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Interdisciplinarity, transversality and complexity: a perfect combination in developing thematic projects in teacher formation courses in Brazilian universities

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In his book La tête bien faite, Edgar Morin points out that there is wide and deep inadequacy in fragmented knowledge and today's multi-disciplinary, complex, multidimensional problems, which makes it impossible for us to see interactions and retroactions between the parts and the whole. For a long time we have been dominated by modern science rationality that does not have answers for our current issues, therefore, a new kind of multicultural scientific approach is needed. Instead of integrating and relating different areas of knowledge, our youngsters are taught to isolate objects, to separate disciplines. Paulo Freire (Pedagogy of the Oppressed, Cultural Action for Freedom) sees education as "conscientization", a process by which the learner achieves critical consciousness by "reading the world" around him/her. Interdisciplinarity questions the segmentation amongst its different fields produced by a compartmentalized vision (disciplinary) of knowledge. Transversality is seen as a pedagogical approach that helps students to acquire a wide and comprehensive vision of reality. They allow us to cross disciplinary borders via the study of science and social topics together, providing a model for coping with complexity. In accordance with this trend of thought, Brazilian schools and universities have been slowly adopting interdisciplinarity and transversality as fundamental curriculum practices. The objective, as stated in our National Curriculum Parameters (PCN), is to form students that should be able to work multi and interdisciplinarily so that they are prepared to act critically in our society. In Didactics, students from different areas are asked to momentarily abandon disciplinary thinking and discuss, organize and present projects under the perspective of contemporary learning theories such as Howard Gardner's Multiple Intelligences, Philip Phenix's theory of meaning or Paulo Freire's thematic universe and the complex theory. The student-teachers have chosen themes such as Biodiesel, Etanol, Industrial waste, Global warming, Amazonia, Celular phones, Renewable Energy, Recycling, and Consumerism. The emphasis is on group work, both in the classroom and in the virtual learning environment TELEDUC. At the end of the semester the students present their conclusions in the form of seminars. One basic obstacle for such collective work lies on the organization of university curriculum – fragmented, linear and alienated - and the emphasis on memorization instead of knowledge production. Also university teacher's traditional formation limits their holistic-integrated thinking. As far as the students are concerned, they demonstrate adherence and rapid assimilation of interdisciplinarity and the ability to cope with the complexity of such themes. They start seeing environmental issues under a different - holistic and integrated – perspective. Interdisciplinary work also helps the students develop a critical-social perspective of knowledge, which causes them to reflect about directions and uses of science.