PROPOSITIONAL ANALYSIS MODEL TO THE COMPARISON OF EXPERT TEACHERS' CONCEPT MAPS

Maria Muradás López
School of Education Sciences, University of Santiago de Compostela, Spain

Abstract. This paper aims at going one step forward in the extraction of expert knowledge from good teachers. We present here a preliminary crosscutting analysis of 4 conceptual maps from 4 teachers. In order to do it we base in the Propositional Analysis Model (PAM) suggested by Campos and Gaspar (2005) in order to extract the joint conceptual core from the four cases. With this analysis we can move forward into the definition of good teaching key elements. This will allow us to establish good starting points in training junior teachers.

1 Introduction: Researching about expert teachers

Four years ago we started the Visibility Project: "Elicit and representation of university teacher's knowledge with good teaching practices: knowledge engineering to improve the quality of university teaching in the European convergence Framework".

The main objective of this project is to show good teaching practices in Higher Education. And to give guidelines for the training of junior teachers and to review the training practices for more senior teachers.

Six Spanish universities are involved in this Project; it is funded by the Spanish Minister of Education and Science through its R+D scheme. We have studied around 75 cases in different scientific areas. For more information on this Project please refer to Zabalza and Muradás. (This was a paper given in the previous Edition of this conference.)

2 Extraction and representation of expert knowledge from teachers with good teaching practices

We used semi-structured interviews in our project in order to extract knowledge, followed by the creation of conceptual maps to represent the teacher's knowledge.

We expected to obtain information on four big headings:
a) Their biography (in order to find out about the story of their lives and the different stages that they have gone through in order to reach their current stage).
b) Their teaching practices from the beginning of their careers till the present (how did they use to teach at the beginning of their career and how they teach now). We took into consideration a series of basic elements in the teaching practice.
c) Their ideas, opinions and satisfaction with their work and their results.

In this paper we will focus on the maps that we talk about in section b, and, more specifically on the ones that focus on the ways teachers plan their teaching.

3 Comparison of conceptual maps: Propositional Analysis Model (PAM)

PAM according to its creators is: is a discourse analysis method that leads to the understanding of the logical-conceptual and epistemological structure of a given text. It can be used to study any type of text. (Campos and Gaspar, 1997, 2005)

Taking the text, it transforms it in propositions with the structure CRC (concept – relation – concept). This structure (called propositional map) it is the same as it is used in the creation of conceptual maps, that's why we think that both models are symmetric and it can complement each other.

We don't take PAM in its full extension. What we are really interested in finding out about is the similarities that exist between different teachers maps; this would allow us to understand the common elements that lecturers use.

We will start by creating what in the PAM is known as conceptual core, namely each one of the four maps that we will work with in the case (see MC 4-6).
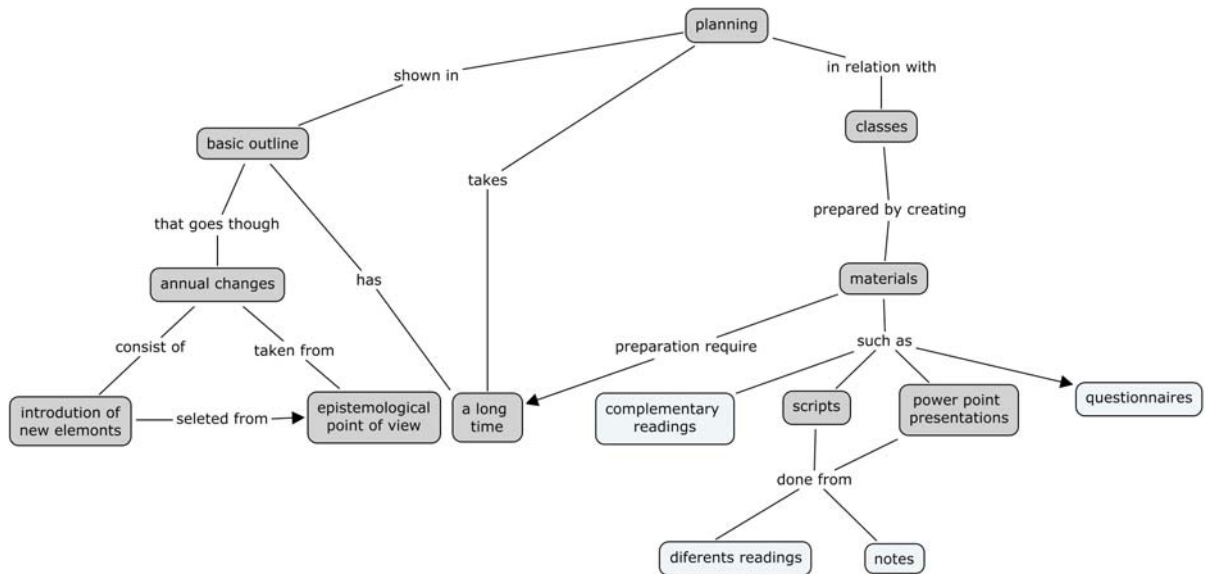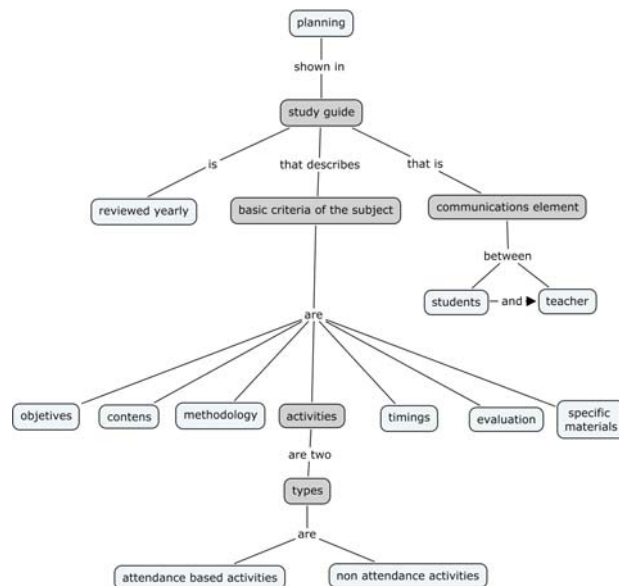

CM 4: IZC Conceptual Core

Next we will analyse the correspondence in three levels:
a) Conceptual correspondence: what Concepts appear repeatedly in the different maps.
b) Relational correspondence: to see if the links established by the concepts from section a) have any sort of correspondence.
c) Correspondence with the core: to identify the Concepts that correspond with each other within the core.
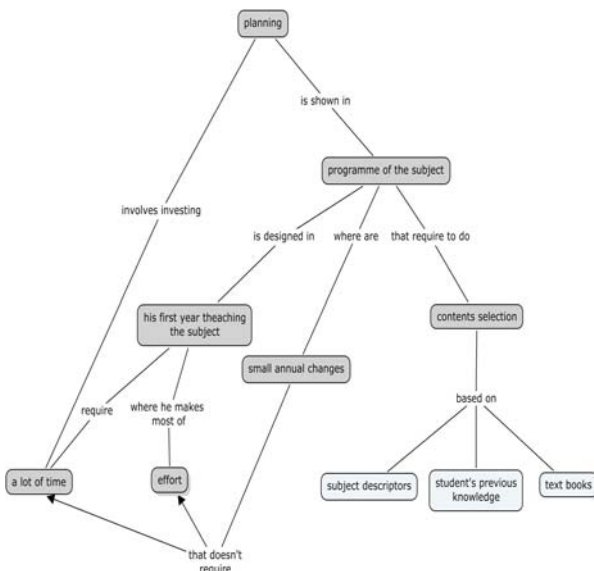
CM 5: DD Concept Core

CM 6: MTC Concept Core

In that way we can put together what would be the shared conceptual core of these teachers in relation to, in this case, the planning of their teaching.
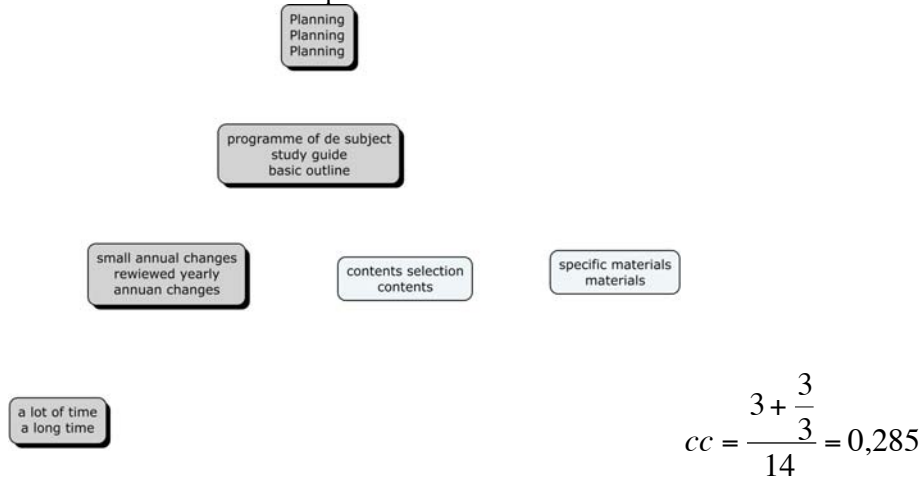
3.1 Conceptual correspondence

As you can see looking at the MC7 there is a correspondence in six concepts (three come up in the three cases and the other three come up in two of them). If we refer to the conceptual correspondence levels, we can say that:

It is the same (same word or expression is used) in two of the concepts (planning and a long time ago).

It is equivalent (it has got very strong semantic similarities) in three of the concepts (annual changes, contents and materials).

It is referential (it has a peak semantic similarity) in one of the Concepts: subject programme; basic outline; studies guide. These concepts can refer to a common element (the programme or subject guide) or to more different concepts.

We must add, that during the interview we didn't explore the significance that teachers gave to this concept, therefore we can't consider them as equivalent.

$$cc = \frac{3 + \frac{3}{3}}{14} = 0,285$$

CM 7: Conceptual Correspondence (all concepts) and Correspondence with the Core (grey concepts)

3.2 Correspondence with the Core

If we refer to the conceptual core (those Concepts that are part of more than one sentence) the correspondence increases to four concepts out of the 5-10 that exist in the different cases.

This indicates that they share a common conceptual organisation regarding the teaching Planning. This, as a result, identifies a product, the programme. And it considers it as a dynamic, annual cycle process that takes a lot of time for the teacher. $c = \frac{4}{7} = 0,571$

As you can see this gives us little information about how the teacher plans, which leads us to believe that:
1) Planning is an individual process with different meanings for each teacher.
2) The interview didn't explore this issue in depth.

3.3 Relational Correspondence

The links involved in the correspondence (MC10) are the following:

Identical: it is shown in (it appears in the three cases). This correspondence has more to do with the person who has done the map than with the expert.

Equivalent: These links are to do with the teacher and they literally appear in the interviews.

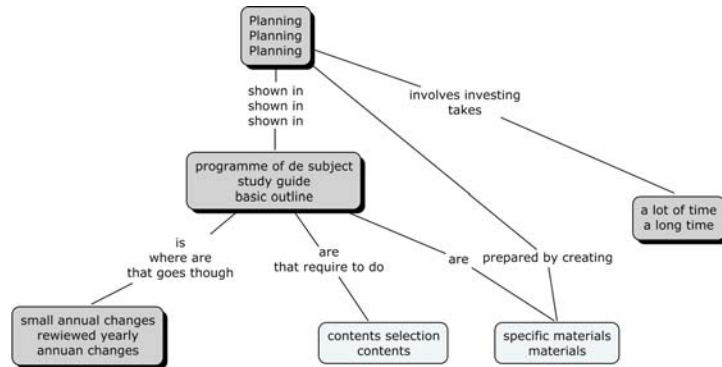| MTC	DD	IZC
is	Where are	That goes though
	Involves investing	takes

Referential:

MTC	DD	IZC
are	That require to do	
are		Prepared by creating

These links are only referential because they are part of different sentences. This confuses the comparison between links.

$$cr = \frac{2 + \frac{6}{3}}{6} = 0,666 \qquad\qquad q = (cc)(cr) = 0,285 \cdot 0,833 = 0,237 \quad q_{corr} = q + c = 0,237 + 0,571 = 0,808$$

CM 8: Concept Map with Relational Correspondence

4 Summary

We can group the conclusions into two axes, the ones that refer to the expert knowledge that has been extracted, and the ones that refer more to the methodology.

The links that refer to the interviewed teachers' expert knowledge:
The conceptual core that has to do with planning is not very wide, between five and ten concepts. Which leads us to think that they are not able to articulate the cognitive process that they go through in order to plan their subjects?
The correspondence is narrowed down to superficial questions such as putting a programme together or to the perception of the time used. An important question such as the concept of change and revision is shown, although it is reduced to the annual cycles or academic courses. This takes flexibility out of their planning concept.
The planning process seems to be individual, and doesn't come from shared meanings, beyond the most institutionalised ones.

The links that refer to the methodology:
The PAM is an interesting tool regarding the conceptual correspondence and to the conceptual cores. But not so much regarding the relational correspondence, since we are not using a model as comparison criteria.
With this model we can, on one hand, extract the conceptual cores shared by the different experts in one area and, at the same time, to observe which things are left outside. These concepts are the ones that make that expert singular.

References

Bain, K. (2006): Lo que hacen los mejores profesores universitarios. Valencia: PUV.

Campos, M. A. (coord) (2005): Construcción del conocimiento en el proceso educativo. México: Plaza y Valdés.

Cañas, A. J. & Novak, J.D. (editors) (2006): Concept Maps: Theory, Methodology, Technology. Proceedings of the second International conference on Concept Mapping. San José: Universidad de Costa Rica.

Muradás, M. & Zabalza, M. A. (2006): Los mapas conceptuales como recurso para representar y analizar buenas prácticas docentes en la educación superior, in Cañas, A.J. & Novak, J.D. (editors) op cit, 375-382.

Zabalza, M. A. (2003): Competencias docentes del profesorado universitario. Madrid: Narcea.