TEACHING RACE, CLASS, AND CULTURAL ISSUES IN EARTH SCIENCES TO ENHANCE MULTICULTURAL EDUCATION INITIATIVES

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ABSTRACT

The perspectives of people of color continue to be largely underrepresented in earth science texts and curricula. In recent years, as part of an effort to make geoscience and other science disciplines more inclusive of diverse experiences, Vanderbilt University and the American Geological Institute launched multicultural education initiatives. The author's implementation of these initiatives in introductory earth and environmental science courses at Vanderbilt and Oberlin College indicates that with proper preparation and pre-assessment of student expectations, geoscience courses can be effectively taught with supplementary material reflecting minority group frames of reference. Challenges to be faced include balancing social and physical science content in geoscience courses and dealing with sensitive issues involving race and class. Experience indicates that inclusion of environmental justice oriented content may not effectively attract and retain students of color from non-science disciplines. Multicultural course content should be used as a means to recognize the significance of minority involvement within the discipline.

Keywords: Education - geoscience; education - minority students; education - undergraduate; education - environmental.

INTRODUCTION

People of color perspectives are generally absent from environmental geoscience curricula, which may in part be blamed for the dearth of minority participation in earth science programs. Recent Environmental Careers Organization (ECO) data indicate that less than one percent of undergraduates of color choose to major in earth and environmental sciences (Environmental Careers Organization, 1992 and 1995). While serving as a faculty member and mentor for the 1998 Keck Summer Undergraduate Student-Faculty Research Program in Geology, I noticed that only four of the approximately 60 participants were african american. Minority students were under-represented in spite of the Consortium's recruitment efforts and attractive student compensation (travel, room, and board with a $1,200 stipend). None of the four attended one of the 12 predominantly white (averaging 3.3 percent african american student enrollment) Keck Geology Consortium member institutions (CollegeView, 2000; Keck, 2000). Without seeing themselves or their communities being fully represented, african american students may be less inclined to enroll in earth science programs.

During the past decade several organizations and institutions have been actively involved in recruiting african american and other students of color to geology and similar disciplines. The American Geological Institute (AGI) Minority Participation Program (MPP), continues to award scholarships to minority geoscience majors. The National Association of Black Geologists and Geophysicists (NABGG) has recently stepped up its efforts to recruit and retain black geoscientists in both the professional and academic ranks (Fields, 1998). North Carolina Central University, Fort Valley State College (Georgia), and Alabama Agricultural and Mechanical University are three Historically Black Colleges and Universities (HCBU) that have significantly increased their offerings in the geosciences. Two faculty members at predominantly white institutions (PWI), Mary Louise Hill at Temple University, and Barbara Tewksbury at Hamilton College, have made significant contributions in the development of programs and curricula targeted at african american and minority student recruitment (Tewksbury, 1995).

GEOSCIENCE TOPICS AND ENVIRONMENTAL JUSTICE ISSUES

Over a four year period, 1995-1999, during which I was a faculty member at Vanderbilt University, and later, at Oberlin College, I developed environmental geoscience courses that included environmental justice case studies and reading materials. The Environmental Justice Movement is a grassroots campaign that began in the early 1980s during a series of protests in Warren County, North Carolina. The predominantly low-income and african american community had been targeted for a landfill for polychlorinated biphenyl (PCB) contaminated soils. Local residents feared that the shallow aquifers from which they drew their drinking water would be tainted by the landfill's leachate. During the protests, for the first time, mainstream environmental activists and civil rights organizat -ions joined forces in direct action tactics.

Since then, a plethora of books, journal articles, and federal reports have been written documenting the disparate impacts of natural and human-induced environmental hazards upon people of color communities. Domestic examples of environmental injustice include: negative im-

pacts of mining upon Native American lands, childhood blood poisoning from lead (Pb) contaminated soil in African American communities, and health impacts associated with pesticide contaminated groundwater in Latino migrant farmworker communities.

APPLICATIONS OF MULTICULTURAL EDUCATION INITIATIVES IN GEOSCIENCE CURRICULA

The Initiative for Cultural Diversity in the Curriculum Program: Vanderbilt University - At Vanderbilt University, Dr. Jay Noller and I were awarded a 1996 Initiative on Cultural Diversity in the Curriculum (ICDC) grant for re-development of the existing Environmental Geology (GEOL 100) course. We team taught the course during the fall 1996 semester using Keller's Environmental Geology (1996) as the main text, with Bullard's Dumping in Dixie (1994) and Schwab's Deeper Shades of Green (1994) as additional required texts. Geoscience-related environmental justice reading assignments were taken from Bullard (1993, 1994), Hofrichter (1993), and Bryant and Mohai (1992). Students were required to view and discuss the videos "Toxic Racism" (1994) and "Keepers of the Water" (1994). The former film features case studies involving african american and Latino communities impacted by groundwater and soil contamination; the latter focuses upon the potential cultural and hydrogeological impacts of a sulfide mine upon Wisconsin's Chippewa Tribe and Wolf River watershed. A field trip, the "Toxic Tour of Nashville" was organized with students visiting several of the city's black and low-income neighborhoods being impacted by solid and hazardous waste facilities.

The American Geological Institute's Improving Delivery in the Geosciences Program: Oberlin College - During the summer of 1998, I was selected to participate in the AGI Improving Delivery in the Geosciences (I-DIG) workshop. My major project was the development of a course plan for Environment and Society (ENVS 101), the introductory course offering in Oberlin College's Environmental Studies Program (ESP), where I was to begin a one-year visiting appointment in fall, 1998. Among the goals of my assignment at Oberlin put forth by the Dean of the College was to "bridge the gap" between the ESP and the College's long-standing african american Studies Program.

In order to fulfill the Dean's multicultural education initiative and potentially attract african american students to the ESP, I developed the Environment and Society course as an update of the Vanderbilt ICDC environmental geology course. Because Oberlin's Geology Department offers an introductory environmental geology class, Environment and Society is designed more along the lines of a traditional physical geography course. The required text is Parks' The Environment: Principles and Applications (1997). The course content is broken into three units encompassing the four earth systems: atmosphere, hydrosphere, geosphere, and atmosphere. Supplementary required environmental justice-related readings are taken from the texts listed above with the Vanderbilt ICDC course, and other notable works including those by Westra and Wenz (1995), and Bryant (1995). Students were directed to resources such as Clark Atlanta University's Environmental Justice Resource Center and the U.S. Environmental Protection Agency's (EPA) Office of Environmental Justice. Case studies of special interest, in addition to the Wolf River Mine conflict, include the Chester, Pennsylvania struggle against a planned soil incineration facility, and the Winona, Texas decade-long fight against a hazardous waste underground injection plant.

"Brownfields sites" are generally defined as abandoned properties with actual or perceived hazardous waste contamination. The high potential liability associated with brownfields sites is a disincentive for redevelopment. As a result, minority and low-income communities are negatively impacted by the blight of idle, decaying structures. It is estimated that over 80 percent of brownfields sites involve either soil or groundwater contamination, making such cases excellent candidates for study in earth science curricula. Low-cost, alternative soil clean-up methods (e.g. in-situ bioremediation) were examined as potential means to encourage remediation and redevelopment. A case study at Charlotte, North Carolina was presented as an excellent example of brownfields site recovery through on-site soil stabilization (Lee and Haas, 1995).

As a follow-up to the fall course, I developed two new courses for spring, Colloquium on Environmental Justice (ENVS 210) and Physical and Environmental Geography of Africa (ENVS 212). Both meet requirements for social science credit in the ESP. The latter course takes an earth sciences approach to the study of Africa and emphasizes the relationship between the physical and cultural aspects of the continent. Students interested in African history and/or politics were exposed to a more holistic interpretation of the status and development of African societies. In an effort to attract african american students to enroll in the Colloquium, I delivered a public lecture on environmental justice at the Afrikan Heritage House, Oberlin's residence hall catering to black students.

OUTCOMES AND ASSESSMENT

Vanderbilt University - The ICDC initiative began at Vanderbilt in the spring of 1995 with its primary goal being to "strengthen the curriculum to reflect the diverse cultures that constitute American life and…our ever-shrinking world"(Burish, 1997). Therefore, the ICDC course was not specifically designed to be a recruitment tool for minority geoscience students. However, we assumed that more culturally inclusive content could potentially gain the interest of students of color. Out of a total of 200 students enrolled in our two ICDC sections, I saw only one identifiable african american. Vanderbilt's student body is four percent african american (CollegeView, 2000).

Assessment of ICDC courses was conducted through instructor and student evaluations. From all indications, the majority of students did not enjoy the course; evaluations were overwhelmingly negative. After examining the

students' written comments, I believe that two factors primarily contributed to this less than favorable response. First, the course was not listed in the catalog as having any special "multicultural initiative" status. Many students mentioned that they did not expect to have to deal with such content. Second, the Environmental Geology 100 course is a very popular favorite of Vanderbilt non-science majors wishing to fulfill a core science requirement. Students come to course not particularly interested in the original subject matter. Thus, many were not highly motivated to study "extra" required environmental justice-oriented material.

To some degree, the students who enrolled in our revised ICDC Environmental Geology offering were blind-sided. From past experiences I can say with a fair amount of confidence that dealing with issues of race and class is not something that many students feel comfortable doing on a quasi-involuntary basis. Additionally, there was not an expectation that a physical science course would contain such extensive emphasis upon social science material.

From my perspective as an instructor, I believe that the course went well in a pedagogical sense. Our co-teaching effort of the two sections of 100 students was effectively coordinated and flowed smoothly. We were able to maintain a good balance between the physical and social science content. The Geology Department was very supportive of our effort and allowed us ample time for preparation and development of materials.

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My primary concern at the time was the ICDC Committee's apparent discomfort with the environmental justice material. In the letter informing us of the grant award there is the following:

> "I should add a note of caution voiced by some committee members. They accept your point that environmental hazards may disproportionately affect certain ethnic and racial groups. They believe, however, that in many cases the effect is on all low-income groups and only secondarily related to race and ethnicity. The committee would not wish to have more made of the association than can be supported by current research findings" (Venable, 1996).

The above is in error, in my opinion, because the most respected environmental justice studies have found that race, not class, is the primary factor in predicting whether one is likely to be impacted by a hazardous waste site (U.S. General Accounting Office, 1983; Chavis and Lee, 1987; Lavalle and Coyle, 1992; Goldman and Fitton, 1994; Goldman, 1994). Despite the ICDC Committee's caution we retained the original content and method of delivery.

The most effective component of the course, in my opinion, was the "Toxic Tour of Nashville" field trip. Approximately two-thirds of the students participated and afterwards made numerous comments along the lines of it being an "eye-opening" experience. We toured communities where residences sat in the shadow of heavy industry. We visited a landfill bordering a middle-class african american community. It appears that the environmental justice material was made "real" to many of the students only after this on-the-ground activity. I also heard good comments following our guest speaker's lecture. John Rosenthal, the head of Howard University's Urban Environmental Institute, addressed the class on brownfields issues. The students, normally unresponsive, enthusiastically participated in a lively discussion.

Though I am no longer at Vanderbilt, the Environmental Geology course continues to be taught with some amount of multicultural content (Noller, 1998). During the fall 1997 semester, I returned as a guest speaker for what was a very well received seminar. Largely due to the efforts of Geology Department faculty, Vanderbilt now offers a minor in Environmental Studies. The new multidisciplinary minor will provide increased opportunities for curricula with multicultural environmental justice content.

Oberlin College - My primary objective in implementing the I-DIG project was to attract students of color, primarily african americans, to the ESP. A secondary mission was to expose white students to environmental justice issues. The Environment and Society 101 course serves as the introductory offering for the ESP. It is a very popular course offered during the fall semester with enrollment approaching 100. Seats are reserved nearly exclusively for first and second year students. During my time at Oberlin, we divided the course into one fall and one spring section in order reduce class size and make the course more befitting a small liberal arts college.

Assessment of the effectiveness of I-DIG program initiative used the following criteria:

- Number of students electing to write environmental justice-related term papers without being so required.
- Number of african american students enrolled in Environment and Society who later choose to enroll in Physical and Environmental Geography of Africa and the Colloquium on Environmental Justice.
- Number of students who become involved in environmental justice activism.
- Number of african american and other students of color who choose Environmental Studies as a major.
- Number of african american and students of color enrolling in spring 1999 ESP courses as a result of "word of mouth" referral.
- Students' written comments.

While the above assessment criteria are expressed in quantitative terms (i.e. "Number of…"), information was gathered subjectively. No formal surveys were taken as I decided that asking students of color individually why they decided to enroll in a particular course could potentially become a sensitive issue.

Eight students (15 percent) of the 55 enrolled in the fall Environment and Society course wrote papers emphasizing environmental justice. This came without any prodding on my part. I was very careful not to give the impression that papers with environmental justice themes would be viewed more favorably. Interestingly, six of the eight papers focused upon Native American case studies. A seventh was based upon a Mexican/Latino community, and the eighth dealt with brownfields issues. No student papers emphasized african american perspectives even though the course materials and case studies did so predominantly.

Two african american females enrolled in the fall Environmental and Society course. One initially expressed a sincere interest in environmental justice issues. Neither of them signed up for ESP courses in the spring. Through subsequent informal discussions, it became apparent that their experiences had not been positive. One expressed her discontent with the predominantly earth sciences oriented material; "I thought we were going to talk about saving the whales." Two different african american first year students enrolled in my ESP offerings during the spring driven primarily by interests they had developed in high school. Both had had some previous experiences in environmental activism and from all indications plan to become ESP majors.

The 10 students enrolled in the Colloquium on Environmental Justice were required to become involved in some form of environmental justice activism. They did so with a significant amount of enthusiasm, assisting several non-profit environmental justice organizations in the authoring of federal assistance grants. Two enrollees traveled extensively throughout the state conducting research on their chosen project. All of the students expressed the positive experiences they had in attending regional and national student-run environmental justice conferences.

My teaching experience at Oberlin was very positive. My only concern is that with my departure may also go the environmental justice curricula. Despite obvious student interest in the issue, there does not appear to be any ESP faculty member(s) preparing to develop a new course, or to incorporate supplementary materials into an existing course.

Among my goals was to have some form of institutionalization of the I-DIG project initiatives. However, unless some unforeseen changes occur, I do not expect to see a significant continuance of environmental justice concerns in the ESP. The one bright spot is that Oberlin's library has acquired many of the major environmental justice titles that I used in my courses. The library has also retained all course reserve materials.

Unfortunately, student evaluations for the fall Environment and Society course were wholly negative. No students agreed that the course had been taught "effectively." No students wrote that they would recommend the course to other students. Many of the students' negative written responses reflected their displeasure with the heavy earth science content; the majority of Oberlin's 2,800 students, and those enrolled in the course, concentrate their studies in non-science, humanities-oriented disciplines. Also, students frequently do not declare a major until well into their junior year. Therefore, first and second year students usually choose courses out of curiosity or mere interest. There is no real intent to follow the subject beyond the end of the semester. Once again, the students were blind-sided somewhat by the course content. In this case, students remarked that they wish that more emphasis had been placed upon environmental justice issues and less upon geoscience-related topics.

RECOMMENDATIONS FOR FUTURE INITIATIVES

The primary challenge in incorporating multicultural material in earth science courses is maintaining a workable balance between the physical and social science content. The secondary challenge is meeting students' expectations for their learning experience. At Vanderbilt, while a good balance was attained, it did not match student wants resulting in gross dissatisfaction. At Oberlin, the balance was apparently shifted too far in the physical direction, which brought forth negative reactions. I would recommend that the balance be determined based upon student expectations. During the first days of the spring Environment and Society class, I queried the students about their expectations and then adjusted the course content accordingly. I was able to link several classic environmental history and philosophy works with earth systems processes (Carson, 1962, and Leopold, 1970). The students reacted very positively in that I noticed a great increase in the number of times reserve readings were checked out of the library compared to the prior semester.

A third challenge is deciding how to appropriately deal with sensitive issues such as race and class. At Vanderbilt, a larger (approximately 5,000 undergraduate students) and much more socially conservative institution than Oberlin, the students were very uncomfortable. Oberlin, with its long history of racial and gender equality, was significantly more open to discourse on the potentially controversial and divisive course content. Deciding upon the pedagogical approach to take here presents a dilemma. At Vanderbilt, my somewhat edgy "in-your-face" approach was not well received by the students. However, I feel that if the environmental justice material is presented in Pollyanna fashion, the students may not take it seriously. In hindsight, I would take a lighter approach at Vanderbilt presenting the supplementary material in "matter-of-fact" fashion without making any grand pronouncements regarding the actuality that the course is meant to expand students' multicultural horizons. Thus, I would hope to avoid the confrontational tone of some of the lectures.

Another obvious challenge is gauging the effectiveness of the inclusion of multicultural content in attracting

and retaining students of color. At Oberlin, there was no indication that the environmental justice readings had a positive impact upon the african american students enrolled. The students expressed interest in the course, but were dissuaded by the earth science focus. So, regardless of my effort to be inclusive, the core subject matter was not deemed palatable by students of color. My recommendation is that students of color be recruited from physical and natural science disciplines. It will be easier for them to make the transition to geosciences. They should come with heightened interest as they see themselves and their communities as stakeholders in cases involving natural and technological hazards.

Somewhat related to the above paragraph is the impact my presence as an african american instructor upon course delivery and impression upon students. My ability to empathize with victims of racism obviously enhanced my enthusiasm in lecture. At Oberlin this had a very positive effect upon the classroom environment as students seemed open and eager to learn more about "the black experience." At Vanderbilt, my presence seemed to conjure up an aura of conflict involving issues of race, segregation, and white privilege far too complex to discuss in detail here. Several of the students at Vanderbilt wrote that I was "intimidating." My assumption is that their lack of familiarity and interaction with african americans in positions of authority created a discomforting environment that to some degree interfered with the exchange of information. Unfortunately, we will not see such situations improve until there is significant growth in the numbers and percentages of faculty of color in higher education in general, and in the geosciences specifically.

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We pass through this world but once. Few tragedies can be more extensive than the stunting of life, few injustices deeper than the denial of an opportunity to strive or even to hope, by a limit imposed from without, but falsely identified as lying within.