Using Rubrics to Assess Student Knowledge Related to Sustainability: A Practitioner's View
Rosalyn Mckeown

The online version of this article can be found at:

http://jsd.sagepub.com/content/5/1/61

Additional services and information for *Journal of Education for Sustainable Development* can be found at:

Email Alerts: http://jsd.sagepub.com/cgi/alerts

Subscriptions: http://jsd.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations: http://jsd.sagepub.com/content/5/1/61.refs.html

>> Version of Record - Mar 3, 2011

What is This?

Using Rubrics to Assess Student Knowledge Related to Sustainability

A Practitioner's View

ROSALYN MCKEOWN

Abstract

As institutions of higher education reorient curriculum to address sustainability, the first step is usually to weave sustainability into the curriculum. Changes in pedagogy, including assignments and assessment of student learning, follow. Complex learning related to sustainability requires assessment techniques that mirror such complexity. This article describes an assignment for graduate students in a school of education—designing a sustainability implementation plan—and the 16-dimension rubric with three levels of performance used for assignment assessment. The 16 dimensions assess three components of the assignment: (1) description of elements of the basic plan, (2) description of the context of implementation and (3) application of principles of sustainability. An additional rubric assesses writing skills. Rubrics are useful beyond grading; they also help students conceptualise the assignment.

Keywords: Scholarship of teaching, student assessment, rubric, university, sustainability

Rosalyn McKeown, Ph.D., is Secretariat to the UNESCO Chair on Reorienting Teacher Education to Address Sustainability at York University, Toronto, Canada. Email: rmckeown@edu.yorku.ca

Education for sustainable development (ESD) calls for us as university instructors to reorient existing programs to address sustainability (UNESCO 2005a). Around the world, there has been a rush to incorporate sustainability knowledge, skills, issues and perspectives into the higher education curriculum. Nevertheless, to help students develop the skills and dispositions they need to create a more sustainable society; higher education pedagogy (i.e., the art and science of teaching) also must change. It is evident that class time dominated by professorial lectures is outdated. Our pedagogy must take into account that: (1) we live in a society where students learn in new ways, for example, information is readily available on the Internet; and (2) we work with students who are seeking to understand controversies and find solutions to problems that the world now faces (Claire and Holden 2007; Sacks 1996).

As instructors, we have the obligation to examine not only our course content, but also our strategies for teaching as well as the assignments we give our students. Our teaching and assignments should foster higher-order thinking skills, support decision making, involve participatory learning, stimulate formulation of questions and challenge students to examine their own world views and values (UNESCO 2005b). We must teach in a way that students become active learners, not passive recipients of published knowledge, so they become knowledgeable, skilled and empowered to create and co-create solutions. After all, this and the next generation of leaders will have to learn their way to a more sustainable society, because, sadly, we currently do not know how to create such a world.

Because of the ideals, responsibilities and demands of teaching ESD in an institution of higher education, I have become reflective on many aspects of teaching. I practice the scholarship of teaching; I collect data through pre-course inventories of student knowledge; post-course evaluations, in which students rate benefits from class activities; and student ratings of mandatory readings. This article describes my personal attempts to create and mark an assignment related to sustainability at the graduate level. I describe an assignment and an evolving rubric that I use to assess students' work. The assignment is a sustainability implementation plan in which students identify a problem in the community and create a solution for it. The rubric has 16 dimensions with three levels of performance for each dimension. The 16 dimensions assess three components of the assignment: (1) description of elements of the basic plan, (2) description of the context of implementation and (3) application of principles of sustainability.

LITERATURE REVIEW

As I searched the literature, using Educational Full Text and Google Scholar, I found few articles that deal with assessment of student work related to sustainability at the university level. Some articles focused on assessment tools for campus sustainability and assessing sustainability plans (Besant Hill School 2009; Shriberg 2002). Others focused on indicators of successful ESD programs (UNESCO Bangkok 2007). It appears that assessment of student learning related to sustainability has not yet been published in the peer-reviewed literature. Some assessment of student learning related to sustainability appears in the grey literature. For example, the Cloud Institute has

created an education for sustainability (EFS) Curriculum Design Studio in a Box, which contains assessment tools such as rubrics and checklists.

The literature on using rubrics to assess student learning is substantial. Stevens and Levi (2005) advocate the use of rubrics because they: convey expectations to the students, help students focus their efforts, improve student achievement, reduce grading time for the instructor and improve the effectiveness of feedback. In addition, the use of rubrics for assessment improves grading consistency while levelling the playing field for first-generation university students and English-language-learning students. A search of peer-reviewed journal articles for assessing student learning at the university level revealed rubrics for nursing, social work, pre-service teachers, online learning, general education, etc.; however, I did not find rubrics for assessing student learning related to sustainability.

Although the literature on assessment, both traditional and leading edge (e.g., authentic assessment), in higher education is substantial, there is a paucity of literature on assessing student learning related to sustainability. In part, I believe that the dearth of research is related to the fact that ESD is a nascent field. At the Mainstreaming Environment and Sustainability in Caribbean Universities Workshop,[1] participants mentioned that greater progress had been made incorporating sustainability content into courses than had been made related to changing pedagogy. Changes in instructional strategies, assessment and community engagement lag behind changes in curriculum.

Referring to the importance of homework assignments, Light (2001) writes that university students typically spend two to three hours studying for every hour in class yet faculty focus more on structuring in-class time than out-of-class time. 'I find it fascinating that in faculty discussions about curriculum and course structure . . . 90 per cent of our discussion focuses on what material and ideas to cover in class. We pay far less attention to the details of homework assignments' (p. 51). Assignments help students achieve a deeper learning of themes covered in class as well as develop skills, such as writing and argument construction (Light 2001).

ASSESSING STUDENT LEARNING RELATED TO SUSTAINABILITY

The pedagogy associated with ESD bridges academia and the realities and complexities of life in the surrounding community. My graduate students want real-world connections for the academics they learn in the university classroom. They want learning to be relevant to their daily lives, the careers they hope to have and the communities in which they live. They want to live sustainably as well as learn about it in the classroom. To address these student needs and desires, pedagogy must include more than lecture.

Sustainability issues have their roots in social, economic, political and environmental realms (Robbins 2004). As a result, our students must gain skills to learn to analyse multilayered, complex problems and seek appropriate solutions. This complexity must be reflected in assignments and the assessment of those assignments. 'Complex learning cannot be assessed with simplistic measures' (Stefl-Mabry 2004: 21). Assessing with rubrics addresses complex learning in a systematic way.

Assignment and Context

In an effort to bridge theory and practice, I crafted an assignment that uses knowledge gained in the classroom to address problems and issues faced by the local community. The assignment requests that students write a sustainability implementation plan for an issue, topic or community problem that interests them. It is important that the processes students use to implement their plans should reflect principles of sustainability used in class (e.g., transparency, public participation, complexity, involving major groups) not just in the content, but also in the processes they design to create possible solutions (see Box 1).

Box 1 Sustainability implementation plan assignment

Select a local sustainability topic for which you would like to implement a change (e.g., increase recycling in rural communities, promote grey water systems, decrease discrimination against immigrants, increase economic opportunities for youth), then create and plan for making the change. First, define the topic and then generally describe the state that you would like to achieve. Next, describe interventions that you will need on municipal, county, state and national levels. Do you need to involve all three branches of government: executive, legislative and judicial? Which part of government sets policy, writes regulations and sets budgets? Write a 9- to 11-page paper, including flow charts or graphs of hierarchies and interrelations of governmental organizations and non profit organizations as needed. This assignment is 25% of the course grade.

The majority of my students were masters' level graduate students enrolled in their first graduate course related to sustainability and education at a public university in a school of education. The assignment counted for 25 per cent of their grade and was due the penultimate week of an 11-week term. The purpose of the assignment was to help students integrate much of what they had learned about education and sustainability throughout the term. To prepare for the assignment, I assigned UNESCO's 'Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability', which describes working at many levels and within many spheres to bring about change in an educational system (UNESCO 2005b).

This assignment caused angst among some students. First, the paths to its successful completion were not obvious. To address this concern, I accepted resubmissions of assignments; if a student submitted an assignment by the due date and received a grade with which s/he was unhappy, s/he could rework and resubmit the assignment during the grading period. A second source of discomfort was revealed when a former student commented that he was accustomed to analysing what was wrong with a situation but had never been asked to solve an important community problem.

To help ease student discomfort and guide the students' writing efforts, I showed them the basic scoring-guide rubric I used to assess their papers. Each dimension of the rubric was graded on a scale of three:—(not mentioned or hinted at), √ (overtly mentioned) and + (mentioned in context) (see Table 1).

Although this scoring-guide rubric allowed for student creativity and flexibility in grading while serving to guide student effort and increase student confidence in

Table 1 Basic scoring guide rubric for sustainability implementation plan

Dimension			–	√	+
I.	Define and describe what you want to implement				
II.	List interventions				
III.	Assessment of context for implementation				
	a.	Needs assessment of your idea Does society need it?			
	b.	Analysis of current status			
		i. Awareness of sustainability			
		ii. Support/barriers to program			
IV.	Plan reflects sustainability				
	a.	Complexity (e.g., 3 branches of governmentor programs, practices and policies)			
	b.	Partnerships and major groups			
	c.	Public participation			
	d.	Transparency			
	e.	Raising awareness/education			
	f.	3 realms of sustainability—environment, society, & economy			
Total					

– (not mentioned or hinted at)
√ (overtly mentioned)
+ (overtly mentioned and in context)

fulfilling a new type of assignment, I found that it did not adequately convey my expectations to the students. For example, public participation is characteristic of sustainability and is important to the planning process. Ideally, major stakeholders, representatives of major groups [2] and potential partners should all be included in the planning process. Theoretically, public participation not only assures that minority voices are heard, but also produces a feeling of ownership and commitment to change and eventually more citizen involvement in implementation. Although my students appeared to understand public participation in lecture and discussion, the same level of understanding was not transferred to the assignment. For example, one student wrote that because public participation was vital to the implementation of the plan, after the plan was created, the public would be informed about how to help implement it. The student described business-as-usual in the local government and had not made the shift to the sustainability paradigm in which public participation is embedded throughout the decision-making process. As an instructor, I realised I had not described sufficiently what public participation should look like. Thus, I decided to use the rubric to further support key concepts covered in class discussions and readings. In the rubric, I now describe three performance levels for each dimension, based on what I learned from reading student papers. I also decided on the maximum point value for each dimension (see Table 2).

Table 2 Expanded rubric for sustainability implementation plan

	Emerging	Developing	Mastery	Comment/Points
1. Elements of plan				
Identify and define the sustainability issue your plan addresses.	Problem or issue is not well defined. It addresses only one of three spheres of sustainability (i.e., environment, society, and economy).	Problem or issue is adequately defined. It addresses two or three spheres of sustainability.	Problem or issue is well defined with environmental, social, and economic impacts and ramifications explained.	/10
Goal of the plan. (What you want to achieve? How do you know if you achieved it?)	No goal stated or improvement in condition inferred.	Goal(s) stated but no indicators or metrics included.	Goal(s) stated as well as indictors or metrics for monitoring progress.	/5
Briefly describe your implementation plan.	Description has gaps or too much detail so reader has difficulty envisioning the plan. Sequence is missing.	Description conveys major activities and sequence. Reader has some difficulty envisioning the plan.	Description conveys the major activities and sequence with enough detail so that it is easy to envision the plan.	/10
List of interventions.	List is incomplete, and does not tie directly to description of implementation plan.	List is complete and ties to description of implementation plan.	List is complete and adds clarity to description of implementation plan. Major activities are bulleted with a rough timeline.	/10
Describe interconnectedness of plan.	Plan describes the problem or issue in isolation.	Plan describes problem in connection to another problem or issue.	Plan describes and illustrates the issue connected to two or more other problems or issues.	/5

2. Description of context for implementation			
Need assessment. (Does society need it?)	Assumes the need for this implementation plan is self-evident.	Describes need for project from anecdotal or personal evidence.	Describes need for project with anecdotes, statistical information, case studies, etc. /5
Analysis of current status (inventory support/barriers to plan as well as public awareness of sustainability).	Does not analyze current status or uses information from another or dissimilar geographic region and assumes it applies to local context.	Uses only anecdotal evidence or outdated/inappropriate published data in analysis of current status. Assumes solution will be accepted/rejected without reservations.	Uses information from a variety of current and relevant sources including personal accounts and published statistics. Carefully predicts support and barriers to implementing plan. /5
Consideration of community livability.	Does not consider community livability or does so from only one of three spheres of sustainability.	Considers community livability from two spheres of sustainability.	Considers community livability from three spheres of sustainability. /3
3. Plan reflection of sustainability (application of principles of sustainability).			
Complexity—instigating change in more than one place in a system.	Plan involves changes to only one of : programs, practices, or policies. Or plan involves only one governmental agency or one branch of government.	Plan involves changes to two of three in: programs, practices, and policies. Or plan involves more than one governmental agency or branch of government.	Plan involves changing programs, practices, and policies. Or plan involves three branches of government and civil society. /3
Partnerships.	One organization or agency acts in isolation.	Plan begins to bridge civil society and government. Two or three organizations act together.	Several organizations from government, civil society, and private sector act together. /3

(*Table 2 continued*)

(Table 2 continued)

	Emerging	Developing	Mastery	Comment/ Points
Major groups.	Major groups not considered when stakeholders were identified and invited to join planning process.	A few nonmajority voices are at the table, which coincidentally overlap with major group(s).	Invitation to joining planning process was inclusive—all major groups were invited to join the planning process.	/3
Public participation and timing.	No public participation in plan developed by an agency/organization. Public is asked to comply after the plan is released.	Minimal public participation. Plan developed with several options by an agency/organization and public is asked to respond to options and perhaps select one for implementation.	Public participation embedded. Public input sought from beginning of planning process through implementation and review/evaluation/revision.	/3
Transparency.	Closed-door process by one or a few individuals to devise the plan. Program announced after decisions are made.	Decision makers periodically inform community or public of process and decisions.	Entire process is publicized through multiple avenues from beginning to end.	/3
Raising awareness, education, and training.	Plan does not address awareness, education, or training.	Plan includes awareness, education, or training but as an unfunded mandate or as an afterthought.	Plan includes awareness, education, or training from beginning, provides for funding of such activities and their evaluation.	/3

Integration and balance of three pillars of sustainability—environment, society, economy.	Plan addresses one pillar of sustainability.	Plan addresses, integrates, and balances* two pillars of sustainability.	Plan addresses, integrates, and balances* three pillars of sustainability.	/3
Intergenerational equity.	Plan focuses on the current problem.	Plan addresses long-term effect if current behavior or activities are continued.	Plan addresses long-term effect if current behavior or activities are continued and projects the long-term effect of the plan if it is well implemented.	/3
Equity for all people.	Plan addresses the interests or needs of the majority or wealthy.	Plan addresses the interests of one or a few minority or disenfranchised groups as well as the majority.	The plan is inclusive and does not discriminate. Or plan is designed to address underserved populations thereby helping the community address the interests and needs of all people.	/3
4. Writing skills				/20
Total				/100

*For balance explanation or indicators can be general or "soft." For example, demonstrate that the plan is not "greenwash" or does not follow the unsustainable development paradigm in which economic development comes with casualties in the environmental and social pillars (e.g., look at biodiversity in the park in the front of the building, but do not look at the pollution in the back of the building or the health of workers inside the building).

Table 2 conveys the rubric for assessing student's application of sustainability. However, I also assess each student's writing (see Table 3). I do not use descriptors for these skills, because my students are studying at the masters' level and have learned these skills and applications as undergraduate students. Generally, I limit the value of the writing section of the paper to 20 per cent of the overall grade.

Table 3 Rubric for assessing writing skills

Writing Skills (20%, 4 points each)	Unacceptable 0	Poor 1	Fair 2	Good 3	Excellent 4
Spelling and grammar are accurate.					
Paragraphs are internally well constructed.					
Paper is organized to create a logical flow. Transitions are smooth, and breaks are indicated by headings.					
Tone is consistent and appropriate for an academic assignment.					
APA style is correct, especially headings, citations in text, and references.					
Total					/20

Adapted from Stevens and Levi (2005).

From Rubric to Grade

The rubric in Table 2 helps me assess students' learning related to sustainability and the rubric in Table 3 helps me assess the writing of the students. You may ask: How do I use the information that I get from the rubric to create a grade (i.e., A, B, C, D or F)? In Table 2, I placed the maximum point value in the far-right column of the rubric. I think of mastery as an A, developing as a B or C and emerging as a D or F, and then I assign points accordingly. My course syllabus denotes the point value for each letter grade (e.g., 90–100 = A, 80–89 = B and 70–79 = C). In Table 3, I placed the point value at the top of the column.

To grade the students' work with a rubric, I follow a sequence common to many instructors. To help me understand the range of quality of the work of the assignments, I read what I expect to be a high-quality paper and I read what I expect to be a low-quality paper. I print a rubric for each student and write on it as I read each student's paper. Stevens and Levi recommend circling the level that best describes the student's work or underlining the part which is applicable. For example, in the complexity section an instructor would either underline 'programs, practices and policies', or 'branches of government' according to the student's approach. Comments go in the column on the right and at the bottom of the form. The instructor uses the column on the right to record the points the student received for each dimension, and then totals these points to obtain the overall grade for the assignment. Some instructors record a

letter grade for each dimension in the right column and then assign an overall letter grade (Stevens and Levi 2005).

REFLECTIONS ON CREATING AND USING RUBRICS

Strengths and Weaknesses of Rubrics

Before I began to grade with rubrics, I had an informal list of key concepts and vocabulary that I expected to see in an essay. I used the list, my written comments and my general impression to mark student's work. Comments that instructors frequently use, such as 'tighten your arguments', 'what are your assumptions?' 'a cognitive leap', 'expand section three' and 'poorly written', do not give students sufficient specificity on how to improve their papers. By marking specific portions of the rubric, the instructor can communicate clearly what is good and what needs improving. Grading becomes more efficient because instructors do not have to write the same comments repeatedly as they grade multiple assignments (Stevens and Levi 2005).

By using a rubric with point values for each dimension, I find that my scoring is more consistent during prolonged periods of grading. For example, by allotting 4 points for each of the five writing dimensions (see Table 3), I limit the negative impression that multiple misspellings or sloppy use of citations has on the overall grade of the paper. (I must admit that after I have spent a great deal of time correcting student sentence structure and circling misspellings, I do have an overall negative impression of the paper. In my humourless state after marking numerous corrections on a well-conceived but poorly typed assignment, my impulse is to give it a low grade; however, by adhering to the scoring format of the rubric, I would give a student who flunks spelling and grammar a maximum of only a 4-point reduction.) Rubrics provide a good check and balance. Stevens and Levi (2005) confirm that using rubrics improves consistency in grading.

One benefit of rubrics is that they prompt students to reflect on important elements of sustainability in their products. Students can easily forget to address common elements (e.g., the participation of women because it is common for women in their neighbourhoods to attend meetings and lead activities) or uncommon elements (e.g., transparency, because that is not the norm for governmental decisions in the town in which they grew up). The rubric serves to help students fulfil the requirements of the assignment more completely. By creating and using rubrics, I hope to set students up for further learning and success.

My colleagues find that when they distribute rubrics while students are preparing their papers (e.g., two weeks prior to the due date), they receive fewer puzzled student inquiries about what was correct and what could have been better about their work.

There are areas of concern and weaknesses associated with using rubrics. The dimensions I selected to grade should ideally correspond to the most important learnings and concepts presented in class. Furthermore, the combined parts (i.e., dimensions) need to give a good assessment of the whole. (Of course, I worried

about the same things when, years ago, I wrote multiple-choice exams.) I am concerned that the structure and specificity of the rubric will restrict student innovation. I know that the three levels I describe for each dimension do not reflect a progression of student learning, which is not unidimensional. I realise that authentic assessment and scoring with rubrics is not perfect. All methods of assessment have advantages and disadvantages (Worthen 1993). As practitioners we must be aware of both as we attempt to assess student learning, especially of complex topics such as sustainability.

Although the world is making strides towards greater sustainability, we are still far from fully applying principles of sustainability across our communities' activities. Thus, we must be realistic about how much we can achieve in the local context. Students may not be able to achieve the highest (third) level of a dimension in their sustainability implementation plans. In this case, I request that they demonstrate understanding of the dimension and explain their perceived limitations of the local context to receive full credit.

Developing rubrics is a recursive process. Each time I teach the course, I gain new insights into student performance, including successes, common mistakes and misconceptions. I reflect on these new understandings and examine my teaching, modify assignments and adjust the corresponding rubrics to improve instruction and student learning.

The Importance of Context and Culture

Rubrics must be developed in context. The descriptions of the performance levels of each dimension in the rubric are specific to the readings, content and context of my graduate-level class in education. For example, in my class, we talked about changing education systems, which involves more than changing the primary and secondary curriculum, but also changing corresponding textbooks and assessment/evaluation (e.g., tests and report cards) as well as teacher education. Additionally, we talked about how changes in policy should be reflected in practice (e.g., revise the handbook that contains protocol for common activities to reflect new policies). In short, programs, policies and practices eventually all needed to be modified to institutionalise a change. We also talked about how three branches of government (legislative, executive and judicial) could be involved in bringing about educational change. The resulting rubric is specific to my course. For use in another course, this rubric would have to be modified to fit its content, disciplinary perspectives and context.

Rubrics, like ESD programs, should be locally relevant and culturally appropriate. The rubric I developed for a masters' level program in education reflects US education traditions and perspectives. The rubric also reflects the US structure of government. For example, in the complexity section of the rubric, I mention three branches of government (i.e., executive, legislative and judicial). I realise that not all governments have three branches; however, complexity of the solution can be recognised and dealt with in other appropriate ways. Also, I mention three pillars of sustainability. Other countries (e.g., Jamaica) use a fourth pillar, 'governance', and UNESCO recognises

an underlying dimension of 'culture'. This rubric, while appropriate for use in the United States in an education program, should not be used in another discipline or geographic region without careful scrutiny and major modifications.

CONCLUDING REMARKS

Those of us who teach sustainability in institutions of higher education know that teaching in a complex, rapidly evolving field (ESD) with a small literature base is neither easy nor comfortable. Both instructors and students are learning our way forward. As practitioners, we need systematic ways of assessing complex learning, which provide structure and yet allow for flexibility, creativity and new solutions. Creating assignments and assessments to match these conditions is challenging. We need to share our progress. I hope my assignment and accompanying rubric stimulate new thoughts among instructors about teaching and learning related to ESD and that they in turn will share those with the education community. I look forward to improving my own practice by adapting ideas, activities, assignments and ways of assessing learning from practitioners around the world.

One of the goals of ESD is to move university students from passive study to active implementation of sustainability. The metaphor often used related to this transformation is changing from 'talking the talk' to 'walking the talk'. The journey from talking to walking is a multistep process rather than a single leap. The combination of the assignment and rubric described in this article could be one step in a student's journey and transformation.

Notes

1 Mainstreaming Environment and Sustainability in Caribbean Universities (MESCA) Workshop was held on 22–24 September 2009 at University of the West Indies, Mona, Kingston, Jamaica.
2 Major groups from civil society identified in Agenda 21 include: women, children and youth, indigenous people, nongovernmental organisations, local authorities, workers and trade unions, business and industry, scientific and technological communities and farmers (Johannessburg Summit 2002).

References

Besant Hill School. 2009. Rubric for Sustainability Strategic Planning 2009. Available at www.besanthill.org/downloads/pdfs/bhs_sust_strategic_rubric.pdf (accessed 2 October 2009).
Claire, H. and C. Holden. 2007. *The Challenge of Teaching Controversial Issues.* Stoke on Trent: Trentham Books.
Johannessburg Summit. 2002. Major Groups. Available at www.un.org/jsummit/html/major_groups/majorgroups.html (accessed 21 September 2009).
Light, R.J. 2001. *Making the Most of College: Students Speak their Minds*. Cambridge, MA: Harvard University Press.
Robbins, P. 2004. *Political Ecology: A Critical Introduction*. Malden, MA: Blackwell Publishing.
Sacks, Peter. 1996. *Generation X Goes to College: An Eye-opening Account of Teaching in Post Modern America*. Chicago: Open Court.

Shriberg, M. 2002. Institutional Assessment Tools for Sustainability in Higher Education: Strengths, Weaknesses, and Implications for Practice and Theory, *International Journal of Sustainability in Higher Education*, 3 (3): 254–70.

Stefl-Mabry, J. 2004. Building Rubrics into Powerful Learning Assessment Tools, *Knowledge Quest*, 21 (5), May/June: 21–25.

Stevens. D.D. and A.J. Levi. 2005. *Introductions to Rubrics: An Assessment Tool to Save Grading Time, Convey Effective Feedback and Promote Student Learning*. Sterling, Virginia: Stylus Publishing.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2005a. *United Nations Decade of Education for Sustainable Development (2005–2014) International Implementation Scheme*. Paris: UNESCO.

———. 2005b. Guidelines and Recommendation for Reorienting Teacher Education to Address Sustainability, *Education for Sustainable Development in Action*, Technical Paper no. 2, UNESCO.

UNESCO Bangkok. 2007. Asia-Pacific Guidelines for the Development of National ESD Indicators. Available at www2.unescobkk.org/elib/publications/121/Guidelines.pdf (accessed 26 September 2009).

Worthen, B.R. 1993. Critical Issues that will Determine the Future of Alternative Assessment, *Phi Delta Kappan*, 74 (6): 444–48, 450–54.