Introduction

The Department of Geological Sciences offers 3000-level courses that are introductory in nature and designed for upper-division non-science majors seeking to satisfy their upper-division natural science requirements. GEOL 3040, Global Change: The Recent Geological Record, is one such course. In previous years, this course was mainly taught as a traditional lecture-centered course. During Spring 2010, an effort was made to teach the course using a transformed or learner-centered approach to teaching and learning.

2. How they attitudes about science and learning science changed during the semester

   2.a. How students performed on various assessments
   
   ➢ This data has not yet been processed

   2.b. How students responded to the overall learner-centered approach used.

   The instructor received many complaints throughout the semester such as:
   
   ➢ “I can’t just memorize things and do well but have to understand processes.”
   ➢ “Why can’t you post your complete lecture notes on OLearn?”
   ➢ “It’s best to learn better how to write good test questions soon.”

Discussion

1.a. Challenge: Having a large number of GEOL and ENVS advanced level majors in a course designed for non-science majors.

2.a. Challenge: Having mainly juniors and seniors accustomed to a traditional approach to teaching and learning.

3.b. Recommendations: (1) Use open-ended questions to develop multiple-choice questions for future use. Arthurs attempted to do this, but more person hours on top of the grading of the open-ended questions was required and not available to do this. (2) Hire a graduate student with course background to be a grader.

Conclusion

Although instructors in other departments, such as Physics, find success in integrating a learner-centered approach to teaching and learning in upper-division courses. There are, however, fundamental differences between those upper-division ENVS courses for majors who have experience with learner-centered teaching in their lower-division courses and upper-division GEOL courses such as GEOL 3040. Two key obstacles, which could be changed in the future, include smoothness in the course and the approach.

4. Results

Data gathered to evaluate the effectiveness of the strategies implemented in GEOL 3040 during Spring 2010 target four main aspects of student responses to them:

1. How helpful students perceived each strategy
   
   ➢ Figures 1-8 illustrate how helpful students perceived each strategy.
   ➢ Preliminarily, it appears that non-science majors more often found the strategies very helpful than did the GEOl and ENVS majors.

2. How their attitudes about science and learning science changed during the semester

   ➢ This data has not yet been processed

3. How students performed on various assessments

   ➢ See Figures 9 and 10. Student performance declined as the semester progressed, this is perhaps due to the fact that they were responsible for learning more material that built upon and connected with other material.

4. How students responded to the overall learner-centered approach used.

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