The importance of the study of evolution in the course
PSC1515 “Energy in the Natural Environment”

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ABSTRACT. This paper demonstrates the importance and relevance of the PSC 1515 course for the students pursuing an Associate in Arts Degree at Miami Dade College (MDC). This course not only provides a general overview of the scientific method but also of the different physical, natural and earth sciences. Of particular relevance is the study of evolution, which is a recurrent controversial topic in our society because of the apparent conflict between the scientific and religious points of view. In this paper, it is demonstrated that this controversy is mostly limited only to the United States, although to some degree, it is also expanding to the United Kingdom and other parts of Europe due to the American influence in that part of the world. This course, PSC1515 also satisfies several of the Learning Outcomes (LO) received by MDC’s graduates, particularly LO #3, #6 and #10.

KEY WORDS: evolution, creationism, intelligent design, science, religion, and scientific method.

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Introduction

One of the most popular courses taken by Miami Dade College (MDC) students, as part of the General Education Requirements for the Associate in Arts Degree, is PSC 1515 “Energy in the Natural Environment”. This course is included in the Natural Science section, Group B – Physical Sciences of the General Education Requirements. In the College Catalog, it appears in the Physics section, as one of the Physical Sciences with a Multidisciplinary approach. The course description in the Catalog portrays it as an “Investigation of the physical Environment using energy as a theme to demonstrate the impact of science and technology on the environment and on the lives of people”.

This course satisfies several of the General Education Learning Outcomes (LO) that demonstrate the knowledge acquired by MDC’s students, regardless of their major, particularly Learning Outcomes #3, #6 & #10. Learning Outcome #3 establishes the following: “As graduates of MDC, students will be able to solve problems using critical and creative thinking and scientific reasoning”. This LO is approached since the first chapter, in which the Scientific Method is discussed, and it is pursued throughout the entire course content.

LO #10 establishes “how natural systems function and recognize the impact of humans in the environment”. The goal of this LO is achieved throughout multiple chapters in the course that discuss energy and its interrelationship with natural systems, as well as the impact of human activities in the environment; special emphasis is placed on global warming and its countless negative impacts in the environment and society, ranging from the impacts on the ecosystems, health, the economy and –even- national security.

The importance of LO #6 cannot be highlighted enough. This outcome “creates strategies that can be used to fulfill personal, civic and social responsibilities”. The issues that are discussed in the course, like evolution, global warming, and others will help our students make informed decisions, as members of our society in many personal, civic and social aspects, like voting for the appropriate candidate elections at different levels, and also choosing the correct organizations to be involved with; and these are decisions that reflect what is important, useful and necessary for the well-being of our nation.
To fully understand the great importance of the depth of the scientific knowledge that the learning of evolution provides to our students, we must consider the results of the public opinion poll released by the Pew Forum on Religion and Public Life on August 30, 2005, which reveals that “nearly two thirds of Americans want both creationism... to be taught along with evolution in public schools. Fewer than half of Americans – 48% - accept any form of evolution... and just 26% accept Darwin’s theory of evolution by means of natural selection. Fully 42% say that all living beings, including humans have existed in their present form since the beginning of time” (cited by Jacoby, 2008).

According to Jacoby, 2008, this level of scientific unawareness cannot be blamed solely on the low level of science education in American elementary and secondary schools, as well as in many community colleges. In her book The Age of American Unreason, Jacoby clearly states: “Only 27% of college graduates believe that living beings have always existed in their present form, but 42% of Americans with only a partial college education and half of high school graduates adhere to the creationist viewpoint that organic life has remained unchanged throughout the ages. A third of Americans mistakenly believe that there is substantial disagreement among scientists – a conviction reinforcing and reflecting... that evolution is “just a theory” (Jacoby, 2008).

The graduates of Miami Dade College who take the PSC1515 course, will not be caught in the “just a theory” argument, because the first chapter of this course is dedicated to the study of science and the scientific method, as well as the relationship between science and religion. In this chapter, the students learn the scientific definition of theory. To our students, a theory is ‘a synthesis of a large body of information that encompasses well-tested hypotheses about certain aspects of the natural world’. Thus, after taking the PSC1515 course, students of Miami Dade College become part of a considerable percentage of college-educated Americans who will be thoroughly informed about this transcendental scientific theory.

**Creationism**

Advocates of the opposition to the study of evolution have attempted to substitute the study of this theory, with the study of the afore cited theory of creationism, which can be briefly defined as the religious belief that human life, the Earth and the Universe were created in some form by a supernatural
being, a God. For the Christian religion, creationism is usually based on a literal interpretation of the book of Genesis in the Bible.

**Intelligent Design**

The concept of *intelligent design* was developed by a group of American creationists who reformulated their argument in the creation-evolution controversy to evade court rulings that ban the teaching of creationism as science. Intelligent design is the allegation that some features of the universe (and of living things) are best explained by an intelligent cause, not an undirected process such as natural selection. It is a more contemporary form of the conventional teleological argument for the existence of God, but without specifying the nature or identity of the ‘designer’, or creator. The discussion about intelligent design must start by indicating that most of the scientific community has rejected this idea. The U.S. National Academy of Sciences, the U.S. National Science Teachers Association, and the American Association for the Advancement of Sciences have all denounced intelligent design as a pseudoscience, because it is not testable according to the principles and methods of science.

In a statement adopted on July 2003 by the Board of Directors of the National Science Teachers Association, we can read: “The National Science Teachers Association (NSTA) strongly supports the position that evolution is a major unifying concept in science and should be included in the K-12 science education frameworks and curricula. Furthermore, if evolution is not taught, students will not achieve the level of scientific literacy they need”.

**Evolution**

In his book, Richard Dawkins states: “all except the woefully uninformed are forced to accept the fact of evolution”, adding to his statement that “…no reputable scientist disputes it [evolution]” (Dawkins, 2009).

The National Academy of Science (NAS) and the Institute of Medicine (IOM) released *Science, Evolution and Creationism* in 2008, where the importance of the teaching of evolution in the science classroom was emphasized, or as the President of the National Academy of Science, Ralph Cicerone, states: “The study of evolution remains one of the most active, robust, and useful fields in science” (Cicerone, NAS, 2008).
The President of the Institute of Medicine, Dr. Harvey Fineberg, says: “Understanding evolution is essential to identifying and treating disease. For example, the SARS virus evolved from an ancestor virus that was discovered by DNA sequencing. Learning about SARS’ genetic similarities and mutations has helped scientists understand how the virus evolved. This kind of knowledge can help us anticipate and contain infections that emerge in the future” (Fineberg, NAS, 2008). The same could even be said today about the H1N1 virus causing the swine flu.

**Conclusion**

The importance of the study of *PSC 1515 [Energy in the Natural Environment]* is such, that this class is at the basis of the scientific literacy acquired by the graduates of Miami Dade College, and encompasses many of the Learning Outcomes that form the core of a college education.

In PSC1515 students learn about science and the scientific method, and the basic elements of evolutionary biology, in contrast to creationism and intelligent design. The most important aspect of the study of evolution in this course is that our students are not mandated to accept it or believe in it. They are given the elements of the three approaches, and then are allowed to draw their own conclusions based on what they have learned about the scientific method. The study of the chapter on evolution is complemented with the study of the Universe and the Solar System, which includes the theory of the Big Bang, the Nebular Theory and the evolution of the Universe and our Solar System.

This class should be recommended to all MDC students, and the chapter on evolution in particular must be considered of high relevance in the teaching of the course.
References


