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Blogging in the Physics Classroom: A Research-Based Approach to Shaping Students' Attitudes Toward Physics

Physics Education Research (PER) has done an excellent job in the past two decades addressing explicit course goals of student content learning; however, implicit course goals, aptly described as the “hidden curriculum”, such as an appreciation of how physicists think and operate, the value of physics as it applies to other fields such as engineering, biology, and medicine, and the applicability of physics to everyday life have remained for the most part untouched. For example, students’ attitudes towards physics in introductory courses have been shown to deteriorate in the normal course of instruction by several studies (and in other disciplines as well) [1-3]. This is alarming since educational research has established convincing links between student attitude and learning [4,5].

This study examined the effectiveness of a course blog in shaping and guiding students' attitudes in an introductory physics course. There are compelling arguments for using a blog [6]: (1) blogging can introduce a broad range of topics outside the classroom that cannot be covered in class due to time constraints, (2) blogging tends to increase student excitement for learning and ownership of the process, (3) blogs open up discussions to students who may not otherwise participate in class, and (4) blogging encourages discussion outside of class with a wide variety of viewpoints. Blogging also provides a way for students and instructor to interact, particularly outside of the classroom[7]. And blogging helps students “see knowledge as interconnected as opposed to a set of discrete facts" [8]. In other words, blogging, more so than other tools, appears to be a way to address the “hidden curriculum” and affect student attitude in a positive and concrete way.

The content of the blog, usually several posts per week, mainly focused on how the physics being currently studied applied to the “real world" and other fields besides physics, and often integrated a wide variety of physics applets and videos available on the web. For example, a post about friction discussed how geckos are able to scale walls, and a post about electricity featured a YouTube video of lightning striking a car with a subsequent discussion of Faraday cages. Students received a few points of extra credit per week for (1) reading the posts to the course blog during the week and (2) for posting comments to one or more posts. The criteria for student comments were that they be a thoughtful and articulate reflection on the blog post, about a paragraph in length that tied in outside information relevant to the topic in question; the outside information usually resulted in additional research on the topic by students.

Student attitude was measured through a 26-question Likert scale survey that was administered as both a pre- and post-test. Student responses to the attitudinal surveys were split into two groups: those who blogged and those who did not. Analyzing the survey results as interval data, an independent samples t-test was performed and an effect size was calculated. The results were also analyzed as ordinal data by comparing favorable and unfavorable student responses (neglecting neutral responses).

The data analysis showed that students who did not participate in the blog generally exhibited a deterioration in attitude toward physics consistent with previous results. However, students who read, commented, and were involved with the blog maintained their initially positive attitudes toward physics. Student response to the blog was overwhelmingly positive, with students claiming that the blog made the subjects studied in the classroom come alive for them and seem more relevant.

In conclusion, a course blog positively impacted student attitude towards physics in an introductory course and helped maintain initially positive attitudes. A course blog appears to be a powerful tool with which to address the “hidden curriculum”.

References

1. E. Redish, J. Saul, and R. Steinberg, “Student expectations in introductory physics," Am. J. Phys. 66, 212-224 (1998).

2. M. Zeilik, C. Schau, and N. Mattern, “Conceptual Astronomy. II. Replicating conceptual gains, probing attitude changes across three semesters," Am. J. Phys. 67, 923-927 (1999).

3. W. Adams, K. Perkins, N. Podolefsky, M. Dubson, N. Finkelstein, and C. Wieman, “New instrument for measuring student beliefs about physics and learning physics: The Colorado Learning Attitudes about Science Survey," Phys. Rev. ST Phys. Educ. Res. 2, 010101 (2006).

4. A. Schoenfeld, “Learning to think mathematically: Problem solving, metacognition, and sense-making in mathematics," in Handbook of Research in Mathematics Teaching and Learning, edited by D.A. Grouws (MacMillan, New York, 1992), 334-370.

5. T. Koballa and F. Crawley, “Attitude-Behavior Change in Science Education: Part II, Results of an Ongoing Research Agenda," Paper presented at the Annual Meeting of the National Association for Research in Science Teaching (65th, Boston, MA, March 21-25, 1992).

6. R. Ferdig and K. Trammell, “Content Delivery in the 'Blogosphere”, T.H.E. Journal; http://www.thejournal.com/articles/16626.

7. “Blogs move student learning beyond the classroom: An interview with Alex Halavais," Online Classroom Dec., 4-8 (2004).

8. E. Brownstein and R. Klein, “Blogs: Applications in Science Education," J. Col. Sci. Teach. 35 v. 6, 18-22 (2006).

Author 1: Gintaras Duda; gkduda@creighton.edu
Author 2: Katherine Garrett; katherinegarrett@creighton.edu

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