

BRAINSTORMING IN THE PROBLEM-BASED LEARNING

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The widespread implementation of problem-based learning (PBL) in the teaching-learning process has resulted in its transformation from artificial heresy to the subsequent proliferation of publications, books and conferences on the subject. Often, this avalanche of information has created confusion in understanding what PBL as a learning strategy.

Once submitted the problematic situation, students often discuss and make a list of areas of knowledge (subjects) that they consider relevant to the situation. At this stage, any intervention is invalid and should be ensured that any opinion is not leaking; everything is appropriate for further analysis. From this list, usually very large, the result of what could be called a “storm or brainstorm” a curriculum or learning plan containing specific goals for the problem situation being discussed is built. These objectives identified by the group of students, are usually related to learning objectives determined by the program (subject, module or program learning), but may include some, which are additional. Each group must agree to the curriculum or learning to every problem. The group should discuss the learning plan, taking into account that should focus on the most part – not necessarily exclusively, in the areas that are most relevant to accomplish program objectives. However, this learning plan may include individual and group not covered by the programmatic objectives of learning objectives. Agreement with a learning plan allows the expression of individual interests’ subject different experiences, strengths and weaknesses, as well as the group. The objectives of learning program often serve as a guide to develop the learning plan or curriculum.

Once the issues are the learning plan have been identified, reorganized and clarified, group members choose the topic or topics they want to work.

It is advisable that all search topics are chosen. It is likely to make this research to surface (mainly due to time). It is essential that prior knowledge of the students about the issues raised in brainstorming and learning plan is identified. This allows a choice of topics that increase the knowledge of students and not those subjects they already know.

Once identified learning issues, it is recommended that the next step is to recognize the likely sources of information of knowledge. There is a wide range of services ranging from textbooks and monographs to teachers and experts both in academia and in the community; it is expected that each group member contribute suggestions. The tutor may help clarifying doubts about the validity of some resources identified by students (if the tutor has any knowledge of these sources of information).

At the second meeting of mentoring, more often the group to discuss the sources and resources used in the study period. Each member briefly summarizes the sources who has explored the reasons for their selection and the problems encountered in the search. This is an opportunity for the group to share the sources of information and to learn how to access them, and evaluated through a critical analysis. From the beginning, the group should discuss how critically evaluate the information collected (e.g., the reputation of the authors, employees search methods and statistical methods applied). This process is part of the skills required for future professional throughout his career.

In the second session, all members of the group should have an opportunity to apply the information they have studied the problem being discussed. Thus facilitating the student is training for critical evaluation and correction of prior knowledge based on newly acquired knowledge, and develop the ability critically evaluate their initial analysis of the problem.

The provision of information that each student performs can be supplemented with articles, diagrams and other material. Nevertheless, this process is not a presentation of the information collected but a reconstruction and interpretation of the acquired knowledge. From what we have learned in relation to the particular problem, students must extract the principles and concepts that can be applied to other problems.

The problem must be re-evaluated by reviewing the learning plan and/or the list of hypotheses, indicate what changes should be made and what assumptions should be ratified, altered or changed. This allows the student and the group to identify issues that have not been discussed in depth; these issues can be part of a plan to further study. The information obtained through self-directed learning is applied again to the problem of an active and stimulating; increasing their understanding and makes, the new information is integrated into the basic knowledge of students. Knowledge discussed also can generate new questions and items that can establish new apprenticeship schemes.

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VISUALIZATION IN ORGANIC CHEMISTRY AS METHOD TO IMPROVE STUDENTS' PERCEPTION

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Introduction: Currently, chemistry computer animation is widely used around the world, for example, well-known programs are: Model ChemLab, Chem Doodle, Odyssey, etc. [1]. With their help, you can make a quantum chemical calculations of the electronic structure of molecules, which helps scientists to understand the mechanisms of reactions, plan experiments, expect results, in popular and accessible