Sustainability, Cognition, and WAC

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"Sustainability is about the terms and conditions of human survival; and yet we continue to educate at all levels as if no such crisis existed."
—DAVID ORR, UNIVERSITY OF VERMONT

AT THE END OF THEIR often cited book *Programs that Work,* Fulwiler and Young list what they call "The enemies to WAC." Among those many enemies—reluctant or resistant faculty; skeptical, parsimonious administrators; untenured WAC consultants; etc. (some of these enemies have mellowed since the fifteen-plus years the book was published)—is the enemy upon which I wish to focus: objective, multiple-choice testing.

Why is multiple-choice testing an enemy to the WAC endeavor? Fulwiler and Young answer that question this way: In the colleges, "students often sit in large lecture halls and take tests that have been designed to be machine-scored. Test scores are then machine-averaged to produce a final grade … In such an atmosphere, the teaching of writing has little place" (291). In the public schools, "no wonder so many [teachers] are seduced by workbook exercises that someone else has designed and that can be marked quickly and efficiently, objective grades in the grade book, standardized test preparation complete, principal and superintendent pleased, the nation secure. In such an atmosphere, there is little commitment to write to learn rather than write to be tested, little commitment to develop a pedagogy that models what writers do so that children can imagine themselves as writers and begin to act as writers do" (292).

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My answer to the question of why multiple-choice testing is an enemy to WAC is pedagogical. Generally WAC is bolstered by a related series of educational principles, such as writing shapes thinking (Applebee and Langer); differing writing tasks shape differing critical thinking skills (Bean, Waldo, Applebee and Langer); the process of writing creates meaning (we understand better what we're writing about as we draft and receive feedback); writing tasks should expand in complexity as students grow cognitively, and tasks should not exceed students' zones of proximal development (Vygotsky); writing in a major helps students learn the language of the major (Bazerman); students must be "immersed," "go native" in the language of a discipline in order to think and write in it (Kuhn, 204); and even though mastery of the discipline's language and thinking is an essential goal, students need to be able to collaborate across disciplines (Waldo).

A couple of points unite these principles. They involve WAC in the development of writing and cognitive abilities, and they acknowledge the importance of writing within and across specialized communities. These principles produce assignments that demand time for students to complete them and for teachers to guide and grade the students. And while the results can be easy to measure individually and to compare between students in the same classroom, they are not so easy to compare between schools, districts, and states.

Multiple-choice tests, on the other hand, produce achievements easy to account for, and they readily demonstrate "adequate yearly progress," or lack thereof. They hint at a scientific basis ("objective," verifiable), are easy to grade, and offer ready comparisons between students, schools, districts, and even states. They promote learning of discrete units of text such as, in the language arts, drill and practice in comma usage or subject/verb agreement. Students memorize (or do not) the rules and pass (or do not) the tests. But multiple-choice tests almost never focus on developing cognitive and writing abilities. Usually, they do not encourage use of particular critical thinking skills, and this is a problem in an age with huge, growing long-term problems that need citizens with critical thinking skills to understand and solve them.

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I want to take the remainder of this article to explain why WAC offers a promising pedagogy for helping people solve complex problems, why multiple-choice testing is nonetheless prevailing, and what WAC specialists might do to counter this situation. The complex problem I wish to use as an example is sustainability—the subject David Orr refers to at the opening of this article. I would like the issues and assignments

discussed here to be thought of as a subset of the WAC/WID movement, a *green WAC* which focuses its consulting in assignment design and paper grading on environmental concerns. Environmental problems have surfaced dramatically in both the United States and the world as among our most serious threats to happy existence, and, therefore, everyone has an interest in them.

I think the conditions suggested by David Orr in his quote are true. There cannot be a subject much more important than sustainability, especially given the precarious ecological position in which we find ourselves, and yet, by and large, we continue to educate in the public schools and colleges as if nothing is happening. But before I enter into the discussion of why this lack of focused pedagogy exists, I think it is important to define sustainability and suggest why it is an issue almost as consequential as global warming, its unhealthy twin.

At bottom, sustainability means that human resources are used only at a rate that they can be replenished naturally, with systems remaining productive indefinitely. It means that we measure our "ecological footprint," understanding that the more resources we use, the larger the footprint of damage we leave. It means that in every personal and professional activity we should consider how our lifestyle choices impact the global environment. If global warming is one of the most pressing problems we face, sustainability has the potential to be one of the great solutions.

It is interesting to ponder why there is so little focused pedagogy on sustainability in our schools. How can the schools, from elementary through post-secondary, "educate as if no … crisis existed"? Orr did not answer that question in his brief quote, but I intend in this article to answer it, at least in part.

One short answer is denial. In the case of sustainability, some doubters might say that the fit between humanity and its habitat is just fine. They argue we don't need any special school attention paid to the issue of sustainability. They argue there's no need to teach our students ecological literacy. Just note how those in denial counter the facts and consequences of global warming, bringing their own "science" and "scientists" to "debunk" the issue. To many the need for sustainability practices, like the need to counter global warming, appears decades off. Given that, turning heads away may seem a reasonable response.

Or maybe it's not so much denial as ignorance that results in the lack of a sustainability pedagogy. Most people know less about sustainability than they do about global warming—a heavily publicized issue. If the public is generally ignorant of what sustainability is, then teachers will not be trained to teach sustainability practices which

involve complex critical thinking activities, group processes, and practice in real world situations. And such teachers cannot be expected to design assignments which require such activities.

Very little pedagogy these days focuses on issues of sustainability in part because of denial and ignorance, but the full reason is much deeper than that. Much at fault is a profound conflict in pedagogical approaches, a conflict that grows out of a federally funded program, "No Child Left Behind" (NCLB). NCLB was literally imposed on the public schools—elementary, middle, and high school—in 2001. The program requires each state establish "higher" standards than it had prior to 2001. It allows the schools to choose the assessment instruments for this requirement as long as they identify their standards and show how the students have met them. Almost uniformly, schools have chosen multiple-choice testing because such testing is inexpensive, and easy to grade, tabulate, and compare between students, schools, and states. Choosing it is understandable, though, I will argue, a sorry situation with grave long-term consequences.

The following points (from the Illinois Board of Education) characterize the NCLB pedagogy:

- Annual testing of all students against state standards in reading and mathematics in grades 3–8 and in science at least three times in a student's school career (including once in high school).
- "Verification" of each state's assessment system via required participation (every other year) by selected districts in the NAEP test.
- "Accountability" through aggregate and disaggregate analysis and reporting of student achievement results.
- A state definition and timeline for determining whether a school, a district and the state are making "adequate yearly progress" (AYP) toward the goal of 100 percent of students meeting state standards by the 2013–2014 school year.
- The use of "scientifically-based" programs and strategies.
- All students will reach high standards.

The first three of these points illustrate the salient features of NCLB. They also illustrate its potential and demonstrated problems. These annual tests occupy the curriculum in two disciplines (reading and mathematics) from grades three through eight and one discipline (sciences) three times. Although the parenthetical "once in high school" requirement in point one sounds syntactically as if it belongs only to the sciences, in fact, many schools test all three areas in high school and include

other tests, such as achievement in writing skills, as well. Because there is so much testing and so little time, it is difficult not to "teach to the test," and such teaching tends to preclude a project-oriented and process curriculum, where critical thinking skills are developed. Point two shows why schools might be invested in the testing of their students: the schools are tested for verification themselves. If the schools do not pass the "verification" test and/or their students do not pass standardized tests, the schools lose federal money; and they may, in a worst case scenario, themselves be lost. Thus the "accountability" provision of point three. This imposed and essentially closed system of "clear" standards, easy measurement, and severe punishment for non-compliance does not leave much room for other approaches that focus on developing critical thinking.

Imagine a "no child left behind" pedagogy treating the subject of sustainability. The student reads about the issue, hears the teacher talk about it in class, and then takes a multiple-choice test to demonstrate achievement.

Sustainability Multiple-Choice Test

1) Which one of the following would not be considered a goal for learning about sustainable living?
   a) To consider the ties between lifestyle choices and their impact on the earth.
   b) To understand how the environment is meant to serve humans.
   c) To understand how nature's organizing principles can be applied in the design and production of goods and in everyday living.

2) An "unsustainable situation" occurs when
   a) Not enough resources are removed from the environment to sustain human happiness.
   b) Human activity only uses nature's resources at a rate at which they can be replenished naturally.
   c) Nature's resources are used up faster than they can be replenished.

3) Individual "ecological footprints" are
   a) Hard to find in deep woods.
   b) Measures of the resources we use during the course of our daily living, the more resources the larger the footprint.
   c) Suggestions of paths to follow in order to live better lives, lives more ecologically sound.

4) Which of the following is not a tenet of sustainable roofing?
   a) Use products made from raw materials whose extraction is the least environmentally damaging.
   b) Consider roof surface color and texture with regard to climate and their effect on roof system performance.
   c) Make aesthetics the most important consideration in roof design; pleasing yourself means pleasing others and the environment.

5) Sustainable roofing minimizes the burden on the environment, conserves energy, and extends roof lifespan. Which one of the following is a type of sustainable roofing system:
   a) Reflective roofs
   b) Garden roofs
   c) Photovoltaics
   d) All of the above

If you chose, say, four out of five correctly (answers are *a, c, b, c, d*), you meet state standards in a way that can be verified and accounted for. Your score becomes a part of your class's, school's, and state's score. It can be readily tabulated and then compared to the scores of other classes, schools and states. But this is educating in the way David Orr suggests, "as if no crisis existed." This "No Child Left Behind" approach could be termed a product pedagogy. The student reads text, listens to the teacher, and regurgitates what she knows by taking the test with little regard for the processes of thinking critically and experiencing the integration of such thought into the development of a viable solution for a real world situation.

Now, imagine a sustainability pedagogy as described by John Gerber:

> SUSTAINABILITY PEDAGOGY: We believe that learning "about" sustainability is not enough. A critical aspect of transformative education for sustainability is the ability to integrate theory and practice in real world situations. Students are encouraged to develop their own proposals for how to acquire experiential education. The range of experiential opportunities is broad, from Community Service Learning in nearby communities to semester abroad experiences. Regardless of the venue, we believe the particular experience chosen should help students integrate the concepts of economic vitality, environmental integrity, and social equity in a real-world business, family, or community setting. We recommend students explore opportunities for internships, practica or independent studies that support their learning. *John Gerber, University of Massachusetts*

Gerber's pedagogy does not completely debunk the "learning about" curricula of NCLB. But he definitely deemphasizes it in favor of a much more active, engaged, "do something" pedagogy. Why is that? It stems from the nature of sustainability itself, highly complex, multilayered, requiring nimble problem-framing and solving skills in numerous disciplines. Sustainability education is experiential, integrating theory and practice in real world situations, and requiring the imaginative while systematic exercise of critical thinking skills. Like WAC activities and outcomes it can become a transformative educational experience, leading students away from passive interactions with data and text into active engagements with concepts and problems. The multiple-choice test, whatever it does for the student, brings him or her no closer to the immense importance of the problem of sustainability and the seriousness of its consequences.

I have created an assignment which I believe approximates Gerber's thinking about sustainability pedagogy and which brings students closer to the issue of sustainability:

> SENIOR PROJECT ARCHITECTURE **476/676:** *Designing Sustainable Space*. This class constitutes the capstone experience for senior architecture students. The class will divide into four groups of six and each group will compete to win the contract for designing the California Museum of Science building. While this building must be aesthetically unique on the world stage, it must also employ as many of the concepts of sustainability in design and construction as are possible.
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> CONTEXT**.** You are part of an architecture firm bidding to design the California Museum of Science building to be built in Golden Gate Park in San Francisco. As part of a team of six, your particular responsibility is to design a functional, aesthetically pleasing roof which blends gracefully with the remainder of the structure and its surroundings. Because of this class, you know that the roof must be more than functional and aesthetically pleasing; it must also be sustainable: "a roofing system that is designed, constructed, maintained, rehabilitated and demolished with an emphasis throughout its lifecycle on using natural resources efficiently and preserving the global environment." To complete this project you must select between garden roof systems, reflective roofs, or roof photovoltaics and defend your choice. You need to do a life cycle analysis "from raw material extraction or processing; through production; packaging; transportation; design; installation; service life; reuse; recover or tear-off; and ultimately disposal." You need to explain

how your design will be cost effective, minimize the environmental burden, conserve energy, and extend the roof's lifespan. To complete this assignment, you 1) should do all pertinent research on sustainable roofing, 2) prepare a written report arguing the merits of sustainable roofing and including the details, drawings, and dimensions relevant to this particular roof, 3) work in regular coordination with other team members in preparing the comprehensive document for submission to the state building review board, and 4) prepare a section of the Powerpoint presentation to be presented to the review board (judges will be esteemed architects from firms around town).

GOALS:

1) To understand the concept of sustainable roofing.
2) To estimate the benefits of sustainable roofing accrued by installing this particular roof.
3) To predict the cost and environmental effectiveness of a general turn toward sustainable roofing.
4) To argue persuasively with your team of five others for your roof design and how it fits into your team's overall design of the structure.

GRADES:

- Thoroughness of research into sustainable roofing (20 points)
- Understanding the value of this particular type of sustainable roofing (20 points)
- Quality of individual and group written report (20 points)
- Quality of work with team (help will be provided early in the semester by experts in group work) (20 points)
- Effectiveness of individual and group presentations (20 points)

With its clear goals, engaging context, and pertinent audience, this assignment touches a variety of issues and activities necessary to solving problems of sustainability. It requires an understanding of the problem: the roof must be more than functional and aesthetically pleasing; it must be sustainable. It requires extensive research into what that means. It requires design details, drawings, and dimensions. It insists on individual and collaborative work, and written and oral presentations, a big difference from what the multiple-choice test requires: literacy, memorization, and some spontaneous analysis.

As proponents of writing across curriculum, we have an important role to play in the struggle between these two pedagogies. Because of our training, we know a great deal about how writing shapes thinking, and about writing as process. This knowledge makes us among the best in the academy to show how assignments promoting critical thinking skills and project assignments are superior to multiple-choice and fill-in-the blank tests in terms of helping students develop focused problem-solving, analytical, and persuasive skills. Given our expertise and the state of the world, I encourage us to work together to develop strategies for offering assignment design workshops to public school teachers—workshops for which participants receive university credit(s). We need to make ourselves available as consultants to the public schools, not as ivory tower sages (not as Friere's extension agents), but as in-the-trenches guides.

I know from my own experience that faculty across the university curriculum are interested in assignment-design workshops focused on topics of critical importance, such as global warming and sustainability. Last spring (2007), I offered two workshops—one completely open to the faculty without restriction and one topic-based on global warming. This meant that group one could use the workshop to design an assignment on any topic while group two had to focus their assignment design on topics relevant to global warming. The global warming workshop filled first in pre-registration, and it produced the best single assignment in the workshops for that year. (I'll send you a copy if you email me a request at waldo@unr.edu.) There is no dramatic revelation in the workshop's popularity; it just suggests faculty interest in having students write in focused ways about topics important to the health of the world.

As WAC consultants, we need to champion writing and critical thinking in the face of pressure to further objectify the curriculum. Our global problems are complicated; they need strong thinkers and writers to confront them. Will the educational system fail to produce the critical thinkers necessary to staff businesses and government agencies that deal with the problems that threaten the well-being of the world? Let's hope not. In any case, WAC can play a role in transforming curricula to promote the depth of education we all need students to experience, students who will be our future critical thinkers and problem solvers.

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