A CONCEPTUAL MAP AUXILIARY IN MODERN TEACHING TECHNIQUES IN THE AREA OF FLUIDS

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Abstract - *In this work we presented a study of the load loss in tubes tends as fundamental, the analysis and the description of a conceptual map according to the theory of Ausubel. It is made, therefore, a narrow connection among the physical phenomenons that happen in the engineering with the modern higher education techniques.*

Introduction

In this article we made a theoretical fundamental of the conceptual maps that apply the model of significant learning of Ausubel (1978).

The material, or learning content, needs a potential of psychological significance, besides the logical significance. This content should mean something objectively for the student, so that he makes a deliberate decision of relating it to its own knowledge, not in an arbitrary, but structured way.

In the maps you consider we found a strategy, through a cognitive technique, that facilitates the learning. They are self-reflection process based on models of processing of information that can act before the cognitive structures, already existent of the student, in this way sedimenting the information.

The formation and development of the cognitive structure depends in the way as a person to perceive the psychological aspects of the personal, physical and social world. The structures can be modified through the needs, motivations, desires, tensions, aspirations and each person's objectives, in particular.

The cognitive structures, they are used by Ausubel to designate the knowledge of a certain theme and its clearly and stable organization. Linking with the knowledge type, its width and degree of the person's organization that it is to learn. Therefore only like this, it is facilitated the acquisition and the retention of the new knowledge through the reflection, of the connection, liaisons and likeness, in such a way to reconcile already the differences or discrepancies with the information existent.

Significant Learning

Unlike the learning memorística - where the information doesn't associate with the pré-existent concepts in the cognitive structure, and therefore, it produces a minimum or null interaction recently among the information acquired and the stored information. The significant learning always occurs when we tries to give sense or to establish relationships, among new concepts, or new information between the concepts and the knowledge already existent, or with some previous experience.

There is significant learning whenever the new information can relate the new knowledge, of non arbitrary way and noun with the one that the student already knows, facilitating the acquisition and the retention, because it implies the use of structures and elements previously acquired, that they work relatively as anchors to the new elements, for likeness and contrast. With this, the learning is retained during a long period more plaza of time.

The learning is an active process, because it depends on the deliberated assimilation of the task of the student's learning and, personal because the significance of the whole task of the learning depends on the cognitive resources that each student uses.

Fundamentally, the learning works as an assimilation process it activates that, it consists of to capture or to acquire what is implied in the learning process and that is going from the sensorial characteristic to the characteristic ones more abstract.

To facilitate the understanding and the assimilation, each person have our own strategies, very auspiciously it is possible to affirm that, the familiarity with the material, has an effect strong positive in adult person. To use these family materials to establish relationships, classifications, categories, outlines and connections, it facilitates a more effective learning. The assimilation process is taken through three forms or different modalities:

a) Subordinate Learning - In this learning form, the new idea or concept is already subordinate un hierarchy to the other existent. It generates a progressive differentiation of the existent concepts in several others of inferior level of abstraction;

b) Ordered learning - THE process in this learning way is inverse of the one of the subordinate learning or of progressive differentiation, in that the existent important concepts in the cognitive structure are of smaller abstraction degree, generalities and inclusion that the new ones to learn.

With the acquired information, the concepts already existent they are reorganized and they acquire a new meaning.

Be a process that is going of bass upward, producing a reconciliation among the lines and attributes of several concepts that give place the other more general, that is the ordered learning, that tries to differentiate and to compare the concepts;

c) Combined Learning - This modality already consists of the relationship of new concepts with the

cognitive structure existent. It is also leans on in the search of common elements among the ideas, in spite of not to establish inclusion relationship.

The significant learning of any information implies, necessarily, in its understanding memorization and in its storage in a wider net of meanings. The more wide it goes to net of meanings, adult will be the student's capacity to establish new relationships, generating, at the same time, new meanings.

For Ausubel, it is possible to identify concept-keys or idea-base in any theme for the understanding learning, in three focuses:

a) Focuses deep - In this focus, the student's intention goes in the sense of the understanding of the meaning of the work theme, or of the tasks to develop, of the establishment of relationships with other knowledge and personal experiences, of the analysis of the data and of the conclusions on the meaning of the materials. It presents as presupposition to the intention of learning, relationship of data and ideas previous with the experience and with the conclusions. There is an exam of the logic of the argument.

b) Focuses superficial - In this focus, the intention is centered in it executions of the requirements of the tasks, in the memorization and reproduction of the contents, facts or ideas, for external imposition. In this case there is not implication, but yes the student's possibility in the accomplishment of the task, is a mechanical and repetitive learning (ENTWISTLE, 1988).

c) Focuses strategic - THE student intends to obtain good external results and he knows the requirements, work procedures and evaluation system. The student shows a more positive attitude than in the superficial focus, although it doesn't reflect the characteristics of the deep learning. It is characterized, mainly, for the intention of obtaining high classifications, with orgnaização of the time and distribution of the effort to obtain good results.

What is a Conceptual Map?

The conceptual map is a technique or instrument, created by Joseph Novak, where its value depends on the goal that it intends to reach and of its effectiveness for the effect. It is characterized by being centered in the student, that assists to the development of dexterities and that intends the harmonious development of all the dimensions of the person.

The presented conceptual map, as summary-outline, it is a resource that presents conceptual meanings included in a structure of suppositions in order to organize knowledge in units, or groupings in a hierarchical way; already, as middle of negotiation, it works as instrument to negotiate meanings, because it allows that these are shared, discussed and agreement object.

In these maps, the concepts - that do references to events - related, they join for a line and the sense of the relationship is clarified with connection words, that it is written with lower cases, close to the union lines. Two concepts, close to the connection words, form a semantic unit, characterizing the proposition.

With the conceptual map we also understood that there is really a learning significant. This learning is facilitated through the previous organizers' use, like this defined, as concepts, or initial ideas presented as reference systems for our concepts and new relationships, that establish a connection current among the contents. The previous organizers are constituted like this in " links ", or "cognitive bridges" between each new content and the student's cognitive structure. Each new concept will constitute a firm base for the posterior learning, not only facilitating it, as turning it more efficient and effective.

Development of the Conceptual Map

THE THEME: Calculation of the loss of energy of the fluids, along tubes, with circular sections, through conceptual maps.

SUBFUNCTIONS OF REFERENCE: atrito factor and characteristics of the flow in tubes.

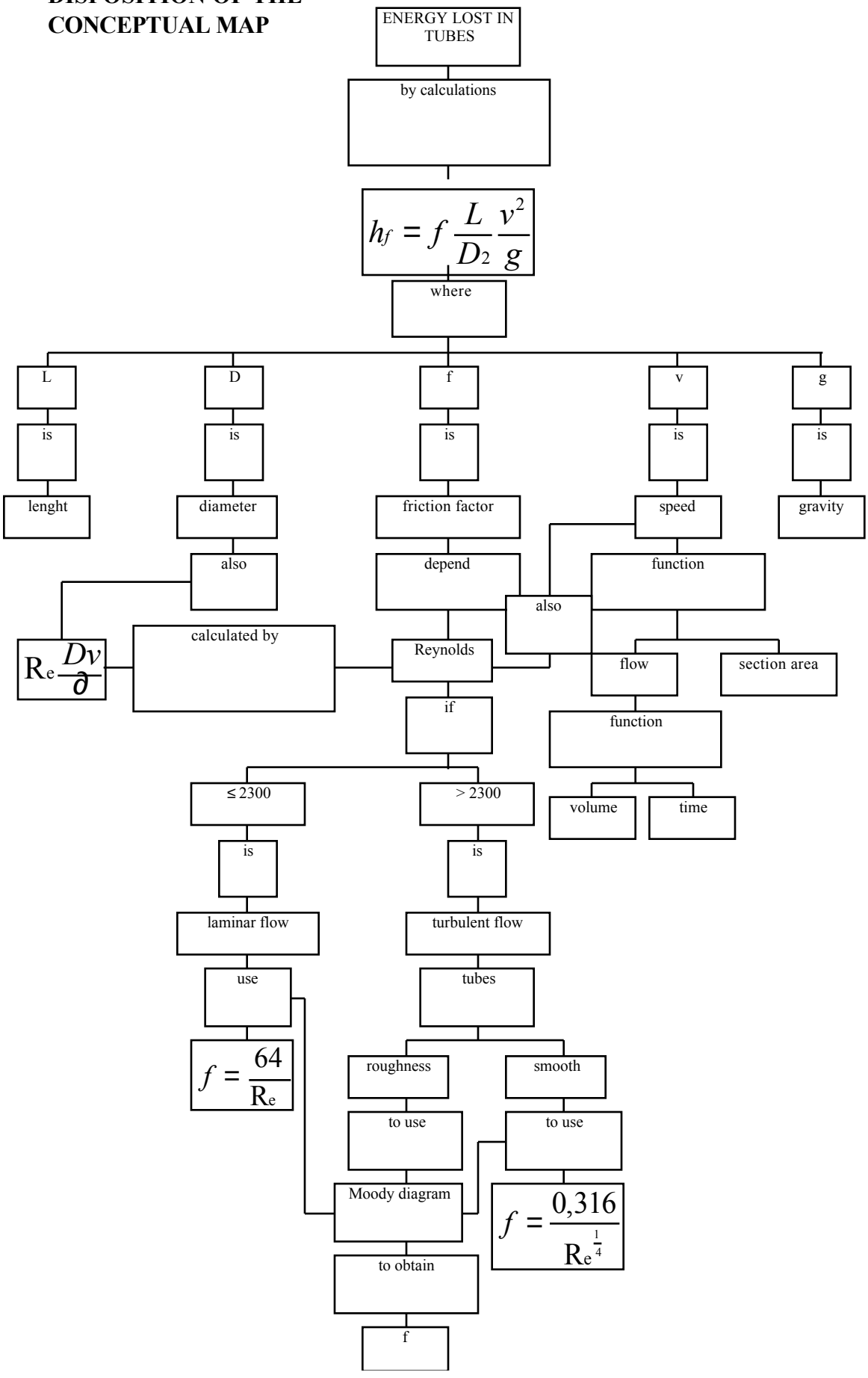
Leaving of the presupposition that the students dominate the subsunçors regarding the atrito factor and flows types, and based in the constructions of its cognitive structures, the present conceptual map is shown as a schematic summary of the learned that, ordered in a hierarchical way, it seeks to provide to the student a deliberate active assimilation, through a progressive differentiation, facilitating the retention of the learning of the calculation of the loss of energy of the fluids along the circular tubes. This retention should be for reconciliation integrativa through correlative and derivative subsunçors that are exposed with clarity.

This map allows the student to have a general vision than it will be studied and it shows as they are related the general concepts, through the subordination relationships and by the order among the same ones.

The student following the map, from top to bottom, he will notice that is possible to calculate the loss of energy in circular tubes, through concepts already well-known. Besides, the map shows, each one of the roads, that should be proceeded according to the situation that each concept is deciding.

The map still has a relationship of freedom between origin and extremity, allowing that the student, also, passes to follow the map, of bass upward. Leaving of the new concept, that is the loss of energy, he will notice that this loss of energy depends on another contents and knowledge are related and disposed to each other. In this procedure there is not only a facilitation in the acquisition of the new knowledge but also the verification of the importance and sedimentacion of previous knowledge. In the next page are presented the diagram of the conceptual map of of the presented theme.

DISPOSITION OF THE CONCEPTUAL MAP



Conclusion

The Conceptual Map according to Ausubel developed for the calculation of the loss of energy of the fluids along circular tubes, to take us to the following conclusions:

a) Provides a vision of group of the concepts and forms used in the calculation of the loss of energy in circular tubes.

b)Organizes the previous knowledge and the new ones in cells or hierarchical groupings, facilitating the learning of the new knowledge and forming sediment the previous knowledge.

c) Allows a fast one and it objectifies group vision of whole the structures involved in the flow.

d. Shows in each road the importance of the applied concept and its functional relationship

and through the progressive differentiation it facilitates the learning of the calculation of the loss of energy.

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