

CONCEPTUAL MAPS AS A TOOL FOR KNOWLEDGE MANAGEMENT AT UNIVERSITIES

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Abstract. Universities are responsible for a large part of the nation's scientific knowledge creation. The knowledge is created through research, teaching and extension activities however it is not always systematized in a way to guarantee efficient access and use. Thus, actions are necessary to systematize this created knowledge in an adequate way. The knowledge management is a method that works with knowledge in different kinds of organizations. The objective is to create a favorable culture to access, share and use the knowledge. One of the tools that can be applied to knowledge management is the conceptual maps which allow the identification and comprehension of the existent knowledge in a determined context. The conceptual mapping technique was applied to the Information Science Department from Sao Paulo State University, as a way to systematize a part of the expert knowledge created by the department's teachers/researchers. The concepts and propositions to elaborate the map were identified by the application of the Delphi Method.

1 Introduction

Knowledge management is a management method that involves techniques, tools, instruments and actions to guarantee the right systematization, socialization, sharing and dissemination of the knowledge in organizational environments. People are able to systematize and socialize knowledge to others and if they are encouraged to appropriate, use and/or apply this knowledge, the process may result in generation of new ideas, creating more knowledge in a continuous spiral. Knowledge maps are one of the tools that makes knowledge management feasible. This tool is emphasized because it is able to systematize the existent knowledge in a determined context and it permits to comprehend what a person or a group thinks about determinate subject, theme, concept etc.

The Brazilians universities are responsible for a big part of the scientific knowledge produced in the nation. This knowledge is constructed through teaching, research and extension activities and it can be reverted to the society through improvement actions impacting in the economic, social and technologic development. However, a big part of this constructed knowledge is limited to the person or group involved in its generation. One of the reasons why it happens is because there is not an adequate organizational action to register and disseminate knowledge. The practices of knowledge management can contribute for knowledge socialization and sharing in a more efficient way on the organizational environment, internally and externally, propitiating the continuous spiral of knowledge construction and then amplifying its access, appropriation and use.

The conceptual mapping was applied with the intention to accomplish the scientific knowledge management on the Information Science Department (ISD) of Sao Paulo State University (UNESP), as a way to systematize part of the existent expert knowledge. From the application of conceptual mapping, it was possible to obtain a map about the Information Science concept whose construction happened from concepts and propositions found between the ISD teachers/researcher. Moreover, it was used the Delphi method which permitted to collect the concepts and propositions in multiples and different rounds.

2 Conceptual Maps as a Tool for Knowledge Management

The knowledge management aims to socialize the knowledge constructed individually to a determinate group, creating, this way, a dynamic that feeds the knowledge generation individually and collectively. The knowledge management applied in any environment permits a spiral that aims for identification, capture, systematization, sharing, dissemination, use and appropriation. According to Machado Neto (1998 *apud* VALENTIM, 2003) knowledge management is a "set of strategies to create, to acquire, to share and to use knowledge assets". Among many tools that can be applied to the knowledge management, the conceptual maps are emphasized.

The conceptual maps arose on the 60s in a research directed by Joseph Novak (NOVAK; CAÑAS, 2006). According to Tavares (2007, p.84) the conceptual maps are understood as “a visual representation used to share meanings” able to transform in concrete what was abstract. This way, the expertise can be mapped in a determined organizational environment whose advantage is related to the knowledge joining its source preserving determined knowledge tacit characteristics which in many times can be lost when the mapping or systematization is accomplished.

Through the graphic visualization provided by the conceptual mapping it is possible to verify a determined knowledge and its specific and generic relations adding thus different possibilities of perception and reading because the reader can interact with the map applying his/her own knowledge. The conceptual maps objectives are aligned with the knowledge management worries mainly in its efforts of identification, capture, sharing, use, appropriation and re-elaboration of knowledge.

3 Knowledge Management at Universities: Sao Paulo State University case

The Brazilians universities play a important social, politic, technologic and economic role for the country. Chauí (2001, p.35) says that universities are social institutions which accomplish and express in a determined way the society which it is part of. They are institutions of knowledge generation and diffusion (FIGUEIREDO; SOBRAL, 1991, p.57). Therefore a big part of the scientific knowledge constructed in the country is product of the work developed by universities. This knowledge interests not only the academics but also the whole society because as Von Albada (1974, p.136, our translation) says “(...) the scientific studies turned into a necessary condition to a good functioning of society”.

The Sao Paulo State University (UNESP) is different from the other universities mainly because it has a multi – campus structure which is distribute in 23 (twenty three) cities in the State of Sao Paulo. In this way the UNESP has a wide insertion in the State participating expressively on the regional development where its campus are located. In the city of Marilia, in the western of the State, is located the Philosophy and Sciences Faculty (PSF) which shelters 9 (nine) of the 168 (one hundred and sixty eight) University degrees. Among those 9 (nine) degrees are the Librarianship Bachelor Degree and the Archival Science Bachelor Degree which together compose the PSF Information Science Department (GARCIA, 2009).

The Information Science (IS) is a scientific field that approaches studies focus on data, information and knowledge understanding that those three elements are interconnected. The scientific field researchers develop theories and practices to guarantee the success on the use and appropriation of data, information and knowledge to any social and economic segment that needs them. The Information Science is a relative new science according to some authors who discuss that its organization as a scientific field starts on the 60s. (SARACEVIC, 1996). It is important to remember that inherent tasks from this science such as the Librarianship, the Documentation, the Archival Science, the Computer Science etc, are older than the IS.

Certainly it is not an easy task to systematize the existent knowledge in a university however it is necessary. Promoting actions to identify, systematize, share, access, use and appropriate knowledge turns it possible the construction and re-elaborating of “new” knowledge maintaining dynamic the knowledge spiral. In recent sciences as the Information Science, the adequate management of the knowledge can favor the construction of foundations, objects and phenomenon promoting a reflection to better knows the field. Thus it is understood that the knowledge management application is necessary in universities so the scientific knowledge can be shared, disseminated, used, appropriated and re-elaborated by all the interested people.

4 Methodology

A descriptive-exploratory research was developed to accomplish the scientific knowledge management on the Information Science Department (ISD) of Sao Paulo State University (UNESP), as a source to systematize part of the existent expert knowledge. This way, it was used the conceptual mapping technique and the Delphi Method as described below.

Starting from the recommendations proposed for Joseph Novak (1998) a research syllabus was constructed. Then the focus question to the map was defined by the importance to know the existent concept about “Information Science” among the ISD teachers/researchers. To find the concepts and propositions to compose the map it was used the Delphi method. According to Zins (2007) this method works as a facilitator resource on the discussions among experts. Through the structuring and after applying a questionnaire it is possible to a group of experts shows its opinion about a determined phenomenon (PEDROSO, 2006, p.103).

The objective was to find along with the ISD teachers/researchers concepts and propositions about Information Science comprehended individually. The research subjects were experts on the Information Science field thus the Delphi method was considered the more adequate method to identify and find the concepts and propositions to compose the map according to its characteristics.

Through a presentation letter the 15 (fifteen) UNESP ISD teachers/researchers were informed about the research focus and objectives and invited to participate of the Delphi method rounds. It was constructed a questionnaire with open questions about the Information Science theme and it was sent to the 15 (fifteen) research subjects, which 8 (eight) answered to the first round. Following the Delphi elaboration methodology the answers given by the 8 (eight) subjects on the first round were systematized in a single document and re-sent to the subjects for appreciation and adjust of the answers given on the method first round. So the subjects answered with new alterations.

From the collected data on these two rounds it was possible to construct a conceptual pre-map using the software *CmapTool*. The pre-map was sent to the research subjects who, in turn, were instructed to make alterations that they judged necessary. Some alterations were done and then it was constructed the conceptual map about the UNESP’s Information Science scientific field.

5 Results and Conclusion

During the three rounds of the Delphi method application it was collected information that were compiled, organized and represented in a visual and clear way, this way helping the access, comprehension, dissemination and use of this information. It was created a big main map to present the results facilitating the structured analysis publicizing. However this main map was dismembered to better understand the final map. One of the dismembered parts can be seen below:

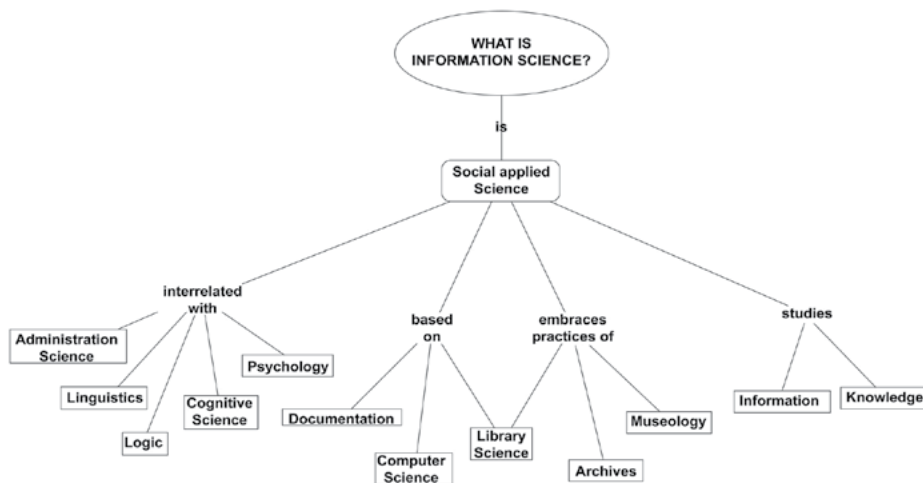


Figure 1. UNESP Information Science Conceptual Map – Dismembered Part

The conceptual map, resulted from the research, brings the definition about Information Science in a general way according to the research subject’s opinion. The map presented on the Figure 1 is the main map reduced version developed during the research and the objective is to allow knowing the different teachers/researchers view in a simplified graphic way.

From this conceptual mapping it was possible to obtain an individual definition about the Information Science scientific field of the collective opinion shared through the Delphi's rounds. By the graphic visualization answers provided by the map structure each teacher had the opportunity to access their department colleague answers inter-related with their own answers instigating this way a more critic view about the subject.

The results of this work demonstrated that conceptual mapping is a very useful technique to be used on knowledge management projects. The ISD conceptual map also helped the researchers to understand what Information Science means for the ISD staff. The map was presented for the ISD teachers who agreed that it was important to be presented for students, researchers, professors and other people involved in IS field from inside and outside UNESP. By doing this, people can understand how UNESP's ISD comprehends the IS field which can make possible part of the construction of IS field in Brazil. This work has fomented the study, discussion and production of other studies related to knowledge management and knowledge maps on UNESP IS field. It is still the begging of a long path to go through for an effective use of the knowledge management and the meaningful learning benefits.

It is necessary that research continues so that other relations among the concepts can be made modifying, amplifying and complementing the map. The biggest challenge of the research was to guide the teachers/researchers to systematize and externalize their own knowledge. The proposal is starting from this initial map and with help of the *CmapTool* software the teachers/researchers can modify the map inserting new concepts, creating new relations and continuing to accomplish a meaningful learning.

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