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Building interdisciplinary thinking through thematic projects

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This study is part of a research in which we investigate how students and teachers conceptualize, accept or reject interdisciplinarity and what obstacles and possibilities they see in its implementation in the university and school curriculum. We define interdisciplinarity as an epistemological approach to knowledge which allows us to cross disciplinary borders via the study of science and social topics. Fragmentation, linearity and alienation in traditional curriculum is being replaced by a vision of totality which includes the psychological, social, philosophical, economical, artistic as well as scientific elements. In the Programme for International Student Assessment (PISA 2009), Brazilian students showed a low level of scientific literacy: the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity. Moreover, there is a large distance between science and society: it is as if science is supposed to exist only inside university walls. Interdisciplinarity, we believe, establishes the link between science and society. In our study, students from different areas are asked to momentarily abandon disciplinary thinking and develop topics under the perspective of two different learning theories: Howard Gardner's Multiple Intelligences and Philip Phenix's theory of meaning. Gardner proposes eight different intelligences to account for a broader range of human potential in children and adults: Linguistic intelligence; Logical-mathematical intelligence; Spatial intelligence; Bodily-Kinesthetic intelligence; Musical intelligence; Interpersonal intelligence; Intrapersonal intelligence; Naturalist intelligence. For Philip Phenix, six fundamental patterns of meaning emerge from the distinctive modes of human understanding: symbolics, empirics, esthetics, synnoetics, ethics and synoptics. A curriculum developing these basic competences is designed to satisfy the essential human need for meaning. This phase of the study was developed with twenty graduate student-teachers and one hundred and two undergraduate science students at the Federal University of Ceará, Brazil, during the years 2008 and 2009. The areas represented were Physics, Chemistry, Mathematics, Biology, Letters, Social Sciences, History and Geography. The students were divided into groups of six-eight. At the end of two lessons, they were supposed to come up with a consensual theme and decide which of the two theories they would be using in their projects. The themes chosen by the students were Evolution, Energy, Biodiesel, The Universe, Etanol, Television, Industrial waste and the environment, Amazonia, Hunger around the world, Science and Exupery′s Little Prince. The next four lessons were dedicated to group work, both presencially and in the virtual learning environment TELEDUC. Two more lessons were dedicated to the presentation of seminars about their projects. I observed them during classes, took notes on their group work and asked them to answer to a questionnaire via TELEDUC in which they should state their definition, acceptance or non-acceptance of the concept, type of formation they are having, how they see the university science curriculum, how different areas should communicate. The findings indicate that one basic obstacle lies on the organization of academic work 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 developed creative and good quality projects demonstrating adherence and rapid assimilation of interdisciplinarity. Another conclusion from this study is that the formation of interdisciplinary thinking cannot focus only on matters to which the society demands solutions, since such matters are highly influenced and dictated by the economic and mediatic agenda. It is necessary that the students develop a critical-social perspective of knowledge, which causes them to reflect about directions and uses of science.