

A PROPOSED MODEL FOR TRACKING THE UNIVERSITY INTERDISCIPLINARY PROJECTS

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ABSTRACT

Interdisciplinary is the concrete interaction between two or more knowledge fields, leading to a transformation of any of the involved disciplines. It is proposed that the way to measure if an interdisciplinary project is successful is to show the transformation of the key concept(s). The model proposes to establish an initial conceptual basis for each discipline, and a crossing matrix of the same or similar concepts from all disciplines used in a research project. At the conclusion of the project, the reformulated concepts are verified into the matrix.

1. INTRODUCTION

At the universities, interdisciplinarity is proposed as a way through innovation (Cabrera, 2006). It's not easy to demonstrated if an interdisciplinary research project has been succesful, because it's hard to show the knowledge fields transformation.

2. PROPOSED MODEL

Research projects for innovation are involved in a middle and long term processes. These processes begin with an interaction of knowledge fields (Piaget, 1973) reveling three moments:

i) First moment: to promote and to manage Multidisciplinarity, that means the colaboration between disciplines involved in the efforts to resolve an specific problem. In this moment it is necessary to specify clearly the research lines in every discipline involved. For each research line there must be a responsible person designed.

ii) Second moment: The holistic vision of the project and the management must be in charged of the University Research Department, in order to promote and to manage Interdisciplinarity to solve *complex problems* (Morin, 1996) or to create *revolutionary science* (Kuhn, 1962) beyond *the Scientific Method* (Asimov, 2007).

iii) Third moment: walking through Transdisciplinarity: remove Faculties as promoters of

research (Martí Marco, 2012); and create dynamically research units ad-hoc for research projects.

2.1. For the first moment, Multidisciplinarity, the research project profile must include:

- a. A table that clearly identifies the different lines of research to be addressed and which skilled professionals will be involved in the investigation of each line.

Table #1: Disciplines, Areas and Lines of Research

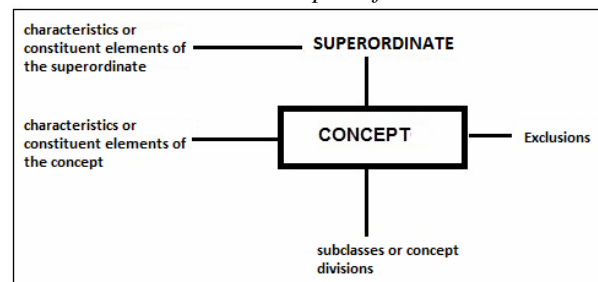
DISCIPLINE 1		
Knowledge Area	Research Line	Expert
DISCIPLINE 2		
Knowledge Area	Research Line	Expert
.....		
DISCIPLINE 3...		

- b. In the schedule, pinpoint the stages in which the expert professionals get involved by specialty.

2.2. For Interdisciplinarity, in the research project profile add:

- a) A conceptual basis, identifying the concepts on which the research will be conducted.
- b) If a concept has different meanings in each discipline or research area, it is necessary to register all these meanings following the next steps:
 - a. Set down a *Concept Definition* for each discipline:

Table #2: Concept Definition



- b. Every Concept Definition must be allocated in a Table called: Interdisciplinary Conceptual Basis

Table #3: Interdisciplinary Conceptual Basis

INTERDISCIPLINARY CONCEPTUAL BASIS			
CONCEPT	DISCIPLINE	KNOWLEDGE AREA	CONCEPT DEFINITION

- c. Analyze each Concept Definition in order to determine areas of influence and expertise of each concept. This analysis shows the differences of the same concept in different disciplines and areas of knowledge.
- d. If applicable, try to make a graph showing the relationship of the different definitions of the same concept.
- c) Perform a matrix or *matrices crossing the lines of research* in different disciplines. To do this, It should be taken into account that:
- There may be several types of crossings, among research lines of the same subject, or among different lines of research disciplines.
 - Organize level interaction of disciplines in binary form (KA: Knowledge Area; RL: Research Line):

Table #4: Crossing Matrix between Research Lines

			DISCIPLINE 1					
			K.Á. 1.1			K.Á. 1.2		
			R.L. 1.1.1	R.L. 1.1.2	R.L. 1.1.3	R.L. 1.2.1	R.L. 1.2.2	R.L. 1.2.3
DISCIPLINE 2	K.Á. 2.1	R.L. 2.1.1						
		R.L. 2.1.2						
		R.L. 2.1.3						
	K.Á. 2.2	R.L. 2.2.1						
		R.L. 2.2.2						
		R.L. 2.2.3						

- c. Create as many matrices as combinations of interacting disciplines there should be done: one matrix for 2 disciplines, three matrices for 3 disciplines, six matrices for 4 disciplines. The number of matrices is a combination of n things taken 2 by 2 regardless of the order. The formula to calculate the number of tables / matrices is:

$$\frac{n!}{(n-2)!} * \frac{1}{2!}$$

- d) In the crossing points write down the concepts that may have changed during the development of the research project. Consider all the concepts of the Conceptual Basis.
- e) Incorporate a Concept Map (network concept) that summarizes the relationship among all the concepts.

2.3. The Management or Research Department appoints an Ad-hoc Committee (due to Budget and the dynamics of the projects) consisting of experts in the knowledge areas involved and related that will discuss: the conceptual basis, the crossing matrices, and the concept map in order to help in their accuracy, and as appropriate, involve other actors and concepts related to the project.

2.4. In the project progress milestones, it is necessary to review possible concept changes using the Conceptual Basis and the Crossing Matrices Chart.

2.5. Interdisciplinary is achieved if:

- One or more of the concepts are transformed, since they were conceived differently in each discipline at the beginning of the research,
- A new common concept for several disciplines emerge.

3. CONCLUSIONS

The proposed model shows the transformation of the fields that have interacted within the investigation.

Monitoring the changes of the involved concepts in a research allow to track the transformation of the disciplines.

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