Chapter 3

Teaching

3.1 Overview

Without question teaching has been my primary focus during my time at Berry College. I have put an enormous amount of effort into improving my teaching and sustaining my teaching excellence. I care deeply about helping my students to learn. All of my activities at Berry (teaching, research, and service) are centered around the goal of educating students. This chapter of my dossier will focus on my work in the classroom, but ultimately that represents only a portion of my efforts to help students learn and grow.

My teaching style and philosophy have evolved considerably over the last five years. When I began teaching at Berry my attention was focused squarely on my own activities: preparing and delivering lectures, assigning and grading homework, constructing and administering tests. In recent years I have been much more focused on what my students do. I now believe that the most important thing I can do for my students is to provide them with challenges and see that they are properly supported as they work to meet those challenges. The transition to this new point of view has not been without difficulty, but I am completely convinced that students learn best in an environment that focuses on what they do rather than on what the teacher does. I have now reached a point where I am as comfortable with student-centered approaches as I am with traditional lecture. I have made tremendous strides toward becoming the best teacher that I can be, but I will always challenge myself to find better ways to help my students learn.

Regardless of my approach I have always pursued my teaching with devotion, even passion. I am strongly committed to being an excellent teacher. Although my conception of what constitutes excellent teaching has changed over the years, my commitment to teaching excellence has never wavered. I am a tireless worker who always finds time for his students. My office door is almost always open and students don't hesitate to email me (in Fall 2005 I received 198 emails from my PHY 111 students alone). I am not afraid to implement difficult changes if those changes will result in improved student learning. I am equally committed to *all* of my students, whether they are physics majors or students in my general education physics course. I believe that every class I teach serves an important function in the education of Berry students, and I take my responsibility as a teacher very seriously. In spite of this seriousness, my students find me both enthusiastic and approachable. I am confident that these qualities will be evident to anyone who examines my Annual Evaluations (see Appendix A) or my Student Evaluations (see Appendix B and excerpts in this chapter).

3.1.1 Courses Taught

Here I provide an overview of the courses that I have taught at Berry. A complete listing of the courses I have taught, the number of students enrolled, and the number of credit/contact hours for each course is given in Table 3.1. Below I provide a brief description of the four general categories of courses that I have taught. More detailed information about many of these courses can be found later in this section.

Physics for Non-science Majors: I have taught 7 sections of PHY 101: Introduction to the Physical World, and two sections of the corresponding lab. This includes two unique variations on this course. In Spring 2004 I taught an Honors section of PHY 101 and in Fall 2004 I taught a section of PHY 101 that was paired with a section of MAT 105. This course primarily serves non-science majors.

Course	**Number of Students**	**Credit Hours**	**Contact Hours**	**Course**	**Number of Students**	**Credit Hours**	**Contact Hours**
Fall 2001	82	8	11	**Spring 2002**	60	9	9
PHY 111 A	33	3	3	PHY 101 A	36	3	3
PHY 111 AL	18	1	2	PHY 112 A	16	3	3
PHY 111 BL	15	1	2	PHY 302 A	8	3	3
PHY 314 A	8	2	2				
PHY 314 AL	8	1	2				
Fall 2002	87	9	11	**Spring 2003**	64	13	10
PHY 111 A	39	3	3	CSC 498 A†	1	3	0
PHY 111 AL	19	1	2	PHY 101 A	32	3	3
PHY 111 BL	20	1	2	PHY 112 A	19	3	3
PHY 402 A	4	3	3	PHY 430 IA	7	3	3
PHY 490 A	5	1	1	PHY 490	5	1	1
Fall 2003	80	8	10	**Spring 2004**	52	12	12
PHY 111 A	35	3	3	PHY 101 A	24	3	3
PHY 111 AL	17	1	2	PHY 101 HB	10	3	3
PHY 111 BL	18	1	2	PHY 112 A	12	3	3
PHY 302	10	3	3	PHY 402 IA	6	3	3
Fall 2004	97	12	12	**Spring 2005**	48	9	9
CSC 498 A†	1	3	0	PHY 101 A	24	3	3
PHY 101 A	12	3	3	PHY 112 A	19	3	3
PHY 101 AL	12	1	2	PHY 430 IA	5	3	3
PHY 111 A	36	3	3				
PHY 111 AL	19	1	2				
PHY 111 BL	17	1	2				
Fall 2005	120	8	10	**Spring 2006**	97	16	11
PHY 111 A	40	3	3	CSC 498 A†	1	3	0
PHY 111 AL	20	1	2	PHY 101 A	24	3	3
PHY 111 BL	20	2	2	PHY 101 AL	24	1	2
PHY 302 A*	19	3	3	PHY 112 A	39	3	3
				PHY 402 IA*	8	3	3
				PHY 498 A†	1	3	0

† uncompensated courses
* includes one student who took an Honors version of this course

Table 3.1: List of courses taught at Berry College

General Physics with Algebra: I have taught 5 sections each of the PHY 111 (General Physics I with Algebra) and PHY 112 (General Physics II with Algebra) courses, as well as 10 sections of the PHY 111 laboratory. These courses are required for several science majors (Biology, Chemistry) as well as a variety of professional schools (in medicine, veterinary medicine, pharmacy, and physical therapy). However, these courses do not serve students majoring in physics or dual-degree engineering.

Upper-Level Physics Courses: I have taught 9 lecture sections and 1 lab section of upper-level physics courses. These courses include PHY 302 (Classical Mechanics I), PHY 314 (Electronics), PHY 402 (Classical Mechanics II), and PHY 430 (Quantum Mechanics). These courses serve physics majors and dual-degree engineering students.

"Extra" courses: I have taught a variety of non-traditional courses to serve the needs of our physics majors. These include PHY 490 (Physics & Astronomy Seminar), BCC 100 (First-Year Seminar), CSC 498 (Directed Study in FORTRAN Programming), and PHY 498 (Directed Study in Quantum Mechanics II).

Overall I have taught 49 sections of 15 different classes. A summary of my teaching load during my first five years at Berry is given in Table 3.2. This data should make it clear that I have "carried my weight" in spite of the fact that I teach in a small department with few majors. While my upper-level physics courses are usually small (4-19 students), I consistently teach much larger classes (with up to 40 students) for non-majors.

Course	**Number**	**Contact Hours**	**Students**	**Credit Hours**
Regular Classes	21	62	488	1456
Laboratories	13	26	227	227
WI Classes	4	12	26	78
Honors Classes	3	3*	12	36
BCC 100	2	0	38	38
Directed Studies	4	0	4	12
Total†	49	105	804	1854

* This figure does not include contact hours for a student who took honorized versions of PHY 302 and 402I, because these hours are accounted for elsewhere in the table.
† Totals have been adjusted so as not to double count the hours for a student who took an honorized version of a WI course.

Table 3.2: Teaching load summary

3.1.2 Summary of Student Evaluations

My complete student evaluations, including numerical scores and comments, are available in Appendix B. Here I provide a summary of the numerical data. In Section 3.1.3 I provide excerpts from student comments.

Table 3.3 shows my Quality of Instruction scores as well as my average score on all evaluation questions for all of my classes except seminar courses (BCC 100 and PHY 490) and directed studies (CSC 498 and PHY 498). Evaluation data for different sections of PHY 111 laboratory during the same semester have been combined. Also shown is the average GPA for the grades I assigned in each class. It should be clear from this data that my students think highly of my teaching and my classes. My grading in the introductory courses is reasonably strict, although my methods of assessment have resulted in some moderate grade inflation in PHY 112. I am working to correct that issue. The grades I assign in upper-level physics courses tend to be higher than average, but I believe this is justified by the quality of our physics majors and by the rigorous nature of these courses. Most of the time the physics majors meet my high expectations, and I grade them accordingly.

It is instructive to examine histograms that show the progression of my student evaluation scores during my time at Berry. Figure 3.1 shows the progression of average evaluation scores and Quality of Instruction

scores for three classes (PHY 101, PHY 111, and PHY 112) as well as for all upper-level physics courses. The most obvious trend is one of sustained excellence. Indeed, only one score is below 4. That single low score came during a semester in which I changed my instructional methods for PHY 111 in the middle of the semester (which I now realize was a terrible idea). Since that change in instructional methods, though, my evaluation scores in PHY 111 have improved steadily. Similarly, the dip in my PHY 101 evaluations during Spring 2006 is likely the result of a substantial change in teaching methods. I expect my evaluation scores to improve in that class as I perfect the new method. For more details about the instructional changes discussed above, see Section 3.3.

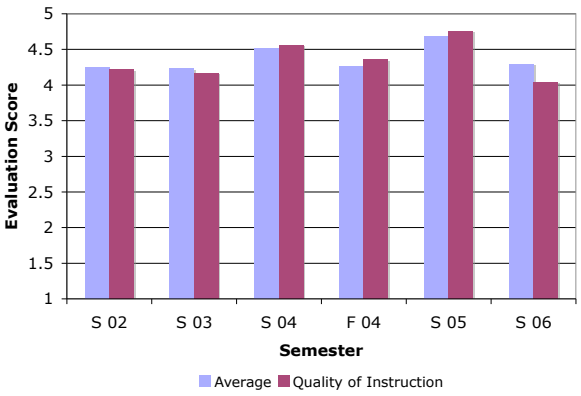
Course	**Quality of Instruction**	**Evaluation Average**	**Avg. GPA**	**Course**	**Quality of Instruction**	**Evaluation Average**	**Avg. GPA**
Fall 2001				**Spring 2002**			
PHY 111	4.54	4.48	2.90	PHY 101	4.22	4.25	2.65
PHY 111 L	4.52	4.45	NA	PHY 112	4.80	4.61	2.87
PHY 314	4.67	4.26	3.29	PHY 302	4.33	4.52	3.14
PHY 314 L	4.5	4.38	NA				
Fall 2002				**Spring 2003**			
PHY 111	3.82	4.11	2.86	PHY 101	4.17	4.23	2.69
PHY 111 L	4.27	4.28	NA	PHY 112	4.53	4.57	3.11
PHY 402	4.25	4.48	3.5	PHY 430 I	4	4.26	3.43
Fall 2003				**Spring 2004**			
PHY 111	4	4.22	2.74	PHY 101	4.56	4.51	2.65
PHY 111 L	4.47	4.44	NA	PHY 101 H	4.17	4.27	2.84
PHY 302	4.5	4.45	2.68	PHY 112	4.82	4.61	3.03
				PHY 402 I	4.83	4.67	3.35
Fall 2004				**Spring 2005**			
PHY 101	4.36	4.26	2.45	PHY 101	4.76	4.68	2.58
PHY 101 L	4.20	4.17	NA	PHY 112	4.94	4.79	3.09
PHY 111	4	4.22	2.79	PHY 430 I	5.00	4.94	3.26
PHY 111 L	4.58	4.55	NA				
Fall 2005				**Spring 2006**			
PHY 111	4.49	4.45	2.79	PHY 101	4.04	4.29	2.57
PHY 111 L	4.58	4.50	NA	PHY 101 L	4.13	4.28	NA
PHY 302*	4.60	4.66	3.25	PHY 112	4.7	4.65	3.11
				PHY 402 I*	4.86	4.88	3.41

NA indicates a laboratory which is not graded separately from the associated lecture course.
* includes evaluations and grades from one student who took an Honors version of the course.

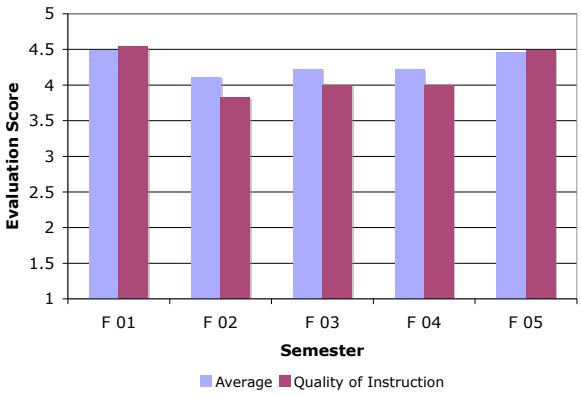
Table 3.3: Summary of numerical teaching evaluations

3.1.3 Student Comments

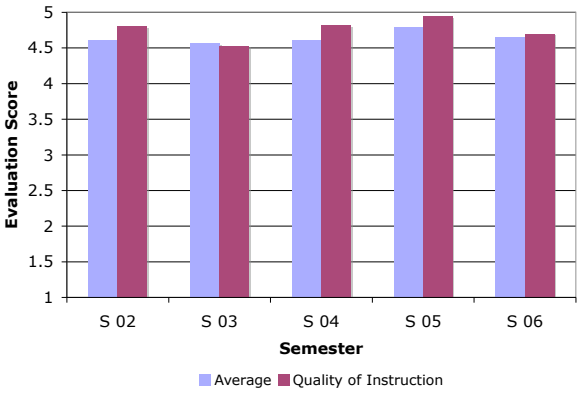
Perhaps the greatest insight into the effectiveness of my teaching is found by examining the comments my students write as part of their evaluation of my teaching. The comments listed below provide a clear



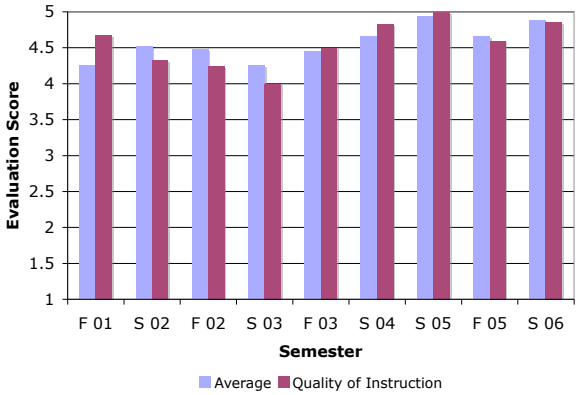
(a) PHY 101 Evaluations



(b) PHY 111 Evaluations



(c) PHY 112 Evaluations



(d) Upper Level Physics Course Evaluations

Figure 3.1: Histograms of evaluation scores (2001-2006)

indication of the quality of my teaching. Note that these comments are all recent and come from a variety of students in courses at all levels. I have also included a few notes from students (and one parent) in Appendix C.

- *Amazingly enthusiastic about content! I love how he is so fired up to teach Physics. He didn't make me feel inferior or incompetent. I always felt so proud to know I had done so well on his challenging test.* - PHY 101 student, Spring 2005
- *I found Dr. Timberlake to be the most helpful and inspiring professor I have had at Berry yet. I like how he pushes you to work harder, yet still understands your limits.* - PHY 112 student, Spring 2005
- *Not only are you an amazing instructor that loves the subject you teach but you have been creative in your teaching methods to make this course approachable and down to earth. This especially helped me through physics. You taught us as someone who was looking at physics from our point of view, yet with your knowledge. . . . Thank you for making physics a good experience for me. Keep up the good work. I'll always remember you and this class.* - PHY 112 student, Spring 2006
- *This was by far the most challenging class I have taken at Berry so far. It is also one of the most rewarding. Dr. Timberlake is an amazing professor with a gift for helping you understand the challenging ideas in Physics. His use of clever analogies and examples of what we were learning in class made the material more accessible. Dr. Timberlake is at his best when teaching one-on-one, he has a*

gift for pinpointing what it is that you are struggling with and explaining it in a manner that you would understand. - PHY 302 student, Fall 2005

- *Doc T is a gifted man - in the right profession for sure!* - PHY 402 student, Spring 2006

I'd like to close this section by listing one more student comment, one which I thought was very insightful:

- *I have noticed you are always reinventing your professor self and striving to become the best possible. Kudos for you.* - PHY 302 student, Fall 2005

I think that comment sums up my value to Berry College as a teacher. I *do* strive to become the best possible teacher and I am not afraid to reinvent my teaching, if necessary, to progress toward that goal.

3.2 Expanding the Curriculum

One of the major themes of my teaching at Berry College has been my attempt to improve the curriculum by offering new and innovative courses. I have created entirely new courses, adapted existing courses to the needs of the Honors program, obtained WI designation for courses that were not previously so designated, and taught directed studies on topics that are not covered by regular course offerings. In cooperation with Dr. Ron Taylor I developed a special version of the gen-ed physics course that was taught in conjunction with a gen-ed mathematics course. Table 3.4 provides a summary of these activities and each is described in greater detail below.

Academic Year	New	Honors	WI	Joint-Enrollment	Directed Studies
2001-2002	0	0	0	0	0
2002-2003	2	0	1	0	1
2003-2004	0	1	1	0	0
2004-2005	0	0	1	1	1
2005-2006	0	2	1	0	2

Table 3.4: Special courses that serve to expand the curriculum

New Courses: Since coming to Berry I have developed two new courses, which had never before been taught here. These courses are PHY 402 (Classical Mechanics II) and PHY 490 (Physics & Astronomy Seminar), both of which I first taught in Fall 2002. PHY 402 is a second course in classical mechanics that allows students to explore a wider range of topics than can be covered in a single semester, including some topics that are usually introduced at the graduate level. PHY 490 is a seminar course that provides our physics majors with the opportunity to read articles on current physics research and present this material to their peers. This exposes these students to cutting-edge research while simultaneously improving their presentation skills. In Fall 2006 I will teach another new course: an advanced laboratory course entitled Measuring the Fundamental Constants (PHY 310).

Honors Courses: I taught a designated Honors section of PHY 101 in Spring 2004. The lecture portion of this course was totally redesigned to provide a greater challenge to Honors students (the lab portion of the course was shared with the regular section of PHY 101). I have also taught an "honorized" version of PHY 302 and 402I to a physics major who is in the Honors program. I designed additional assignments for her to complete in order to earn the Honors designation.

WI Courses: I have obtained approval for two new WI courses: PHY 402I and PHY 430I. These courses have greatly expanded the WI offerings for physics majors and dual-degree engineering students. More detail on the writing assignments for these courses is provided in the Section 3.3.

Joint-Enrollment Course: During Fall 2004 I taught a special section of PHY 101 that was coordinated with Dr. Ron Taylor's MAT 105 class. The same group of students enrolled in each class and Ron and I worked very hard to coordinate the two classes. To facilitate this process we each attended the other's class and we met frequently to plan ways in which our courses could complement each other.

Directed Studies: I have taught four directed studies. Three of these were directed studies in Fortran Programming (CSC 498), which provided physics students with background in a programming language that is widely used in the physics community. The fourth directed study was in Quantum Mechanics II, a second semester of quantum mechanics for a student who was preparing to enter a very competitive physics graduate program.

3.3 Inquiry-Based Learning

Over the past five years my teaching style has changed from a traditional lecture approach to an approach that focuses on the active engagement of students. In my introductory courses I now devote most of the time in class to posing questions or problems and encouraging students to answer or solve them on their own. This approach is often described as "Inquiry-Based Learning" (IBL). A great deal of educational research has shown that IBL methods are much more effective than traditional lecture. The *Physics Today* article "Transforming Physics Education" by Carl Wieman and Katherine Perkins (available in Appendix H) provides an argument in favor of using IBL methods in physics instruction.

The remainder of this section details the methods I have used to implement IBL in several of my courses, as well as some student comments on these methods.

3.3.1 General Physics with Algebra (PHY 111/112)

In PHY 111 & 112 I use a combination of two proven instructional methods: Just-In-Time Teaching[1] and Peer Instruction[2]. The Just-In-Time Teaching component requires my students to read material from their textbook and then answer several conceptual questions (multiple choice and essay) online prior to coming to class. Once in class they revisit these questions by discussing them in small groups and supplying their answers using an electronic feedback system (this is the Peer Instruction component). The electronic feedback allows me to determine how successful the students were at answering the question and this guides the ensuing class discussion. After each class students are required to complete a homework assignment that focuses on problem-solving. Prior to each test students work in groups to complete a large-scale assignment that involves conceptual and numerical problem-solving. For more details see the PHY 111 & PHY 112 course materials in Appendix D.

I am still tweaking my teaching methods in these courses, but on the whole this approach has been very successful. I have assessed student learning in PHY 111 by administering the Force Concept Inventory (FCI) at the beginning and end of the semester. Students in my class show an average gain of 37% of the maximum possible gain. This is comparable to gains seen in other interactive engagement classes, and superior to the gains seen in traditional lecture courses (see Richard R. Hake, "Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses," *American Journal of Physics* **66**, 64-74 (1998) - available in Appendix H). In addition, I have received very positive feedback from my students as indicated by my overall evaluation scores and by a variety of student comments. Some recent comments are shown below.

- *I have never been so happy with the format of the course because you had so many ways of making sure we were reading and understanding the material. Online quizzes and question. Powerpoint, worksheets, etc. Thank you for dedicating the amount of time you do making sure we know the material. I appreciate it so much.* - PHY 111 student, Fall 2005
- *I can't even list all the strengths of this course. To me, this class is almost ideal - student participation, constant practice and reinforcement of concepts, great teaching style and approachability.* - PHY 112 student, Spring 2006
- *I liked the style this course was taught. The online quizzes and practice problems helped me keep up with the material and the teaching style was wonderful. Physics is a really hard subject to learn and I actually learned it. Great class.* - PHY 112 student, Spring 2006

[1] Gregor M. Novak, Evelyn T. Patterson, Andrew D. Gavrin, and Wolfgang Christian, *Just-In-Time Teaching: Blending Active Learning with Web Technology* (Prentice Hall, 1999).

[2] Eric Mazur, *Peer Instruction: A User's Manual* (Prentice Hall, 1997).

One major change that I plan to implement in Fall 2006 is the use of Physlets: interactive Java applets that simulate physics content. By encouraging my students to use Physlets outside of the classroom I will provide yet another way for them to learn the concepts and principles of physics.

3.3.2 Introduction to the Physical World (PHY 101)

I received a Summer Course Development Grant in 2005 to develop a series of 22 worksheet-based classroom activities and 9 lab activities for my general education physics course (PHY 101). This approach was inspired by the Process-Oriented Guided-Inquiry Learning (POGIL) methods used in some chemistry courses at Berry. I used these activities for the first time in Spring 2006. I found this approach to be successful for the most part, with students performing as well on exams as students in previous semesters. Student reactions were mixed but for the most part the students liked the activities, particularly those that involved hands-on experimentation. A few student comments are given below.

- *The activities were great. They had information on them and they allowed us to have a hands-on learning environment.* - PHY 101 student, Spring 2006
- *Excellent preparation, love the hands-on activities - it gave me a better understanding of the material.* - PHY 101L student, Spring 2006

For a more detailed look at this course, see the PHY 101 course materials in Appendix D. In the coming years I will put significant effort into improving and refining these activities. In particular, I would like for the activities to address the *process* of science in a more explicit fashion. In order to accomplish this I may need to reduce some of the content, but only so that my students can delve deeper into the experiments and thought processes that lead to the development of major theories.

3.3.3 Upper-level Physics Courses

My primary method of classroom instruction in upper-level physics courses is still lecture. However, I incorporate a variety of strategies to ensure that my students are actively engaged with the material *outside* of the classroom. Traditional homework problems from the textbook can encourage active engagement, but I always supplement these assignments with other tasks that promote critical thinking. In my Classical Mechanics courses (PHY 302 and 402I) students complete several computation-based projects using the *Mathematica* software package. In PHY 402I, which is writing-intensive, these computational projects are the bases for writing assignments in which students must prepare a professional-looking paper with proper typesetting and properly formatted figures. In Quantum Mechanics (PHY 430I), another writing-intensive course, students read about fundamental experiments in quantum physics and write papers that relate the experimental results to the concepts we study in class. In all of these courses students work on these assignments outside of the classroom. However, these classes are usually small and I am able to support the students one-on-one as needed. For more details see the course materials for PHY 302, PHY 402I, and PHY 430I in Appendix D.

I think these approaches have been very successful, and my students seem to agree. Some recent student comments are given below.

- *The computational problems were an amazing aid in our understanding of how the systems we were learning about worked.* - PHY 302 student, Fall 2005
- *I thought the writing assignments were a good addition to the class. I gained a lot of skills in typing scientific papers. Also, the papers gave me a deeper insight into the topic.* - PHY 402I student, Spring 2006
- *I thought that the writing assignments were a key factor in my understanding of the concepts presented in this course.* - PHY 430I student, Spring 2005

In the future I plan to make use of Physlets (Java applets that simulate physics content) in PHY 430I. In Fall 2006, I will teach a new advanced lab course (PHY 310) that has never before been offered at Berry.

3.3.4 Student Research

The best way to help a student learn through inquiry is to involve them in real research. I have conducted a number of research projects with students during my time at Berry. Some of these projects involved technical research that was conducted over the course of a summer and led to publications in major journals. Others were smaller-scale projects conducted during a portion of the academic year and resulting only in presentations at the Berry Student Research Symposium. All of these projects, though, have played an important role in educating the students who participated. More details on my research with students, including my plans for the future, can be found in Chapter 4.

3.3.5 IBL Development

The following is a list of things I have done to improve my ability to offer effective IBL courses.

- I attended the 2002 *Workshop for New Physics & Astronomy Faculty* in College Park, MD. I first learned about IBL methods, including Just-In-Time Teaching and Peer Instruction, at this workshop.
- I attended the 2004 *Gordon Research Conference on Physics Research and Education* at Mount Holyoke College. This conference focused on the teaching of classical mechanics.
- I was awarded a 2005 Summer Course Development Grant to develop activities for PHY 101 (as described above). The grant application is available in Appendix C and sample activity and lab handouts are available in Appendix D.
- I attended the 2005 *Wye Faculty Seminar*. This seminar is devoted to connecting teaching in all fields to issues of citizenship.
- I attended the 2006 *Winter Meeting of the American Association of Physics Teachers*. In addition to attending the regular meeting, which featured a variety of talks on physics pedagogy, I also attended four half-day workshops focusing on different IBL methods (see certificates in Appendix C).
- Along with five other Berry faculty I was awarded a grant from the Educational Advancement Foundation to develop an interdisciplinary community of IBL teachers at Berry College. The full grant proposal is available in Appendix C.
- I attended the *Ninth Annual Legacy of R. L. Moore Conference* by invitation from the Educational Advancement Foundation. This conference focuses on inquiry-based instruction in mathematics, but also includes IBL methods in other fields.

3.4 Technology

I have found creative and productive ways of incorporating technology into every class I teach. The list below provides a sample of the ways in which I use technology in my courses.

VikingWeb: I have been a pioneer in the use of VikingWeb. I use the online quiz feature in several classes (PHY 101, 111, & 112). I have used online essays and forums in PHY 430I. I post a wide variety of course materials on VikingWeb for all of my courses. I have also been actively involved in providing feedback on the VikingWeb system to the designers at Jenzabar.

Computer Simulations: I make extensive use of computer simulations in PHY 101 and PHY 430I. I plan to incorporate a package of computer simulations, known as *Physlets*, into my PHY 111 & 112 courses in the coming year.

Mathematica: I have been the primary person responsible for training Berry physics majors to use the Mathematica software package. I use this powerful computational and mathematical software in PHY 302, 402, and 430I.

Class Response System: Along with Dr. Charles Lane I have implemented the use of an electronic classroom response system ("clickers") in my PHY 111 and 112 courses. This system allows students to interactively answer multiple-choice questions and then displays a histogram of responses on the projector screen. This is an important part of the Peer Instruction method that I utilize in these courses.

I have found that my students are very appreciative of the way I use technology in my courses. Sample comments from student evaluations are given below.

- *. . . use of technology (VikingWeb, PowerPoint, etc) was the best of any professor I have had at Berry and very helpful for the course.* - PHY 112 student, Spring 2005.
- *I really like your use of VikingWeb. It's helpful to have all the information I need online when it comes time to study for the tests.* - PHY 111 student, Fall 2004
- *I like the clickers we use in class. These are fun and interactive.* - PHY 112 student, Spring 2006

As mentioned above, I plan to expand my use of pedagogical technology by using Physlets (Java applets that simulate physics content) in several of my courses.