APPLICATION OF CMAP TOOLS IN THE PBL (PROBLEM-BASED LEARNING) ONLINE

Facilitator: Carla Joana Carvalho, University of Minho, Portugal

Workshop aims

1. To contribute to the development of problem solving skills, namely synthesis of information, reasoning and establish logical connections between concepts through the creation of individual and teams' concept maps.
2. To identify the challenges of the use of Cmap Tools as a cognitive strategy for representing, organizing and browsing knowledge models that promote meaningful learning.
3. To provide an interactive, collaborative experience through co-construction and sharing of conceptual maps by the users, promoting a deeper understanding of knowledge explored, discussed, constructed and learned during the PBL process.
   - To enable moments for synchronous collaboration, either by exchanging messages via the chat functionality in Cmap Tools software or by real-time edits of the concept maps under construction.
   - To permit moments of asynchronous collaboration by the use of the functionality rows of discussion that allows that the information provided by different users during the preparation of the same concept map becomes stored and can be accessed by them anywhere anytime provided they have a computer with Internet access, the Cmap Tools software installed and an email account.
4. To facilitate the (re) structuring of knowledge by testing assumptions about possible relationships between concepts, allowing its repositioning in the concept map along the PBL process.
   - To identify the flexibility in the reconfiguration of the concept maps along the PBL process in the digital version of one online construction, compared with a version of pencil and paper or using ppt.
   - To encourage reflection by using the recording functionality of concept maps process (co) construction, providing the users the consultation and analysis of the final result as well as the entire process of ones design, which in turn leads to a awareness of the various stages of the development of such maps.
5. To provide a synergistic visualization of the structuring and interlinking of knowledge by adding and establishing creative and quick connections of concepts in the conceptual map to other media resources (such as audio, video and text, web pages and other concept maps that are on the network) enabling complementarity and detailing in such concepts in the course of solving a problem, contributing to better time management, organizing and integration of information.
6. To understand the potential of using concept maps at the beginning of the teaching and learning process as a gain in the (co) construction of scientific knowledge essential to aid in the PBL problem solving.

Methods:

The training strategy consists of four stages:

1. Provide a brief theoretical context of the characteristics of online PBL approach and phases of the PBL process as well as the notion of concept map.
2. Promote the participants familiarization with the Cmap Tools functionalities by providing a digital form manual (possibility of consulting it a posteriori) and exploration of those functionalities in loco by each participant individually.
3. Provide creative and shared drafting (creation of working groups with 4 people each) of a concept map starting from problematic scenarios (previously selected by the trainer), and its online publication in the Facebook group previously created for this purpose. In addition, enable the development of the basic technique for constructing a conceptual map:
    i) Provide a good starting question (PBL problem raised by the scenario presented to each group of participants) whose path to its resolution is stated in the concept map set up.
    ii) Define a set of concepts (keywords) about the problematic issue, based on the facts presented in the scenery and on the prior knowledge that the scenario issue will emerge in each participant.
    iii) Organizing such concepts, establishing hierarchical and / or parallel relationships between them.
    iv) Collect additional information about each concept in order to confirm and / or reformulate interrelational branches of the concepts set forth in the preceding paragraph.
4. Provide self-and hetero-assessment of the workshop by completing an online questionnaire about the advantages and disadvantages of Cmap Tools, as well as about the difficulties experienced during training and about the guidance given by the trainer in order to overcome them.

Outline

The demands of a globalizing society compel teachers to embrace more effective learning approaches, such as problem-based learning (PBL), creating suitable conditions to allow students to be skillful team players in the leading edge of scientific and technological advances, and quite resourceful in using problem-solving skills. The recently emerged PBL online (iPBL) combines the problem-solving process with an online collaborative framework.

The Cmap Tools is a software of free application developed by the Institute for Human Machine Cognition, University of West Florida that allows the (co) construction of conceptual maps, the inclusion therein of various media and its online sharing, because Cmap Tools has an interdependent platform, uses Java technology and allows exporting in xml / xtm format.

The basis of this software is the notion of conceptual maps presented by Novak. Thus a *concept map* is a two-dimensional graphical representation, similar to a flowchart. Its construction shows notorious relational links between concepts, across the designed hierarchies (starting at the more general concept to more specific concepts) and the linking phrases to join each of the concepts, thereby forming propositions that summarize knowledge and /or ideas.

Using Cmap Tools in PBL online is a true integration of an emerging technology in a teaching and learning methodology. Thus the Cmap Tools in PBL online can be seen

as an informatics tool to promote online teamwork and the development of inquiry, problem solving, negotiation, communication, creative skills and abilities to organize knowledge and / or ideas. Therefore, the Cmap Tools in PBL online can have a more targeted use for self-regulatory and collaborative learning, in addition to promoting an active and meaningful learning in online environments.

Optimum number of participants: 32 (8 groups of 4 each)

Notes
- Each participant must have an email and Facebook account
- At a minimum there should be one computer for every two participants
- Preview installs of Cmap Tools software on all computers made available for the workshop