IMPLEMENTATION OF CASE STUDIES IN AP BIOLOGY

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Focus Question:

How will the implementation of case based learning activities affect my students’ performance on assessments and their participation in class discussions in an AP biology class?

Sub Questions

❖ Will how will student’s attitude and interest toward the course change?
❖ How will student performance on Free Response questions be affected?
❖ What will be the effect of student participation in collaborative groups?

Background:

Advanced placement biology is a rigorous second year biology course taken by juniors and seniors in high school. This course is the equivalent of an introductory major level biology course in college.

Stephen F. Austin High School is a large suburban high school that has about 2339 students. I had about 46 students enrolled in AP Biology during the 2009 – 2010 school year. Most students who took this course were highly motivated and have taken other high level courses while some were taking AP biology as their first AP course.

This has usually been a lecture based course due to the large volume of material covered on the AP exam. However, lecture is not always the best way to build knowledge.

The purpose of this project was to introduce inquiry learning in the form of case studies to the AP biology students. The goal was to get students out of their comfort zones and to develop their critical thinking skills.

Methodology

The treatment period was from January 5 through March 15. During this time students were introduced to new units by a narrative that describes a scenario. This narrative should describe some situation that leaves the student to questions about the case.

Students were assigned into groups to brainstorm what they know and what they want to know about the case. They filled out a case study analysis and when this session was finished, students were brought back to discuss as a class.

After each unit that was taught using collaborative groups and case studies, the students were assessed by an AP exam style quiz that contained both multiple choice questions and a free response question.

Data Collection consisted of interviews, student confidence survey (pre- and post-treatment), quiz and free response data, group work evaluation, and assignment surveys.

Conceptual Framework:

All students should have the opportunity to achieve scientific literacy in this advancing age of technology. There should be support for the teacher and student to conduct inquiry in the classroom (NSTA, 2003). According to Taylor (2008), both teachers and scientists suggest that there needs to be more critical thinking in science education, and cases are a way to introduce inquiry. The National Science Standards and the Benchmarks for Science Literacy from American Academy for the Advancement of Science (AAAS, 1993) which suggest that students should know and understand values of science such as curiosity, honesty, openness, and skepticism and how these incorporated in the scientific process. Any teacher has the capability of becoming an inquiry based teacher, if they are willing to adapt a philosophy of inquiry and have an open mind (Herreid, 2005). “Teachers can be effective guides for students learning science only if they have opportunity to examine their beliefs, as well as to develop an understanding of the tenets on which the Standards are based – (NRC, 1996, p. 28). Case studies fit in beautifully with the constructivist, 5E learning cycle (Llewellyn, 2005). Cases allow students to interact, plan, and discuss that can lead to the development of higher order thinking skills developed by inquiry (Llewellyn, 2005). Some cases can be short, completed in a class period while others can be lengthy lasting a month. The teacher has the capability of becoming an inquiry based teacher, if they are willing to adapt a philosophy of inquiry and have an open mind (Herreid, 2005). “Teachers can be effective guides for students learning science only if they have opportunity to examine their beliefs, as well as to develop an understanding of the tenets on which the Standards are based – (NRC, 1996, p. 28). Case studies fit in beautifully with the constructivist, 5E learning cycle (Llewellyn, 2005). Cases allow students to interact, plan, and discuss that can lead to the critical thinking and analytical skills developed by inquiry (Llewellyn, 2005). Some cases can be short, completed in a class period while others can be lengthy lasting a month. The goal is to develop a community of learners, were discussions are facilitated by teachers and students are involved in a positive manner. (Wilks, 1995).

Data Analysis and Conclusion:

After implementation of the trial case study, 63% of the students said they prefer the lecture/reading cycle of learning. Many of the reasons were that case studies, even though interesting, do not have anything to do with the AP exam. Another common reason was that case studies are too time consuming and unstructured. Only 28% of the students preferred case studies. However, one student who disliked her group at the beginning because they were unFocused, changed her mind after she saw what they were able to accomplish. At the end of the treatment period, results indicated that test scores increased and the post – confidence survey suggested that students were more confident with the content to write a free response essay. There were 35 % of students who felt very confident which increased from 11% on the pre-survey. More students also preferred case studies, especially those that allowed for kinesthetic activity or role playing.

Case studies were found to be a valuable tool to implement inquiry techniques. I am looking forward to continuing my use of cases and apply other inquiry techniques in my classroom. It was difficult at first to let go of control and want to give the answers, but I took a step back and in time this became easier. The student resistance, which was very frustrating also faded with time. I learned to let go of control and let students find the joy of science on their own.

References Cited


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