

Report OFD Innovation in Teaching Awards – AY 09-10

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Title: *Communicating Evolutionary Theory to Large Audiences: A Model for Science Education, Scholarly Work in Education, and Public Outreach*

Project Description: This proposal relied on five goals concerning instructional development and scholarly teaching of Biology of Organisms (BIO-121/131 and 122/132) at UMass Dartmouth: (i) Promote the communication of evolutionary theory (a centerpiece component of science, broadly defined) to large audiences via integration of both lecture and laboratory settings, (ii) Use teaching technologies for the successful communication of complex scientific principles to college audiences, (iii) Assess the learning experience of large student populations in lecture and laboratory (sub-learning units/modules), (iv) Generate a model/template for possible adoption by UMassD instructors of science and other disciplines involving large student populations, and (v) Create opportunities for public outreach via colloquium and debate.

Results: Survey sampling revealed that (1) *Biology Majors* in 2008 had levels of “open acceptance” of evolution between 52.0 percent (Freshman) to 65.5 percent (Seniors). No opinion decreased from 47.9 percent (Freshman) to 34.4 percent (Seniors). In contrast, *Non-biology Majors*’ highest levels of acceptance of evolution reached 54.4 percent among Seniors (a value that most likely remained unchanged by the time of graduation), comparable to the level of the “arriving-to-college Biology Majors” (52.0 percent), similar to the USA college graduates (53 percent), and below the New England average (59 percent). No opinion decreased as function of academic level but from 65.3 percent (Freshman) to only 45.6 percent (Seniors). (2) It is important to notice that after re-conceptualizing the Freshman Biology Majors courses *Biology of Organisms BIO-121/122* and *Laboratories BIO-131/132* (re-conceptualization began in the 2007-2008 academic year to present), which now have a comprehensive evolutionary approach, all cohorts of Biology Majors have increased significantly their acceptance of evolution, from 58.8 percent (Freshman) to 95.8 percent (Seniors). These values are comparable to the 97 percent acceptance of evolution by New England Professors, and rank among the highest nationwide. (3) *Longitudinal analysis* of two *Freshman cohorts* (2008-9 or 2009-10) revealed significant increase in acceptance of evolution in a single academic year (50/61 percent in September, 65/74 percent in December, and 75/85 percent in May).

Significance of Project and Applicability: Because this project was based on reaching large student audiences via integration of both lecture and laboratory settings, the use of teaching technologies including blended courses (face-to-face plus online work and assessment), and vigorous public discussions where students became part of the debate (actively organizing town hall meetings and conceptualizing the dialog), this project can serve as a template for other teaching and outreaching initiatives at UMass Dartmouth.