AGRUPE - A KNOWLEDGE MANAGEMENT TOOL

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Abstract: This paper presents a system in use at the Institute of Aeronautics and Space (IAE), developed specifically to support knowledge management, based on a hierarchical structure. This management is not only necessary to organize research endeavour itself, but also to identify commonalities between different research areas and needs for realistic planning and strategic development. The proposed system, AGRUPE, will also help to identify research leaders through the most relevant scientific production recognition.

1 INTRODUCTION

Information is the most relevant value in Institutions of Research and Development (R&D) where technologies are obtained through Research Projects (RP) developed by groups of professionals with common goals, named Research Groups (RGs).

RG, key unit of scientific research, can be defined as a community involved with the same topics of study, aiming scientific development and specific expertise. The interaction among different RGs should be encouraged and facilitated by knowledge management and information sharing in an open and not bureaucratized environment. RGs' structural organization does not need to coincide with the administrative structures of the related organization.

However, such a free environment may favour the existence of isolated and often similar RGs in the same organization, resulting in the duplication of facilities and development of similar technologies (Bhatt, G. D., 2001). Therefore it is necessary to ensure that the management of such scientific development and specific expertise are related to the organization's production chain and aligned with its strategic goals, promoting the interaction between the RGs. As a consequence, Research Networks (RNs) can be formed, where knowledge dissemination is accomplished by contact among researchers and interdisciplinary exchange of their experiences.

Considering this context, the need of strategic Knowledge Management (KM) is evident. KM can be understood as a "systematic, integrated, continuous, purposeful and interdisciplinary process that pervades the institution, which includes creating, identifying, selecting, organizing, sharing, disseminating, using and protecting strategic knowledge, generating value to the stakeholders and continually increasing the individual competence of each employee and the organizational learning" (Nonaka and Takeuchi, 1995).

Although this is a simple process, it is not always easily implemented due to each organization's unique characteristics. KM models should be developed considering these characteristics, including the culture that surrounds the individuals.

In order to carry on this process at Institute of Aeronautics and Space (IAE), a management system was developed and implemented, named the Research Group Archives; AGRUPE (an acronym in Portuguese), which is also associated to an R&D Project Coordination process already in place (Alves and Morais, 2009). For the alignment with IAE's strategic goals, typical requirements related to the aerospace development were created, aiming to obtain the needed technologies.

AGRUPE provides the necessary information for KM and, consequently, the scientific progress made by the RGs are shared and disseminated. AGRUPE also provides the Scientific Production Evaluation (SPE) of each member of an RG which helps to identify and recognize the leader of that specific RG. The customized queries make it possible to identify the involvement of IAE's Human Resource (HR) in the scientific scenario.

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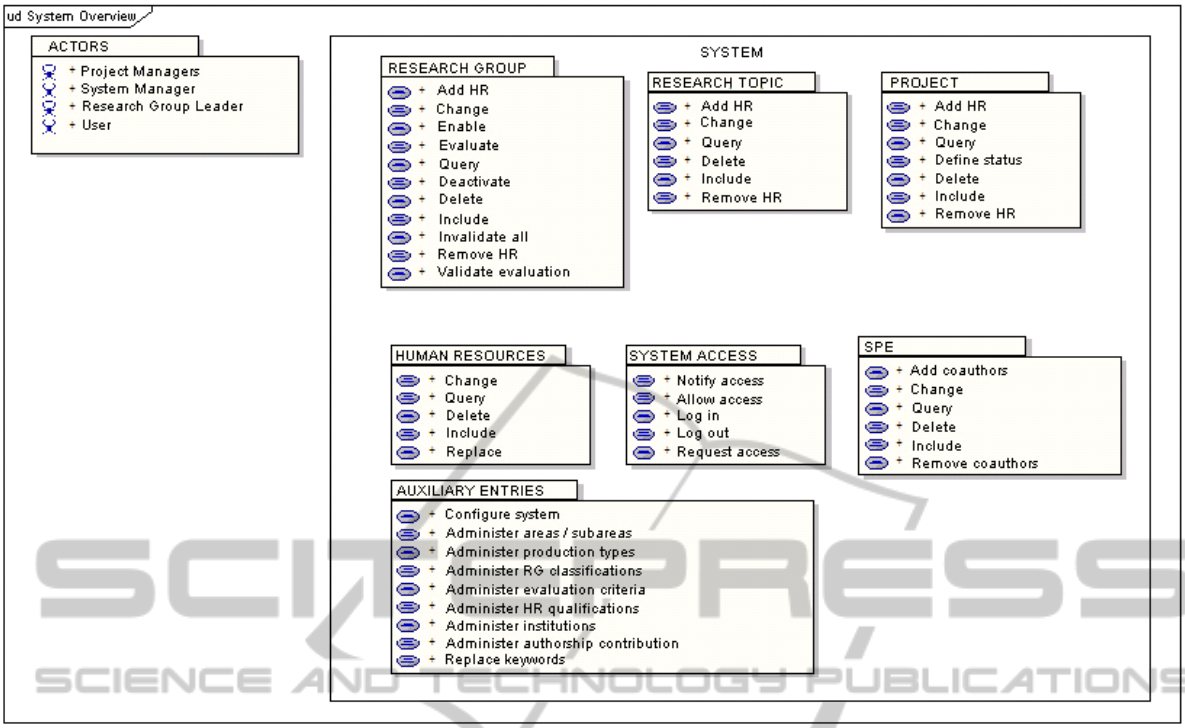

Figure 1: AGRUPE overview.

2 THE TOOL AGRUPE

AGRUPE consists of a database available on IAE's internal network server. It uses a GUI-based web browser that enables the collection, visualization, analysis and data management related to the various RGs, including Research Topics (RT) and their Research Projects (RP), HR and its Scientific Production (SP) and the relationship among diverse RGs, defined by their role in the client-supplier chain type.

2.1 Overview of the System

Figure 1 illustrates the overview of the system in which the actors and the main components of AGRUPE are presented, considering the definitions used in the Directory of Research Groups of Brazilian National Council for Scientific and Technological Development (CNPq, 2010). The system's hierarchical structure is based on the technical and scientific experience, and qualification of the RG's members. RPs are associated to a specific RT that, ultimately, provides the research findings, such as new technologies, scientific publications, technical reports and patents.

The actors of the system are classified into:

- Project manager: member of the group that performs maintenance of all information regarding the project.
- System Manager: responsible for maintaining supporting data and for validating the RG and the scientific-technical productions.
- Research group leader: Responsible for maintenance, validation and assessment of all information related to the RG.
- User: all individuals with access to IAE's intranet. This actor can make specific queries and visualize all information.

There is an inheritance and hierarchy relationship associated to the actors' access and privileges defined in the AGRUPE, making it possible to consistently structure the roles of each actor. The group leader, in addition to his own access rights, also has all the access rights given to the project manager, who in turn inherits all the rights of a user. The system manager also has all the user access rights in addition to his own rights.

2.2 Use Cases

The use cases were specified according to the types of actors defined in the previous section and also to

fulfil the following general requirements of AGRUPE:

- Clearance to access the system;
- Registration of information in general, also including supporting data;
- Management of RG, RT and RP;
- Assessment of the groups and associated HRs;
- Customized queries and general reports.

Table 1 shows the number of use cases identified and grouped by each system component.

Table 1: Number of use cases.

Component	N° use cases
System Access	5
Supporting data register	9
Research Groups	11
Research Topics	6
Research Projects	7
Scientific Production	6
Human Resources	5

From these use cases, the possible actions in the system are identified, including the supporting graphical interfaces, as well as a detailed description of each use case. Many different queries possibilities were established, supported by special selection filters available to each specific component.

2.3 Relationships among Components

The relationships among the AGRUPE's components were determined by the standard definitions adopted by the Institute. The identified components were: RG, RT, RP, SP, SPE, HR, Knowledge Hierarchy (KH), Criteria, and Group Classification (GC) and its relationships are shown in Fig. 2.

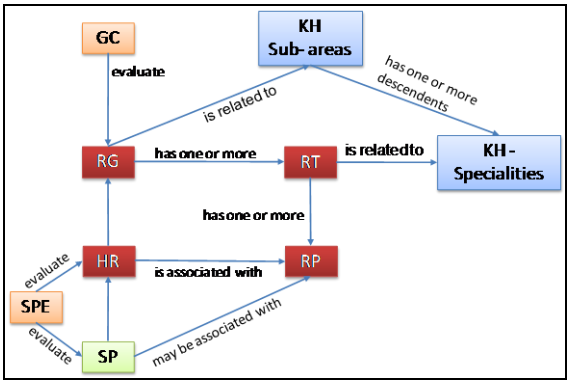

Figure 2: AGRUPE's components and its relationships.

2.4 Structuring of the Research Groups

The registration of a RG in AGRUPE is voluntary, but it is highly encouraged considering that this registration is a condition for financial funds approval to support the RPs of a group. Thus, an RG of minor relevance should look for interaction and join more structured RGs, hence mutually strengthening each other. The visualization of the research environment as a whole picture is vital for this integration, as well as the identification of the RG's leader, who usually has the highest SPE.

The desirable requirements for the RGs were established, according to the characteristics of the space research area. The main motivation behind this effort was to arrange their structure to better accommodate the needs of this area. The RGs are scored and classified according to the number and degree of atypical features presented by the system manager.

Each RG must therefore be organized around a leadership. The RG leader should be the researcher with the highest intellectual and academic qualification, who is normally responsible for coordinating and planning the group's research work.

A RG is formed by RTs that represents related themes of scientific studies from which projects originate, and which results have affinities with each other. In this way, a strong relationship between the topics and among areas, with apparent separation, is accomplished. The RTs are related to thematic topics, focusing on the knowledge production. The responsible for the RT is the researcher who, due to his/her experience in a specific knowledge area, plans the activities and proposes RPs, following up their implementation (CNPq, 2010).

Knowledge Areas (KAs) are classified into Subareas, which in turn have Specialties. Such Knowledge Areas classification has practical purpose, providing a functional manner to aggregate knowledge information, enabling its systematization. The Knowledge Area refers to the set of interrelated knowledge, collectively constructed and assembled according to the nature of the research object. The Knowledge Subareas represent segmentations of the Knowledge Area, correlated with the main study object, and methodological procedures that are recognized and widely used (CAPES, 2010).

The Knowledge Specialty is the thematic characterization of the research activity, and due to the possibility of being related to different areas and subareas, results in greater flexibility in representing

specific interests, favouring the inclusion of topics of interdisciplinary nature (CAPES, 2010).

3 CRITERIA

The requirements that a RG should fulfill, are:

Requirements with weight 3:

- Contain more than one member;
- Have a relationship with another RG;
- The leader must have a doctorate and lead only one RG;
- Be clearly associated with the Knowledge Subareas adopted by AGRUPE;
- Have the exclusive RTs that are associated with the Knowledge Specialties adopted by AGRUPE;
- Contain at least 50% of the members with exclusive dedication in that RG.

Requirements with weight 2:

- Have only one leader and with the highest SPE;
- Contain doctors;
- Contain at least two RTs;
- Have an on-going RP;
- Have members of more than one organizational unit of IAE;
- Have infrastructure located at IAE.

Requirements with weight 1:

- Contain students and technicians;
- Contain no more than five RTs;
- Have all members registered in the Lattes Database (LATTES PLATAFORM, 2010)
- Have fellow researchers of outside institutions;
- Have appropriate infrastructure for RP.

The SPE is performed considering:

- Authorship, considering the main author and the number of co-authors;
- Publication of articles in journals and in scientific events;
- Participation in academic activities;
- Authoring of technical reports;
- The patents, books or book chapters published.

The groups are classified based on a scale that can be adjusted according to organization´s needs.

4 FINAL CONSIDERATIONS

Differently of others systems for KM implemented in Africa (ANSTI, 2010), Canada (SCIENCE CA, 2010), Japan (ReaD, 2010), Italy (DAVINCI DATABASE, 2010; RIDITT, 2010) and Brazil (LATTES PLATAFORM, 2010), AGRUPE provides support for orientation of isolated skills, grouping them around expertise and leadership, recognized by no subjective criteria.

Since AGRUPE started operating, it was observed that the system promoted synergy among the diverse groups of the IAE, resulting in unique, bigger and stronger RGs, changing the dominant situation before AGRUPE. There were an excessive number of RGs considering IAE's core business and size and most of the RGs were not aligned with the hierarchy of knowledge with a high number of atypical features.

Finally, AGRUPE shows that KM does not always require sophisticated instruments. The use of information technology produces positive results, but it also requires significant and continued endeavour to build, maintain and upgrade its functional aspects as well as the content involved.

REFERENCES

Alves, M. B. and Morais, A. M. F. (2009). The management of knowledge and technologies in a space program. *Journal of Aerospace Technology and Management.* 1 (2), 265-272. doi:10.5028/ jatm.2009.0102265272

ANSTI. Retrieved Jul 19, 2010, from http://www.ansti.org.

Bhatt, G. D. (2001). Knowledge Management in Organizations. *Journal of Knowledge Management.*5(1), 68-75.

CAPES - Table of Knowledge Areas. Retrieved May 8, 2010, from http://www.capes.gov.br/avaliacao/ tabela-de-areas-de-conhecimento.

CNPq - National Council for Scientific and Technological Development. Retrieved May 8, 2010, from http://www.cnpq.br/gpesq/apresentacao.htm.

DAVINCI DATABASE. Retrieved Jul 19, 2010, from http://www.esteri.it/davinci.

LATTES PLATAFORM. Retrieved Jul 19, 2010, from http://lattes.cnpq.br.

Nonaka, I. and Takeuchi, H. (1995). The Knowledge-Creating Company, New York: Oxford University Press.

Read. Retrieved Jul 19, 2010, from http://read.jst.go.jp.

RIDITT. Retrieved Jul 19, 2010, from http://www.riditt.it.

SCIENCE CA. Retrieved Jul 19, 2010, from http://www.science.ca.