

**Additional material/ outline of the short talk:**

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Effective Teaching and Active Learning in the Evolutionary Biology Classes

Evolutionary biology is in some ways a “metacognitive” discipline and understanding of its significant concepts might contribute to deeper appreciation of science and human knowledge, as well as promote critical thinking in students. The variety of practical applications of these concepts is evident (from medicine to environmental biology) and work on better education in this field is very important.

Some of the challenges that I have faced in teaching Evolution classes are: student engagement, monitoring comprehension and providing a dynamic learning environment that fosters academic success. In order to achieve such enhancement of teaching and learning in my Evolution classes I have developed two methods and applied them to my classes from 2010-2013 school years. The first method was based on drafting Evolution specific conceptual tools and using them in a Plus Program (a peer mentoring study) in my class. The second method was based on student developed case studies that would come from numerous applications of evolutionary biology in all areas of science and medicine. My study focuses on population genetics mathematical modeling and case studies of natural populations, with application of theoretical models, through formal and informal assignments.

It has been proven difficult to develop conceptual tools which might reinforce understanding population genetics theory, as well as the mathematical principles and a range of applications. However, with training and use of peer leaders in the “plus program” sessions, we have achieved significant improvements in learning gains and student exam scores, at least for the learning objectives that we have compared in three consecutive semesters. Such methods paired well with the use of the interactive classroom technology and alternative classroom environments.