

Teaching Portfolio

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Teaching Philosophy

There are few environmental problems facing the world today that are not earth science based. Solutions to these demanding problems require that all citizens hold some basic understanding of earth science principles in order to make intelligent decisions concerning the use of natural resources and to mitigate man's negative impact upon the environment. I believe my duty as a teacher is to help develop a "geoperspective" in every student that enters my classroom. A geoperspective is the unique way that earth scientists view the earth and seek solutions to problems. This perspective is not intuitive and requires a teaching methodology that is student centered. For me, student-centered learning isn't just an educational buzz word; it is a holistic approach to dealing with a student as a learner and is crucial to the development of a geoperspective.

The development of a geoperspective requires that the students promote and share their ideas. This approach compels the student to actively process the information at hand. For example, the first day of class I like to place students into groups and tell each group to make observations and come up with questions concerning a rock sample from the perspective of a person with a non-scientific background. Each group is given a unique perspective: a child, farmer, religious leader or perhaps a miner in a quarry. The observations and questions developed by each group are then shared with the whole class. We then discuss how a person with a geoperspective might view the sample. One can see from this example that this approach requires the lesson to be organized in a way that enhances student interaction. I will often arrange students into small groups during various phases of a discussion; sometimes they are asked to analyze a question, generate a concept map or list previous knowledge which is then shared with the whole class. This form of interaction facilitates further discussion and actively engages students, which facilitates the development of their own geoperspective.

Far too often teachers expect their students to come to class preprogrammed for motivation; however, this is often not the case especially for students who are taking the class to fulfill a graduation requirement. I believe that it is my responsibility to enhance the motivation of all my students. This is typically achieved by creating an enjoyable classroom atmosphere that students are encouraged to be a part of. For example, humor is an element of my personality that has helped me to gain student attention and to make information more memorable. I have found that this attribute of my personality has increased the level of communication, cooperation and motivation of my students beyond what I have seen in the typical classroom. Highly motivated students are more receptive to new ideas and concepts necessary for advancing one's geoperspective.

Research is a critical component for the development of a geoperspective; however, undergraduates are rarely given the opportunity to participate in authentic research experiences. In recognition of this problem, I became involved with modifications made to the Earth Materials (GEOL 3010) curriculum at the University of Georgia to include a collaborative research component. Earth Materials at UGA is a prerequisite course for several other classes and is typically taken early in the undergraduate's career thus providing the research opportunity before the end of the student's second year. The final product of the research is the submission of an abstract to a regional conference. During the first year of the project, students were involved with the characterization of a suite of zeolites found in veins in the Elberton Granite of Georgia. The analyses involved petrography, mineral optics, X-ray diffraction and electron microprobe work. The results were presented by the students at the Southeast Section of the Geological Society of America annual meeting in 2008. This authentic experience introduced the students to the scientific process, highlighted the value of collaboration and provided students with valuable research skills.

In a 1788 paper presented at the Royal Society of Edinburgh, James Hutton, the father of modern geology, remarked, "(in geology) we find no vestige of a beginning, no prospect of an end". Stated in these simple words is the heart of the geoperspective: the earth has been evolving since its beginning. It is my hope that students leaving my class will have a perspective that will allow them to view the earth in this dynamic way. Embracing the concept of a dynamic earth, understanding the mechanisms responsible for change and applying that knowledge in their everyday life will facilitate intelligent, responsible decisions concerning issues affecting the earth.

Description of Courses Taught

University of Georgia

Introduction to Earth Processes and Environments (GEOL 1121L)

- Laboratory Instructor
- 7 sections
- 81 students
- Undergraduate non-major

This laboratory course provides hands-on experiences, which complement the core lecture course GEOL 1121. Topics covered in this class include the identification of rocks and minerals, map interpretation, geologic processes and hazards. My role as laboratory instructor is to introduce lab concepts, monitor student progress during lab, answer questions and grade laboratory assignments. My approach to teaching this course was to instill a sense of enthusiasm for each topic introduced in lab. I would typically start the introduction of a lab with a demonstration, a short PowerPoint presentation or short discussion using hand-samples brought in from my own collection. During lab, I would move between groups looking over student answers and asking questions to ensure that each group was on the right track. If a student had a particular question, I will try to coach them through with a series of questions that illustrate how a geologist would work through a problem.

Earth Processes and Environments (GEOL 1121)

- Instructor
- 1 section
- 15 students
- Undergraduate non-major

This course presents introductory concepts relating to earth materials, processes and geologic hazards. My goal as instructor of this class is to create the conditions necessary for the students to develop a geoperspective. This is a student-centered approach is best achieved through active participation: student discussion groups, hands-on activities and case studies supplemented with PowerPoint presentations, demonstrations and short lectures.

Earth Materials (GEOL 3010L)

- Laboratory Instructor
- 3 sections
- 35 students
- Undergraduate majors and occasional graduate student

This course is an intensive survey of the physical and chemical properties, identification, and modes of occurrence of minerals and mineral assemblages. My role as laboratory instructor is to show students how to utilize a variety resources to characterize and identify unknown minerals and rocks in hand sample and thin section (microscopy). Typically, this requires the student to be prepared prior to lab. I show students techniques that will help them become better prepared for lab: pre-reading, note taking techniques, accessing visual references of the material before coming to lab and coming class with pre-lab questions. My duties also include helping students with data collection for the voluntary research project that is presented at a regional geology conference each year.

Description of Courses Taught

Georgia Perimeter College: Adjunct Faculty

Physical Geology (GEOL 1121)

- Instructor
- 1 section (Fall 2005)
- 21 students
- Undergraduate majors and non-majors

This course is the study of the earth and the processes which shape it. The course offers an overview of plate tectonics, volcanism, earthquakes, mountain building, weathering, erosion, soil, the origin of minerals and rocks, and water and energy resources. Lectures were supplemented with PowerPoint presentations and small group discussions.

Historical Geology (GEOL 1122)

- Instructor
- 1 section (Fall 2005)
- 19 students
- Undergraduate majors and non-majors

This course is the study of the history of earth and life through time. It provides an overview of evolution, fossils, dinosaurs, geologic time, radiometric dating, the origin of the earth, environments, and the geologic history of North America. Pre-reading strategies, small group discussions and short student presentations were used extensively in this course to enhance student participation.

Historical Geology Laboratory (GEOL 1122L)

- Laboratory Instructor
- 1 section (Fall 2005)
- 16 students
- Undergraduate majors and non-majors

This laboratory course is designed to accompany GEOL 1122. The laboratory provides practical experience in studying sedimentary rocks to interpret depositional processes and environments, examining fossils and their use in age determinations, correlating rock units, interpreting geologic history from maps, and examining the regional geology of North America. I supplemented many of the labs with materials from my own collection.

Environmental Science (GEOL 1122L)

- Instructor
- 1 section (Fall 2005)
- 25 students
- Undergraduate non-majors

This is a non-laboratory science course designed to investigate the role of humans in their environment. Emphasis was placed on sustaining resources and making informed choices concerning environmental issues. Small group discussions, concept mapping and exploration of student generated topics concerning environmental issues were dominant strategies used in this particular course.

Northeastern Illinois University: Adjunct Faculty

Environmental Geology (ESCI 123)

- Instructor
- 4 sections (Spring 2002-Summer 2003)
- 214 students
- Undergraduate non-majors

This course focused on the earth, its structure, composition, and resources. Topics include mineral and energy resources, their formation and distribution, their supply and demand projections for the future. Also, the environmental impact of resources, nuclear, waste disposal and geologic hazards are covered. This course was taught in a large lecture hall (50-70 students). Lectures focused on local geology and environmental issues. Despite the large class size, small group discussion and interactive classroom discussion were emphasized.

Description of Courses Taught

College of Lake County: Adjunct Faculty

Environmental Geology (GEO 224)

- Instructor
- 2 sections (Fall 2000-Spring 2001)
- 34 students
- Undergraduate non-majors

This course focused on human interrelationship with geological hazards and problems. Volcanoes, earthquakes, landslides and subsidence, surface and groundwater hydrology, waste disposal, mineral resources, and the energy situation are all included. A traditional lecture course at CLC; however, interactive discussion of concepts, lab demonstrations and PowerPoint presentations were utilized to enhance student understanding of material.

Secondary Education Experience

Biology, Chemistry, Geology, Physics, Integrated Lab Science & Earth Science

- Instructor
- 2-3 preps., 5 classes/day
- 100-120 students/semester
- Freshman thru Senior level

I taught secondary science education for 12 years at three different schools in Illinois: Mundelein High School, Niles North High School and Warren Township High School. I taught classes in Biology, Chemistry, Geology, Earth Science, Integrated Lab Science and Physics. I was involved in curriculum writing for Chemistry, Integrated Lab Science and Geology courses. I served as a voluntary Track & Field coach and Senior Class Sponsor for 3 years. I established a hands-on inquiry based approach to teaching my classes. I organized weekend field-based learning experiences for Geology students two times per semester. My teaching goal was to make sure my students had an understanding of the scientific process and less with the memorization of facts.

Evaluations

University of Georgia

Evaluations and Summary of Student Comments for Introduction to Earth Processes and Environments (GEOL 1121L).

Based upon a scale of 1-5: 1 = Poor, 3 = Average, 5 = Excellent

Term	Fall 2005		Spring 2006		Summer 2006	Spring 2008		Total
Number of Students	6	15	14	14	3	13	16	81

Instructor Evaluation	Average							
Clarity of Presentation	4.3	4.8	4.4	4.4	5.0	4.5	4.3	4.5
Enthusiasm and stimulation of interest	4.7	5.0	4.4	4.4	5.0	4.6	4.6	4.6
Willingness to help students	4.5	5.0	4.4	4.9	5.0	5.0	4.8	4.8
Encouragement of students to think for themselves	4.3	4.9	4.6	4.3	5.0	4.8	4.4	4.6
Fairness of grading	4.3	4.9	4.5	4.6	5.0	4.5	4.5	4.6
Overall rating of instructor	4.7	4.9	4.6	4.5	5.0	4.9	4.6	4.7

Student Comments (1121L)

- Excellent instructor, very good at presenting ideas and keeping things interesting.
- I could tell Prof. Bulger was really excited about geology and teaching because he really made me excited about geology. I was never bored in his class. Also, if I was ever stuck, he would help by pointing me in the right direction but still letting me find the answer for myself.
- Instructor explained everything thoroughly, and always answered our questions when we asked them. His humor kept me awake at eight in the morning.
- The instructor's enthusiasm and helpfulness made the lab interesting and useful in aiding with lecture course concepts. I feel as though I learned more from lab than I did in lecture.
- Great Teacher!

Evaluations and Summary of Student Comments for Earth Processes and Environments (GEOL 1121).

Based upon a scale of 1-7: 1 = Poor, 4 = Average, 7 = Outstanding

Term	Summer 2006
Number of Students	15

Knowledge of Subject Matter	6.7
Stimulation of Interest	6.5
Concern for Students	6.2
Preparation	6.5
Course Organization	6.4
Methods of Instruction	6.1
Critical Thinking	5.9
Overall Course Rating	6.4
Overall Instructor Rating	6.5

Evaluations

Student Comments (GEOL1121)

- The instructor did an excellent job of maintaining my interest in a subject that I would otherwise not care about.
- He was always very enthusiastic about teaching and that spread throughout the entire class. Furthermore, his teaching methods (power point, hands-on examples) really helped students (including myself) better understand the topics.
- Did a very good job of presenting possibly confusing material in a clear understandable way.
- I really appreciate the instructor's desire to teach geology. This was a great class.
- Made the material engaging and relevant.
- Used power point to show real life examples as well as brought in many physical examples so the material could be understood. Always made the class interesting with scenarios that helped me understand the material.

Evaluations and Summary of Student Comments for Earth Materials (GEOL 3010L).

Based upon a scale of 1-5: 1 = Poor, 3 = Average, 5 = Excellent

Term	Fall 2006	Fall 2007	Fall 2008	Total
Number of Students	12	9	15	36

Instructor Evaluation	Average			
Clarity of Presentation	4.3	4.0	4.0	4.1
Enthusiasm and stimulation of interest	3.5	3.3	3.9	3.6
Willingness to help students	4.7	4.6	4.6	4.6
Encouragement of students to think for themselves	4.3	4.8	4.7	4.6
Fairness of grading	4.7	4.9	4.4	4.6
Overall rating of instructor	4.6	4.3	4.5	4.5

Student Comments (GEOL3010)

- Dan was extremely helpful during labs. Sometimes it was difficult to even know where to start, though, since we had never seen any of this stuff before.
- Dan is a very good instructor
- Dan did a bang-up job!
- Good class!

Georgia Perimeter College

Georgia Perimeter College does not provide student evaluations.

Evaluations

Northeastern Illinois University

Evaluations and Summary of Student Comments for Environmental Geology (ESCI 123).

Term	Response*	Question Number									
		1	2	3	4	5	6	7	8	9	10
Spring 2002 (72)	A	59	51	50	53	48	60	63	34	64	34
	B	7	14	19	14	23	7	4	21	5	25
	C	6	4	3	1	1	5	0	11	1	6
	D	0	3	0	4	0	0	5	5	2	7
	E	0	0	0	0	0	0	0	0	1	0
Fall 2002 (58)	A	52	51	52	47	45	57	56	42	53	37
	B	6	3	6	8	12	1	1	13	5	17
	C	0	3	0	2	0	0	0	2	0	4
	D	0	1	0	1	1	0	1	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
Spring 2003 (64)	A	59	54	55	52	48	57	61	49	57	45
	B	3	8	8	10	15	5	1	9	6	15
	C	2	1	0	0	1	2	1	4	0	2
	D	0	1	1	1	0	0	1	4	1	1
	E	0	0	0	1	0	0	0	0	0	0
Summer 2003 (22)	A	18	21	22	18	17	21	22	14	21	18
	B	4	1	0	3	4	1	0	5	0	3
	C	0	0	0	1	1	0	0	1	1	1
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0

* Evaluation form can be found in the Appendix

Student Comments (ESCI 123)

- See unsolicited letter of recommendation from Martha Nelson, a student in ESCI 123 (Fall 2002), in Appendix.
- He's the best. You need more like him!
- Mr Bulger knows his stuff and makes the class fun and interesting. I wish all the teachers at NEIU were like him.
- Enthusiastic, always prepared and fair. I would rate Dan Bulger at the top of my instructor list.
- Enjoyed the class very much. Instructor was able to make the class fun and interesting. He is able to relate to students well.
- As an education student, Prof. Bulger modeled effective teaching methods. His classes are informative and enjoyable.
- Engaging lectures!
- Dan should be hired as a full-time geology teacher at our university.

College of Lake County

Evaluations and Summary of Student Comments for Environmental Geology (GEO 224).

Based upon a scale of 1-5: 1 = Low, 5 = High

Term	Fall 2000	Spring 2001	Total
Number of Students	12	22	34

Instructor Evaluation	Average		
Instructor willing to help students	4.95	4.67	4.77
Instructor provides student participation	4.51	4.43	4.46
Instructor maintains appropriate atmosphere	4.80	4.67	4.72
Instructor uses time effectively	4.61	4.66	4.64
Instructors voice clear & understandable	5.00	4.83	4.89
Instructor follows stated grading policy	4.86	4.67	4.74
Tests and homework related to objectives	4.66	4.59	4.61
Instructor explained grading policy	4.91	4.63	4.73

Student Comments (GEO224)

- Instructor is excited about the material. He applies material to our current lives and surroundings.
- Relaxed style enhances learning environment. I feel the instructor is there to promote learning and will make all attempts to help if asked.
- The instructor does a good job of using analogies to explain things and has a good sense of humor. He can explain things very well.
- Instructor tried to make everything hands-on if possible and used quite a few visuals.
- He's very laid back yet he really wants you to understand what he's trying to teach.
- The instructor uses an informal style that makes the evening less difficult to get through. He is willing to follow any direction that arises in class discussion and is very informed.
- Very enthusiastic/high energy. Made learning geology exciting.

Innovative Teaching Projects

Earth Materials (GEOL 3010) Collaborative Research Project

Research opportunities for students in the geosciences are typically reserved for senior level undergraduates fulfilling a senior thesis requirement or graduate students. Far too often the opportunity for research evades the undergraduate early in their college career if not entirely. In recognition of this problem, I became involved with modifications made to the Earth Materials (GEOL 3010) curriculum at the University of Georgia (UGA) to include a collaborative research component. Earth Materials at UGA is a prerequisite course for several other classes and is typically taken early in the undergraduate's career thus providing the research opportunity before the end of the student's second year.

During the fall of 2007, the collaborative project centered on the identification and chemical characterization of a previously unidentified suite of zeolites associated with veins in a granite body at Blue Quarry, Elberton, Georgia. In the fall of 2008, the project involved the mineralogic and chemical characterization of pegmatite veins found in the granite at Blue Quarry. Both projects emphasized skills learned during lecture and lab: X-ray diffraction, microprobe analysis, optical properties and thin section preparation. Volunteers attended bimonthly meetings throughout the semester to discuss results and assess progress. Students documented all aspects of their work in notebooks dedicated to the project. Upon project completion, participants contributed to the writing of an abstract that was accepted at the southeast section of the Geological Society of America annual meeting.

My responsibilities during the project included helping students with thin-sectioning preparation, preparation-analysis of samples with X-ray diffraction and mineral identification. I showed four students how to properly prepare thin-sections for the study. Thin section analysis with the petrographic microscope was critical in determining relationships between different minerals within the veins in the granite. Also, I instructed students how to properly prepare and analyze zeolite samples with X-ray diffraction. Preliminary identification of mineral suites in the granite veins were later confirmed by X-ray diffraction analysis. Once all the data was collected, I showed students how to find resources to help them correctly identify and characterize the zeolite minerals in the granite veins.

Student motivation for the project was maintained beyond the conclusion of the Earth Materials course. Based upon student comments and course evaluations, I concluded participant motivation for the project were the result of the following: 1) Participants recognized the value of skill acquisition applicable to future research endeavors; 2) participants recognized the value of skill rehearsal and success in classroom assessment measures; 3) participants were afforded the opportunity to choose specific research objectives; 4) participants viewed the defense of the abstract as a more authentic experience than an in-class presentation or project.

Participation in the development of this project has provided me with many useful skills applicable to organization of a research activity for a large group of students. Successful completion of the project required overall group monitoring, coordination between sub-groups, motivation of individuals as well as the group as a whole and skill training. This experience has provided me with insight into the implementation of a successful classroom research project.

Sample Teaching Material

A critical component missing from the voluntary research project offered to the Earth Materials (GEOL 3010) students in the fall of 2007 was an evaluation form for the project. I devised an assessment form (shown below) in collaboration with Dr. Swanson that would provide a way to monitor and improve upon the project experience. This evaluation was given to the Fall 2008 Earth Materials class.

General questions for everyone to answer (Circle one).

1. Did you participate in the 3010 research project?

YES NO

2. Do you plan on doing a senior thesis?

YES NO

3. Do you plan on attending graduate school?

YES NO

For those who participated in the 3010 research project, please answer the following questions. Base your answers on the following scale:

4. Rate your overall experience with the project?

Bad			Neutral			Great
1	2	3	4	5	6	7

5. Prior to the project, rate your motivation to pursue research

None			Neutral			Great
1	2	3	4	5	6	7

6. After working on the project, rate your motivation to pursue research

None			Neutral			Great
1	2	3	4	5	6	7

7. Do you feel the project was helpful in stimulating ideas for future research?

No			Neutral			Definitely
1	2	3	4	5	6	7

8. Would you recommend future 3010 students participate in a similar project?

No			Neutral			Definitely
1	2	3	4	5	6	7

9. Do you feel you have gained valuable skills as a result of the project?

No			Neutral			Definitely
1	2	3	4	5	6	7

Sample of Student Work

The following is a summary of responses made on the Earth Materials (GEOL3010) research project evaluation form (Fall 2008).

General questions (n = 12)

1. Did you participate in the 3010 research project?

YES (58.3%) NO (41.7%)

2. Do you plan on doing a senior thesis?

YES (58.3%) NO (41.7%)

3. Do you plan on attending graduate school?

YES (83.3%) NO (16.7%)

For those who participated in the 3010 research project, please answer the following questions (n=7).

4. Rate your overall experience with the project?

Average = 5.6 SD= 1.0

5. Prior to the project, rate your motivation to pursue research

Average = 4.4 SD= 1.9

6. After working on the project, rate your motivation to pursue research

Average = 5.9 SD=1.1

7. Do you feel the project was helpful in stimulating ideas for future research?

Average = 4.7 SD= 1.6

8. Would you recommend future 3010 students participate in a similar project?

Average = 6.6 SD= 0.8

9. Do you feel you have gained valuable skills as a result of the project?

Average = 6.3 SD= 0.8

The following can be summarized from the data above:

- Despite the academic rigors posed by GEOL 3010, a majority of the class chose to participate in the research project
- The project appears to motivate students to pursue research (based upon t-test results of student responses to question 5 and 6)
- Participants of the project would recommend that future 3010 students take part in a similar project
- Students feel they have gained valuable skills from the project

Future considerations:

- Follow-up research is needed to see if the percentage of students planning to pursue a senior thesis successfully complete one and how many of those students participated in the research project
- Students need to be shown how skills may apply to their future research interests

Activities Related to Teaching

Graduate Student Representative on the Committee on Education (2009-2011)

I've been selected by the Officers and Council of the Geological Society of America, the oldest and largest geological society in the country, to serve on the Committee on Education as a Graduate Student Representative. The purpose of the committee is to work with other interested scientific and education organizations in the development of earth science education and outreach objectives. My role on the committee is to provide input, advice and insight on how the Society can assist in promoting Earth science to students at the graduate level.

Certificate of University Teaching (2007-2009)

I am currently pursuing a Certificate in University Teaching offered by the Graduate School at the University of Georgia. The goal of the program is to assist doctoral students in developing their teaching skills as Graduate Teaching Assistants as well as to prepare them for future academic positions. The certificate requires nine credit hours in course work related to teaching development and presentation of a project in higher education at a regional conference. I am scheduled to complete the requirements of the certificate by fall 2009. The program has been extremely helpful in my development as a higher education teacher.

Future Faculty Program (2008-2009)

I was selected to participate in the Future Faculty Program offered through the Office of Teaching and Learning at the University of Georgia as one of only fifteen graduate teaching assistants receiving the Outstanding Teaching Assistant Award. The aim of the program is to promote interaction of teaching assistants from many different disciplines to share their ideas on various topics in higher education. In conjunction with this program, I gave a presentation on Grading at the campus-wide orientation for graduate teaching and laboratory assistants.

Senior Thesis Advisor (2008-2009)

I am currently directing a research project of an undergraduate geology student working towards a Senior Thesis at the University of Georgia. I have trained the student in thin section preparation, advised him in areas involving fieldwork, sample preparation, data collection and grant writing. The aim of the project is to identify and describe the morphological features of a Mississippian aged stromatoporoid.

Geological Society of America Abstract (Fall 2008)

I presented a geoscience education poster at the Joint Annual Meeting of the Geological Society of America in Houston, Texas: *Implementation of a voluntary research-based project to enhance undergraduate involvement in the scientific process in mineralogy*. The abstract described the undergraduate research project offered to GEOL 3010 students in the fall of 2007. This conference provided me with valuable experience presenting information to peers as well as valuable contacts in the area of geoscience education.

Intel International Engineering and Science Fair (Spring 2008)

I served as a Special Awards Judge in geology as a representative of the American Geological Institute. Duties as a judge included interviewing high school students about their projects, critiquing their posters and ranking presentations. This experience was valuable to me for learning how to interact with a wide variety of students and to critically evaluate their work.