresponding processes or products are specified.

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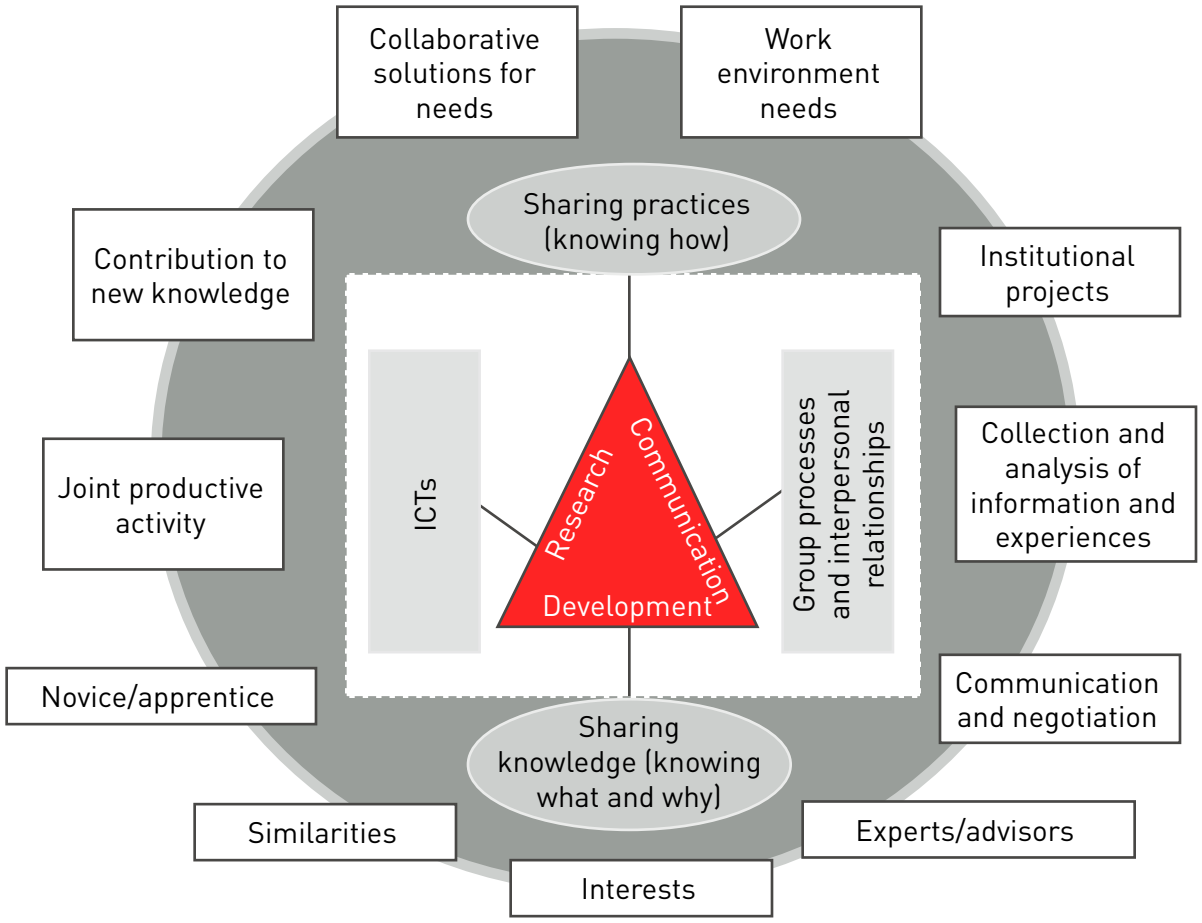

Figure 3. Combined Model of Organizational Learning Adapted from "The Learning Organiza-tion: Change Proofing and Strategy", by S. Drew & P. Smith, 1995, The Learning Organiza-tion, 2(l) (p. 10), Copyright 1995 by MCB University Press.

Table 2

Description of the Goals and Criteria Established

META	DENOMINACIÓN	DESCRIPCIÓN
1	**Approach**	Construction, implementation and analysis of the use of instruments to identify the resources, needs, threats, strengths and possibilities of the service users.
2	**Training**	Events such as courses, workshops, colloquiums, and on-site and off-site conferences to promote knowledge in agrometeorology with the integration of multimedia resources, as well as the development of presentations, teaching material and contributions to the network electronic portal.
3	**Evaluation**	Considering evidence that shows improvement in users' performance.
4	**Implementation**	Comparison of the achievements reached by users under study and proposition of other applications and extensions.

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Translation Stage. In the context of today's society, characterized by the use of information and knowledge, education is an essential factor. First, for social equity reasons, for the Venezuelan state to comply with its responsibility of providing all citizens the same capacities that will allow them to take advantage of opportunities; and second, because the resources invested in educational and training programs are the best way to assure a country—in the short and long run—greater growth and equity, improving the abilities and dexterities that may be used throughout life and have direct effects on future incomes.

The purpose of this translation stage is to conform a learning society in which students of the different institutes and universities of South Anzoategui may explore each one's abilities and potentialities, emphasizing what each one is able to learn. It is also expected that the members of this learning community share their experiences and exchange their communications with the support of resources oriented towards information and communication technologies, so that organizational knowledge is constructed jointly.

Analysis Stage. Each one of the training events in the area of agrometeorology established the perfection of the students' abilities, the acquisition of new competencies and the development of aptitudes to perform in the profession or service related to agriculture. In this sense, the training courses were aimed at a teaching focused on the fundamentals of knowledge and not merely on procedures, as has traditionally been the case in Venezuelan universities.

The problem solution is established within a constructivist model for the teaching of natural sciences. It is convenient to point out that among the most frequent limitations found in institutions and universities that offer the programs related to agricultural sciences in South Anzoategui, we find a high percentage of advanced age faculty or facilitators, which generates certain fear in the use of ICTs; also little availability of students' economic and technical resources; and finally, the strict development of the traditional teaching method to which students are subject.

It is worth mentioning that the majority of participating students were willing to get involved in the events where the topic of agrometeorology with technology was addressed. In this way, the students may be able to own the training process and the acquisition of a more comprehensive vision of their profession, as well as have a look at the curricula from a social, political and agricultural perspective with the purpose of improving the rational use of resources and making a larger commitment with the development of knowledge possible.

Design Stage. In this stage, a graphic representation (see Figure 4) of the elements in the cognitive space of the solution which refers to three transformation activities was made. (1) educational research with the aim to understand the critical factors and the operational principles, (2) development to make things work efficiently as planned, with quality and success, and (3) communication relates to the emission, reception and interpretation of messages.

Implementation Stage. During the 2009-2013 period, a series of courses, workshops, colloquiums were developed and aimed basically at students, faculty and producers from agricultural communities (see Table 3). These events were carried out together with the School of Agronomy of Universidad Nacional Experimental Politécnica de la Fuerza Armada (UNEFA), Universidad Bolivariana de Venezuela (UBV), Misión Sucre, P.N.F. en Gestión Ambiental, Instituto Universitario de Tecnología José Antonio Anzoátegui (IUTJAA) at El Tigre and Pariaguán. The objectives of the events were to socialize and evaluate the potentialities, limitations and weather characteristics of the environmental systems in order to improve production and its quality; reduce the loss and climatic risks; reduce costs; improve the efficiency in the use of water, work and energy; and keep the potential resources in the region.

Figure 5 shows the different types of training in which students from the different educational institution previously mentioned participated. In principle, we pretend to promote the activities programmed in a comprehensive manner within the framework of the agrometeorological network in Anzoategui, including new information patterns for the dissemination of

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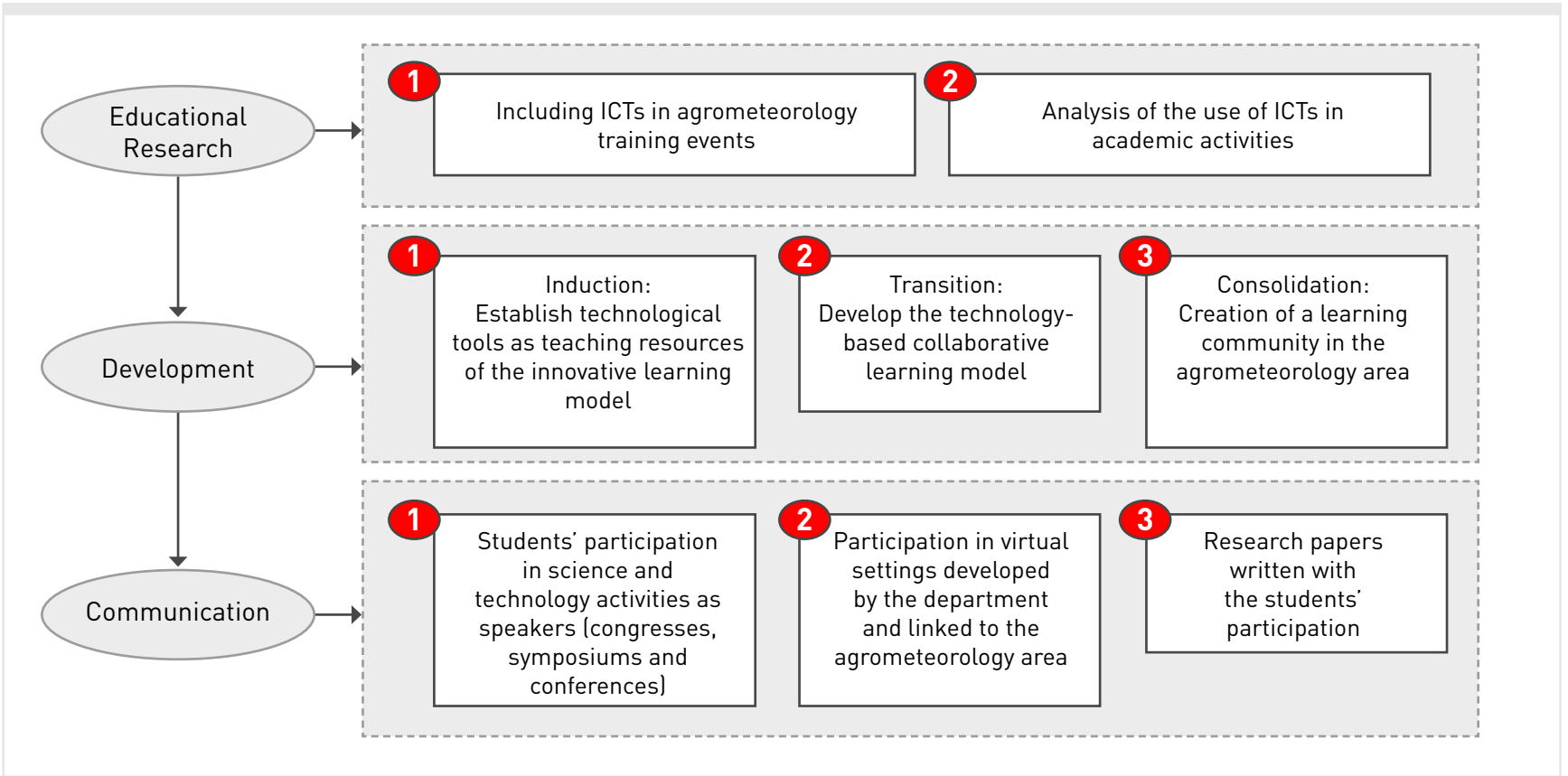

Figure 4. Graphic representation of the elements in the cognitive space of the solution referred to in the three transformation activities. Adapted from "Mathematics for Social Scientists: Learning Cycles and Teaching Strategies", by J. Barojas & N. Dehesa, 2001, Industry and Higher Education, 15(4) (p.7), Copyright 2001 by IP Publishing Ltd.

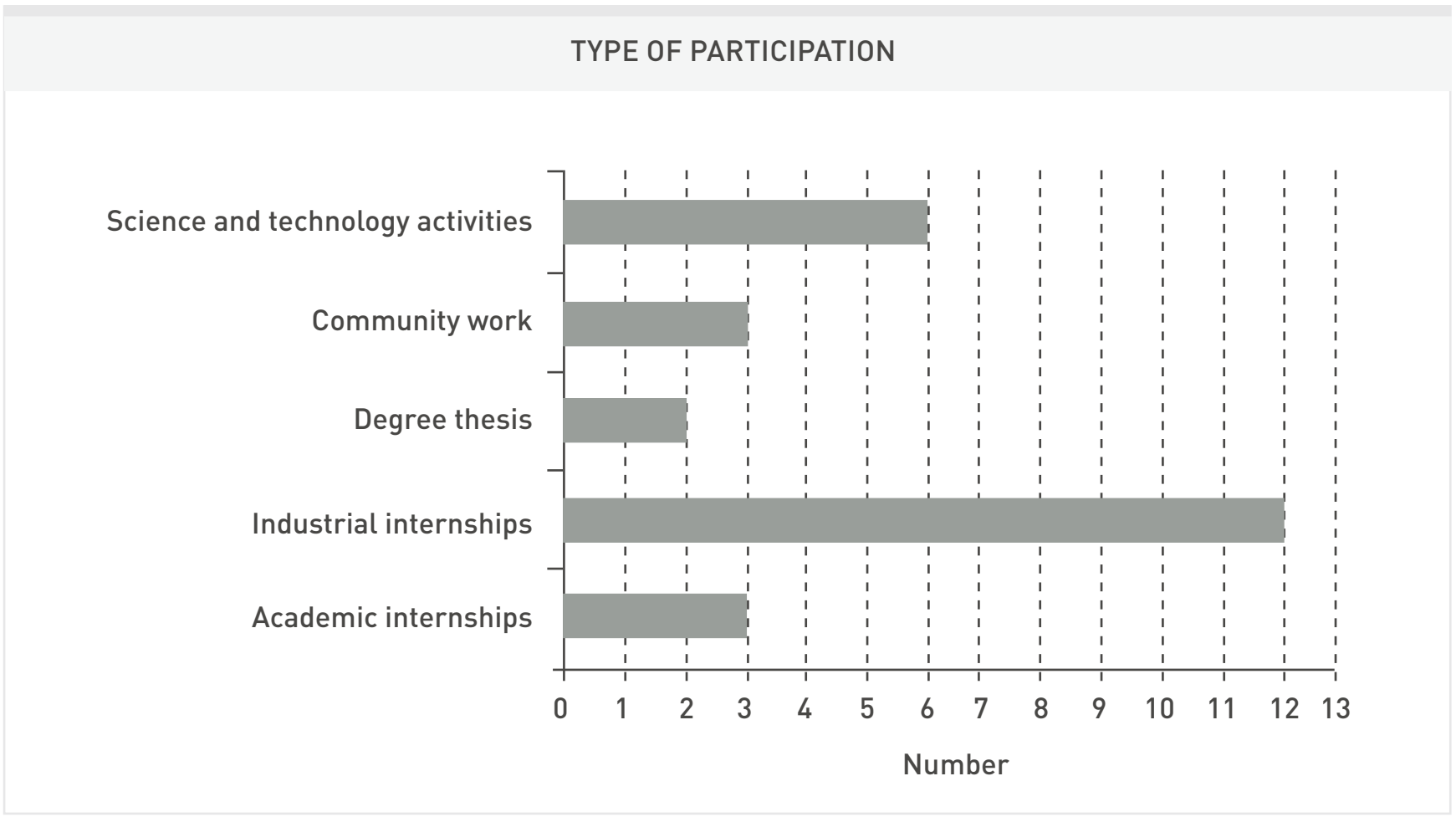

Figure 5. *Student participation in the different types of training in the 2009-2013 Anzoategui agrometeorology network project.*

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Table 3
Events Developed by the Agrometereological Service of INIA Anzoategui, 2009-2013

N	EVENT	INSTITUTION/ COMMUNITY	PARTICIPANTS
1	Course: Determination of the Hydric Requirement of Crops	UNEFA	27
2	Workshop: Agroecological Alternatives for the Agronomic Management of Crops	UNEFA and UBV	25
3	Colloquium: International Experiences Exchange: Connecting Countries for Strengthening Latin American Climate Knowledge	IUTJAA El Tigre and Pariaguán	12
4	Theoretical Practical Course: Interpreting Climate Information with Agricultural and Environmental Purposes	UNEFA	34
5	Workshop: Agroecological Management of Crops in the Mesa de Guanipa	IUTJAA El Tigre	35
6	Workshop: Generalities on Sustainable Soil Management under the Tropical Dry Forest	IUTJAA Pariaguán	41
7	Practical Workshop: Sustainable Management of Soil in Agricultural Production Systems under the Tropical Dry Forest.	IUTJAA El Tigre	85
8	Workshop: Characteristics of Agricultural Interest Concerning Precipitation	IUTJAA Pariaguán	42
9	Course: Key Aspects for Data Collection in the Weather Station	UBV - Sucre Mission	18
10	Practical Workshop: Awareness Raising Concerning Agrometereological Knowledge	UNEFA Aguasay	29
11	Course: Socialization of the Agrometereological Knowledge in the Environmental System	UNEFA and UBV	21
12	I Colloquium on Sustainable Soil Management in Mesa de Guanipa	UNEFA	21
13	I Participative Conference on the Recognition and Evaluation of Fodder and Leguminous Fodder under Savannah Conditions	UNEFA	12
14	II Colloquium on Sustainable Soil Management in Mesa de Guanipa	IUTJAA El Tigre	25
15	Workshop: Characterization of the Hydric Regime with Agricultural Purposes	IUTJAA El Tigre	12
16	Popular Construction Workshop: Agroecological Management and Rescue of Manioc Crop Knowledge	Kashaama	16
17	Collective Participation Workshop: Agroecological Fundamentals for the Growth of Sweet Potato in the Eastern Plains	Kashaama	12
18	Working Group for the Strengthening of Popular Power: Hierarchization of Agrosocial Information as a Tool to Promote Communal Organization	Kashaama	17

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issues related to agrometeorology, which—to a certain extent— guarantee the knowledge empowerment in rural agricultural territories.

This project made different media or audiovisual and written resources available, supported by new ICTs to promote, spread and disseminate the applications and products generated in the agrometeorological environment which will be at the service of the people and for the people. Table 4 shows the number of research and dissemination products generated in the department with the active and leading role participation of students in South Anzoategui.

Two virtual environments were also generated, which allowed participants to relate to resources they had not used before and socialize with professionals and members of scientific associations nationally and internationally. In sum, technological didactics is an educational method that arises from the own need of education and educational technology. It is essential that technological innovation be accompanied by pedagogical innovation, for which it is necessary to incorporate strictly technological changes in educational projects and specially in regards to faculty. Current education must support pedagogical projects that promote the construction of knowledge. This entails concrete educational plans supported by technological aids that stimulate reflexion, analysis, proposition and execution as processes towards significant learning.

Revision Stage. The reflection point here is precisely the impact that technology has had in education with regards to training processes, where it is known that such impact has been null, mainly because of the little intention in the educational sector to adapt to the new student profile in this digital era. In that sense, we require a profound change in the way we educate or train people. We need to transform the way we educate based on obedience and punishment, orienting the process towards a bonding process between the student and an attractive environment associated with the use of technology.

This way, the solution proposed has demonstrated to be able to generate organizational knowledge within the training program for students at university level in South Anzoategui. However, there are certain limitations, as the students' lack of time to participate in these training events. Also, the little interest of faculty or educational institutions in involving their students in events of this sort. It is worth mentioning that the majority of students have the adequate computer equipment, which allowed their wide participation in virtual settings.

Table 4

Research and dissemination products generated in the project during 2009-2013 with the participation of students in South Anzoategui.

TYPE OF PRODUCT	QUANTITY	TOPICS
Scientific papers	9	Climatic variability, data quality control, local climate perception, phytopathology and temporal space analysis of precipitation
Book chapters	2	Soy crop agricultural management
Informational paper	12	Rain characteristics, importance of agrometeorology, local agrometeorology knowledge, irrigation and agrometeorology, irrigation systems, soil and water conservation
Total	23	

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CONCLUSIONS

From this experience it can be concluded that there are many aspects we need to consider to achieve a real knowledge management in educational institutions. First, we need to strengthen this complex and strategic approach in order to formulate knowledge policies, taking into consideration epistemological, pedagogical, organizational and social aspects of the scientific-technological and academic programs of the institution. Second, we need to consolidate institutional consistency by defining the objectives, mission, vision, tasks and objectives; then we need to assure organizational coherence and finally, achieve a close interrelationship between the institution's basic functions (teaching, research, extension and dissemination).

As a way of reflection, for the staff associated with the project, the experience meant a significant advance in the institution's trajectory, mainly because of the implementation of strategic elements of organizational knowledge management for innovation. Among the products of the agrometeorology network, publications in wide spread journals in the country, the training of a considerable number of people from different settings and the dissemination of science in community spaces stand out. For students who participated in the activities associated to the network, this experience represents the foundations to encourage more incursions in agricultural, teaching or extension research.

The results presented here may be easily replicated in other contexts and higher education institutions in terms of the implementation of a knowledge management process as the one applied, as long as the strategic elements promoted in this experience, the type of project to develop and the public involved are taken into account.

The important contributions by Barojas (2002); Barojas and Pérez (2001) and Barojas (2003) conclude that educational systems operate more efficiently, being more dynamic and flexible, as long as we insist on the fact that the structural capital is of use only if the human capital knows how to use it, which implies an efficient organizational knowledge management. This knowledge should be developed in human organizations which extensively use ICTs in order to enrich knowledge and learning, both in individuals and organizations.

Due to the great and significant changes generated by the transition to a new agricultural production model, the development of different forms of knowledge dissemination is required in a wide sense. In the same way, the diversification of the ways to promote activities, tasks, results and products generated by the project, before, during and after its execution, in a complete and easy manner, is required. This needs to reach the population in a timely manner and with great content to impact and promote the adoption of technology and innovations, as well as to make the population aware of the advantages of agrometeorology and its importance in the agricultural development of the country.

Based on the statements above, we expect the effective use of knowledge management to allow for more efficiency in the work assigned to the organization. Likewise, through knowledge management, organizations foster the individual's development in their work by suggesting ideas and, at the same time, prevent "brain drain."

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