JET The Journal of Effective Teaching
an online journal devoted to teaching excellence

A College Honors Seminar on Evolution and Intelligent Design: Successes and Challenges

Patricia H. Kelley[1]
University of North Carolina Wilmington, Wilmington, NC 28403

Abstract

College honors courses provide an opportunity to tackle controversial topics in an atmosphere that encourages active learning, critical thinking, and open discussion. This venue is particularly appropriate for examining the debate about teaching intelligent design (ID) in public school science classes. A one-credit honors enrichment seminar taught at the University of North Carolina Wilmington provides a model, with associated successes and challenges, for addressing the controversy. This interdisciplinary course consisted primarily of discussions based on a set of weekly readings that presented contrasting viewpoints on evolution and naturalism, ID, theology, and educational issues. In preparation for each class, students constructed charts contrasting the views of each writer on key points presented in the readings and summarizing their own responses. Discussion focused on a set of questions arising from the readings and designed to provoke debate. The *Kitzmiller v. Dover* decision served as a final case study; each student prepared a final paper defending or criticizing Judge Jones' decision in the Dover court case. Prior to the course, some students had not heard of ID and many had limited knowledge of evolution. The course improved student knowledge of evolution, ID, and the issues involved in the controversy, preparing them to make informed political decisions. Challenges included the uneven level of knowledge about evolution among students in this non-science course and the time constraints of a 1-credit course. In addition, because I had decided to serve as a facilitator and not press my opinions, misconceptions were more difficult to correct, although the variety of disciplines represented by the students allowed them to correct one another.

Keywords: Intelligent Design, evolution, honors course, pedagogy.

College honors courses provide the opportunity to step outside the typical curriculum to explore interdisciplinary areas or controversial topics. This venue is particularly appropriate for addressing the current societal debate surrounding the teaching of "Intelligent Design" (ID) as an alternative to evolution in public school science classes. Intelligent design is the concept that life forms are too complex to have developed through natural processes of evolution and instead began abruptly through an intelligent agency (see Scott, 2004, for a concise summary of the main ID arguments).

The modern intelligent design (ID) movement developed in the mid-1980s (Numbers, 1998) and gained strength after the *Edwards v. Aguillard* Supreme Court decision ruled

[1] Corresponding author's email: kelleyp@uncw.edu

unconstitutional the Louisiana law requiring balanced treatment of "creation-science" and "evolution-science." ID attempts to escape issues of constitutionality by not overtly mentioning the activities of a creator, but instead attributing Earth's life forms to an unspecified intelligent agent. However, in the recent *Kitzmiller et al. v. Dover Area School District* decision (Jones, 2005), ID was judged to be religious rather than scientific. Judge Jones's decision stated, "the writings of leading ID proponents reveal that the designer postulated by their argument is the God of Christianity" (Jones, 2005, p. 25-26) and expert witnesses for ID made it clear that the designer is supernatural and thus outside the realm of science. ID was also judged not to be science because it has "failed to publish in peer-reviewed journals, engage in research and testing, and gain acceptance in the scientific community" (Jones, 2005, p. 89). The court also found that the primary argument for ID, Michael Behe's concept of irreducible complexity (Behe, 1996) "has been refuted in peer-reviewed research papers and has been rejected by the scientific community at large…. Additionally, even if irreducible complexity had not been rejected, it still does not support ID as it is merely a test for evolution, not design" (Jones, 2005, p. 79). The court also recognized that arguments against evolution have been countered by the scientific community, but even if they were valid, they would not support ID because the two are not mutually exclusive (or the only) alternatives.

Despite the defeat of Intelligent Design in the Dover case, proposals to include ID in public school science classrooms as an alternative to evolution continue to be argued at local and state levels (Branch and Scott, 2009). Thus courses addressing the scientific, religious, philosophical, educational, and political issues surrounding the ID/evolution controversy remain relevant. In this paper, I describe a one-credit honors enrichment seminar that was taught at the University of North Carolina Wilmington in Spring 2006, immediately following the *Kitzmiller v. Dover* decision (Jones, 2005). The course provides a model, with associated successes and challenges, for teaching about the controversy.

Pedagogical Principles

An honors course is particularly appropriate for addressing the issues surrounding the debate about teaching Intelligent Design in the public schools because of the pedagogical approaches typically involved in honors courses. According to West (2000), the goals of an honors education include developing the abilities of students to reason, express themselves in speech and writing, and to collaborate as well as to work independently. This honors enrichment seminar was designed to further these goals. In addition, an honors education should develop students' capacity to "commit to a position, recognize that it may change, and tolerate uncertainty and ambiguity" (West, 2000, p. 3). These goals are particularly appropriate to the controversial subject matter of this course.

The UNCW Honors Scholars Faculty Handbook[2] encourages faculty to develop courses that "have less lecturing and predigesting of material by faculty; make more use of primary sources and original documents; encourage critical thinking and independent scholarship; … focus on open discussion; follow a colloquium or seminar format; allow pro-

[2] http://www.uncw.edu/honors/facultyHandbook.htm

fessors and students to take risks." These goals are consistent with educational research that indicates that students learn best by doing, e.g. through active learning and collaborative learning rather than formal class lectures (Donavan et al., 1999). Thus this course used a minimum of lecturing, focused on readings from primary sources, and was based on small- and large-group discussions of controversial questions.

Course Design

In Spring 2006 I developed and taught a course entitled "Intelligent Design: An alternative to evolution?" The course was a one-credit honors enrichment seminar; honors students at UNCW are required to complete two such courses, which include a component of participation in campus events outside the classroom. Such courses bear the "HON" prefix rather than a disciplinary designation and are often interdisciplinary. The course enrolled 18 honors students, including 6 freshmen, 10 sophomores, one junior and one senior (honors students at any level may take the enrichment seminars, though many elect to complete this requirement as freshmen and sophomores). Honors enrichment seminars at UNCW have no prerequisites other than formal enrollment in the Honors Scholars Program. The students represented a diverse range of fields as follows: business - 5 students; education - 1 student; nursing - 1 student; humanities - 4 students; social sciences - 4 students; natural sciences - 3 students. In addition, two geology graduate students who were interested in the topic attended class and completed the assignments but did not participate in class discussion, in order to prevent altering the experience for the honors students (they registered for a Directed Individual Studies graduate course).

We met once a week for 70 minutes for ten weeks. The initial class meeting set the tone for the course. Participants were asked to share their interest in the topic and their stance on Intelligent Design. I began by sharing my perspective (a paleontologist whose research focuses on evolution; a person of faith and minister's wife who finds no conflict between faith and evolution; Kelley, 2000, 2009). Students were then invited to share their perspectives. Most were curious about ID and knew it was a national news item; about half the class was sympathetic towards the teaching of ID and a third had not yet made up their minds. A minority of four students opposed the teaching of ID in public school science classes. The first session was also used to establish ground rules of tolerance and respect within the course; all students were encouraged to speak their opinions freely, and were reassured that no one would be criticized (or graded negatively) for expressing his/her opinion.

The first session concluded with a hands-on exercise on the nature of science. In keeping with the goal that honors courses should foster collaboration, students worked together to categorize a set of statements (Appendix A) as either "science," "religion," or "something else." (These statements were ones I had composed and had used successfully in my geology courses that consider the nature of science. Some statements come from my paleontology background; some have a local flavor; they also reflect the largely Judeo-Christian background shared by most of my students. The list could easily be adapted by other instructors to fit their particular situations, reflect other student demographics, or incorporate other fields of study.) We then discussed the criteria that students used to

classify statements. This exercise was used to reinforce the idea that science involves the study of the natural world, that it consists of a set of tightly integrated facts and theories, and that the explanations of science must be natural (because science consists of hypothesis testing and only natural explanations are testable). Students then worked together to categorize each statement as either "fact," "theory," or "something else." This exercise led to discussion of how terms such as "fact," "hypothesis," and "theory" are used in science (e.g., "theory" as a well-tested, repeatedly confirmed explanation rather than a guess, as used in the vernacular).

Week two included the only lecture of the semester. Because students varied widely in their educational background and thus their understanding of evolution, I felt that a lecture was the most efficient means of bringing all students to a basic understanding of what evolution is. In this lecture, I discussed three different meanings of the term evolution (Thomson, 1982): 1) change in life through time (which can be considered a fact) and the evidence for it; 2) descent with modification (a very strong theory that has been repeatedly tested and confirmed) and the evidence for it; and 3) the process of evolution, especially what is mean by natural selection and how it works (also theory).

The next seven weeks of the course involved discussion of weekly readings from an anthology of primary sources (Pennock, 2001). Pennock's book, *Intelligent Design Creationism and Its Critics: Philosophical, Theological and Scientific Perspectives*, is a compilation of writings with opposing views, written by many of the key figures in the ID debates. Pennock's book was selected for its in-depth coverage of the key philosophical, religious, scientific, educational, and political issues involved in the ID debate. We focused on four main topics: 1) evolution and naturalism; 2) Intelligent Design (irreducible complexity and information theory); 3) theological perspectives; and 4) educational issues. Table 1 lists the topics covered and the authors whose readings from Pennock's book were used.

Each week, prior to class, students (and I) independently completed comparison charts in which they listed the key points of the readings, contrasted the opposing views of the writers on those points, and noted their own response to those views. (Because this course received only one semester-hour of credit, this approach was more appropriate than requiring more time-consuming weekly essays.) Comparison charts were graded based on thoroughness and analytical insight, rather than on the opinions expressed; the charts represented 50% of their grade. Consistent with the expected pedagogy for Honors courses, the class followed a seminar format; class participation represented 20% of their grade. The first 20 minutes consisted of small-group discussion to encourage students who were less comfortable in large-group settings to express their thoughts. During the small-group (3 - 4 students) discussion, students expressed initial reactions to the readings and the time was used to resolve any points of confusion concerning the readings. Because of the breadth of disciplines represented, students were able to assist one another in resolving questions (e.g., science students helped classmates with scientific concepts; philosophy and religion students assisted in understanding theological and philosophical arguments). I migrated among groups to assist as needed and to observe the student interactions. The remainder of the period was spent discussing as a class a set of questions

Table 1. Topics discussed, authors read for each topic, and questions posed for class discussion in Honors enrichment course on Intelligent Design

Topic	Authors read	Discussion questions
Evolution and naturalism	Johnson vs. Pennock	• Does science require ontological naturalism or only methodological naturalism? • Is evolution based on a philosophical assumption rather than evidence? • Is Darwinism incompatible with belief in God? • If evolution by natural selection is wrong, is creationism right?
Evolution and naturalism	Plantinga vs. Ruse	• Are religion and science inherently conflicting? • How should science be defined? • Should miracles be allowed in science? • Should faith be used to evaluate science?
Intelligent Design: irreducible complexity	Behe vs. Kitcher	• How strong is Behe's argument that "irreducible complexity" requires ID? • Are supernatural explanations acceptable in science for unexplainable phenomena? • Should ID be required to explain how design would be carried out? • To what degree should ID allow evolutionary processes?
Intelligent Design and Information	Dembski vs. Godfrey-Smith	• Which is the better argument for ID, irreducible complexity or information theory? • Do you agree that natural causes can't increase "complex specified information"? • What is meant by "chance," and what is its role in evolution?
Theological perspectives	Plantinga, Van Till, and McMullen	• Is conflict or cooperation a more appropriate metaphor for science and religion? • Should science and scripture correct each other? • Is evolution religiously neutral? • Does scripture demand rejection of evolution?
Theological perspectives	Johnson, Murphy, and Peacocke	• Are theism and naturalism incompatible? • If there is a God who is active in the world, is it through the natural order or by supernatural miracles? • What are the roles of chance and law in how life has come to be the way it is?
Educational and political issues	Pennock vs. Plantinga	• Is ID a type of creationism? • If creationism were taught in public schools, would it help or harm religion? • Should we avoid teaching subjects that might contradict someone's religious beliefs? • If creationism were taught, which version should be taught? • Does the constitution protect or prohibit teaching of creationism in schools?

that I developed relating to the readings. Questions were specifically designed to provoke debate (see Table 1 for examples). I moderated the class discussion but deliberately refrained from injecting my own opinion into the discussion in order to maintain a neutral environment.

The *Kitzmiller et al. v. Dover Area School District* decision, published just a month before the class commenced (Jones, 2005), served as a case study to conclude the course. This approach allowed students to synthesize the ideas they had been developing throughout the semester and apply them to an actual legal case. Students read Judge Jones' 139-page decision and were encouraged to read a white paper on ID by Lofaso (2005). The final week's discussion focused on the court case; students also wrote a final essay answering the question "Do you agree with Judge Jones' decision? Why or why not?" This paper represented 30% of their grade. Students were given latitude in terms of their approach to the question, but they were expected to reflect on the decision in the context of the assigned course readings. Grading was based not on the opinion expressed but on the quality and thoughtfulness of the argument, the understanding of the constitutionality issues involved, and the degree to which the essay was informed by the semester's readings.

The honors experience was also enhanced by a visit to campus by philosopher of science Michael Ruse, sponsored by the UNCW Honors Scholars Program. In keeping with the expectation that honors enrichment seminars involve experiences outside the classroom, students in the class met with him for a question and answer period, attended his public lecture, and also had dinner with him. Students had read Ruse's article in the Pennock anthology at the beginning of the semester and benefited greatly from the opportunity to meet him and discuss questions arising from his work.

Outcomes, Successes and Challenges

The approach taken in this course was successful in informing students about the issues involved in the debate about teaching ID, and in enabling them to make an informed decision on the topic (Table 2). This assessment is based on their statements in class discussion, the comments included in their weekly comparison charts, and especially on their statements in the final paper.

Table2. Views of students in Honors course on Intelligent Design concerning teaching Intelligent Design in public school science classes.

Time in Semester	Number of students in class supporting, opposing or undecided about teaching of ID		
	Supporting ID	Opposing ID	Undecided
Start of Course	8	4	6
End of Course	2*	16	0

* one of these students proposed teaching ID in a required origins course rather than a science class

At the beginning of the course, a third of the students knew too little about ID and the issues involved in the public controversy to be able to take a position. For instance, one commented in the final paper:

> When I walked into the Honors Seminar Intelligent Design course on the first day, I had no idea where I stood on the intelligent design vs. evolution debate. I had signed up for this course in a desperate attempt to figure out what was going on.

By the end of the course, all 18 students had reached a decision on the appropriateness of teaching ID in public school science classes. Sixteen of 18 students concluded that Judge Jones had made the correct decision, though some of these students remained sympathetic to ID. One paper commented, "While I agree with Judge Jones' decision, I am pulling for the defense to regroup and fight on." Another stated, "I personally feel there is validity to the argument of intelligent design, but at this time see no appropriate way to include in a high school science classroom." In the final class discussion, several students expressed a desire to include ID somewhere in the curriculum (e.g., as an elective course or in a social science course) but stated it should be excluded from science classes.

Based on student comments during discussions and in the papers, at the conclusion of the course students better understood: 1) the difference between science and religion; 2) what evolution is and how it works; 3) ID and the arguments for and against it; 4) philosophical, theological, scientific, educational and political issues involved in the ID controversy. They were also better prepared to make informed political decisions about the teaching of ID in public school science classes. The following comments in student final papers indicate the course accomplished the above objectives:

- "Before taking this class, I was unsure of where I stood in the evolution vs. creationism debate. After learning all of the aspects of each side, I am now able to take a stance."
- "Reading and comparing excerpts from different authors with opposing ideas not only helped me to find my own beliefs on creation and evolution, but also helped cultivate a more discerning method of learning crucial to any successful scholar."
- "In this class I have been able to fully evaluate where I stand on the subject of evolution versus creationism. The readings and discussions throughout the course of the semester have been a big help in allowing me to reach my conclusion."

One of the more vocal students added a personal note: "I just wanted to thank you for everything. I enjoyed the manner that you taught the class and that not only allowed for significant debate on the various subjects, but also that you put up with me!"

A course such as the one described is not without challenges for the instructor. Students ranged from freshman to senior level, and represented a great diversity of disciplines; only three were interested in pursuing degrees in the natural sciences (biology, chemistry, and geology). Thus students had a very uneven level of knowledge about evolution, which was not entirely ameliorated by the one lecture I gave on the topic. Constraints were also imposed by the time available; the course would adapt well to a two- or three-

credit hour setting, which would enable more thorough coverage of all topics, including providing a firmer foundation on the topic of evolution. Because I chose to take the role of discussion facilitator, with minimal lecturing, it was difficult to correct misconceptions. However, the diversity of student backgrounds allowed students to correct one another (e.g., science students could correct other students' misconceptions in scientific areas). Indeed, the students may have learned more from correcting and being corrected by each other than if I had taken a more traditional role in this course.

Conclusions

This honors enrichment seminar provided an appropriate venue for examining the debate about teaching intelligent design (ID) in public school science classes while fulfilling the goals typically recognized for honors courses. A seminar format in which students read and discussed contrasting views on the topic succeeded in informing students about the issues involved in the debate about teaching ID, and in enabling them to make an informed decision on the topic.

Acknowledgments

I thank the University of North Carolina Wilmington Honors Scholars Program, and especially Kate Bruce and John Myers, for support of this course. I thank two anonymous reviewers for their helpful comments.

Appendix A: Statements classified by Honors students as "science," "religion," or "something else," and as "fact," "theory," or "something else."

1. Jesus will return on January 1, 2007.
2. The Civil War was fought to put an end to slavery.
3. An atom is made of protons, neutrons, and electrons.
4. Igneous rocks form by cooling of magma.
5. The South Brunswick High School Cougars are the best men's soccer team in North Carolina.
6. Birds are the descendants of dinosaurs.
7. Jesus died for our sins.
8. Ice ages occur during cold phases in cycles of the Earth's orbit, axial tilt, and the precession of the equinoxes.
9. Extinction of the dinosaurs was caused by the impact of a large asteroid.
10. The Grand Canyon was dug by 40,000 angels.
11. There are more Episcopalians than Presbyterians in this room.
12. God created the Earth.
13. Life has changed through time.
14. Human destiny is controlled by our astrological signs.
15. Toyotas are better vehicles than Chevys.
16. The Bible is the word of God.
17. The sea covered this area 2 million years ago.
18. There is one God and Allah is His name.

19. The Earth is about 4.6 billion years old.
20. Nuclear power is safer than burning coal.

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