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The sustainable school: A sustainability assessment questionnaire for high schools

Curtis Willard Jacquot

THE SUSTAINABLE SCHOOL: A SUSTAINABILITY

ASSESSMENT QUESTIONNAIRE FOR HIGH SCHOOLS

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A Project

Presented to the

Faculty of

California State University,

San Bernardino

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In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

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by

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ABSTRACT

The "Sustainable School Assessment" project was completed to assist high schools seeking to model and teach sustainability. A sustainability assessment questionnaire was developed for use by a high school team made up of teachers, administration, staff, and students. To identify important content for the questionnaire, literature relevant to sustainable development in educational settings was critically reviewed to determine characteristics and components that should be included in the assessment. Components identified include: energy and water waste elimination, green purchasing, solid waste elimination, recycling, community outreach, student involvement, and sustainability education. Important characteristics identified were: administrative support, ongoing team approach, salience, credibility, and relevance (to the assessment/planning team), and ease of cross-institutional comparison via the questionnaire results. Also, since sustainability efforts are ongoing, the questionnaire is modular, so users can update it as the need arises.

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CHAPTER ONE

INTRODUCTION

The result of this project is a sustainability assessment questionnaire for the high school setting (see Appendix A for definition of terms). The questionnaire fills a gap in the literature pertaining to assessing direct and indirect environmental impacts of educational institutions at that level.

Environmental impact assessment formally began in the 1970's as a structured attempt to quantify human impact on the environment. It was done as a result of legislation that sought to prevent degradation of the environment on which life and economic activity depend. Assessments were done to predict human impact and to guide planning to minimize negative impact. Most early impact assessments were required by law and carried out by government or business as a prerequisite for development of some kind.

By the 1980's, the concept of sustainable development began to be used by those seeking to move beyond a one - time mandated environmental impact assessment to a voluntary one that was more comprehensive and ongoing. By the 1990's, the concept of sustainable development was beginning to be used by organizations interested in

development that would "...provide for the needs of the present generation without compromising the development opportunities of future generations" (World Commission on Environmental Development 1987). Since the early 1990's sustainable development (and assessment of sustainable development) in educational institutions has become the focus of many individuals and organizations. The vast majority of programs and published works on sustainability in educational institutions has been completed in the last five years (1997-2002), and is aimed at the university level (Nixon 2002, 26). Hundreds of universities worldwide are involved in the process of sustainability assessment (Nixon 2003, 26).

The sustainable development of educational institutions or "Green Campus" movement seeks to have schools model and teach sustainability to all students, teachers, and staff. The belief is that the schools and particularly universities should lead the effort to prevent a possible environmental catastrophe by facilitating the understanding and practice of sustainability.

However the effort to assess and implement sustainability in the K-12 setting, where most students

will end their formal education, lacks literature that assesses and guides the process of sustainability.

During five years as a program manager working with K-12 schools in the field of energy management, the author of this work learned that few works were available that focused specifically on sustainable development in the K-12 setting. The few works in the field for the K-12 level provide only a general framework and/or are focused assessments of eco-efficiency rather than comprehensive sustainability. As a result, this project is focused on designing an assessment tool for sustainable development in high schools.

First, selected literature relevant to sustainability assessments in educational settings was critically reviewed. Next, understandings gleaned from the reviews and ideas the author developed during five years working with schools in the field were used to develop an HSSAQ (High School Sustainability Assessment Questionnaire).

This HSSAQ is based on components and characteristics identified from critically reviewing works on sustainability assessment in general, from that in higher education, and from the literature reviewing the general and focused assessments for the K-12 setting.

The literature review is divided into two main sections. Works that analyze sustainability assessment are reviewed in section one. Ideas are identified that are helpful in reviewing and analyzing sustainability. These works have collected quantitative and qualitative data and developed guidelines and/or recommendations for sustainability assessment. Using ideas gleaned from section one of the literature review, and ideas the author identified working with high schools in the field, the second literature review section analyzes works related to sustainability assessment in various settings with an objective of further determining components and characteristics to include in a HSSAQ.

The following characteristics and components were identified from the literature as being important in a sustainability analysis:

1.   Is the assessment comprehensive yet concise and clear? Time constraints on high school personnel dictate that audits should be effective without being unwieldy (Cornwall 1989, 5). Likewise, effective assessments should look at essential areas applicable to high schools: water and energy waste elimination, solid waste management, staff and student involvement,

school ground enhancement, green purchasing,
future design, and education for sustainability
(Keniry 1995, 187).

2. Can the audit be completed by a school team made
up of administrators, teachers, maintenance and
facility personnel, and students? Effective
assessments should involve multiple stakeholders
in the assessment process (Cornwall 1989, 20;
Cash and Clark 2001, 3). Furthermore, the team
approach can help complete the assessment in a
minimum of time.

3. Does the design of the assessment allow for
cross-institutional comparisons for rating or
certification purposes? In environmental
assessments of higher education institutions,
practitioners and theorists have begun using
results of assessments for rating and
cross-institutional comparisons (Shriberg 2002,
255). Such ratings and comparisons based on the
assessments may encourage and inspire high
schools to improve performance, and the ideal
SAQ aimed at high schools should allow for these
comparisons.

4. Does the assessment attempt to measure sustainability or simply eco-efficiency? Scholars have begun contrasting the difference between efforts that are incremental and try simply to reach mandated guidelines (eco-efficiency) versus those that use an ongoing process to eliminate negative environmental impact (sustainability) (Shrieburg, 2002, 256).

5. Some higher education SAQ's have begun assessing deeper and more indirect environmental impacts that an institution might have on the environment. Curriculum and student and community involvement are less obvious but important elements of comprehensive assessments. The environmental effects of graduates may be difficult to measure, but they are undeniably significant. Policies regarding curriculum and student involvement in environmental assessments can and should be assessed in comprehensive SAQ's (Shrieburg 2002, 255; Orr 1991, 139).

Because the characteristics and components identified as being important in a HSSAQ include recommendations for guiding an assessment team (in order to save time) and

allowing flexibility (to allow for team involvement), the HSSAQ must balance these differing elements if it is to be useful. Appendix B is the SAQ that was developed using the identified characteristics and components.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The works chosen for review were selected after survey of over one hundred works relating to sustainability assessment. They were selected because they had information that is most relevant to Sustainability Assessment Questionnaire (SAQ) development for the high school setting.

The review is divided into two sections. The first section evaluates works that <u>analyze</u> sustainability assessment. The second section evaluates works <u>related to</u> sustainability assessment in various settings, including universities, K-12 schools, and individuals. The characteristics and components, or best practices discerned from the literature are then summarized. They guide the development of the produced SAQ (see Appendix B).

(Note: Works are listed in order of significance to this project).

Ecodemia, Julian Keniry 1995

Most of this 1995 book is devoted to case studies of higher education campus environmental stewardship programs. The final chapter, however, describes twelve characteristics found in the most long-lived university programs on sustainability. Descriptions of the characteristics identified are clear and concise. All are in some way applicable to the high school setting either directly or through adaptation to the setting.

Keniry points out the following characteristics as being important in the university setting:

1. Executive Support: This can provide guidance, policy formation, funding, committee staffing, and leadership for the sustainability effort.

2. Policy: Written policies are a vital component of successful sustainability programs. Policies should be developed that are appropriate for various levels of a school. At a university there are usually university wide policies as well as more specific departmental policies. A

written policy, when combined with executive support can help "...insure that a program survives among competing priorities" (Keniry 1995, 190).

3. Resources and Incentives: Equipment, staffing, office space, and savings incentives have helped programs get off the ground or continue to improve. Allocation of resources to fund a full or part time coordinator has been instrumental in the success of many campus stewardship programs.

4. Structural Framework: Designation and support of a committee or committees for assessment, planning, and program implementation.

5. Curriculum: By encouraging and supporting teachers in different disciplines to interweave environmental literacy into curriculum and by involving students in stewardship initiatives, universities can be effective at increasing environmental responsibility among graduates.

6. Research: New and ongoing departmental research on environmental issues and approaches can be implemented and/or shared throughout the

institution to improve environmental literacy and the overall stewardship programs.

7. Ecological Planning and Design: There are several levels that this component occurs on the university level. The central campus plan is the most comprehensive level where new structures are scrutinized for environmental impacts and life cycle costs. Some campuses design a model housing or research structure. Some schools attempt to lessen impacts and save money by planning and implementing energy retrofits or low water landscaping.

8. Sense of Place: Keniry points out that garnering support from faculty, staff, and students is much easier if natural areas on campus are used to "...help connect people to place." Some programs do this simply by providing access to campus natural areas. Some faculty use local natural areas for study while others simply hold classes outdoors. Other schools coordinate internships that involve students in studying the links between the campus and surrounding community.

9. Measurable Reduction of Cost and Waste: By determining quantitative measures of success, schools are better able to obtain support for their sustainability programs. These measures include dollars saved though eliminating waste and pollution prevented as a result of measures implemented.

10. Public Relations and Documentation: Promoting success of the sustainability program is another important aspect found in long-lived programs. Publicity for the plan and the qualitative and quantitative successes will help garner and increase support from administration, community, students, and faculty.

11. Financial Accountability: By considering and trying to reduce negative impacts of purchasing and investing, a school operates in a more sustainable manner. This includes evaluating the more indirect aspects of spending or investing. Some schools evaluate the positive or negative environmental impacts of companies they invest in. Some analyze the environmental costs of things like food. Manufacturing, transportation and disposal costs may not occur directly to the

university but are considered when deciding on purchases.

12. Leadership and Training: Offering training that leads to leadership in the campus sustainability effort helps garner and continue support for the program. Some schools have increased volunteer participation by offering training and leadership opportunities for staff and students.

Improving the Campus Sustainability Assessment Process, Andrew Nixon, 2002

Nixon's thesis is the most comprehensive work related to analyzing sustainability at the university level. In it he reports on his survey of over 200 university level sustainability assessments. He reviews the philosophical and historical basis for Campus Sustainability Assessments (CSA's). He also identifies key components, characteristics, benefits, and functions of CSA's. Nixon also creates terminology useful in the field of sustainability. He coined the terms SAQ, CSA, and focused and comprehensive assessment (see Appendix A). His conclusions concerning the benefits and functions of an SAQ could be helpful in providing a rationale for a high school sustainability program.

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Rating Colleges, David Orr, 1991

(Note: Because this article is influential in the field, I have expanded the analysis of its applicability to the high school setting)

This article is a landmark work by a very influential figure in the school sustainability assessment movement. It is a short article but several designers of higher education sustainability assessment questionnaires have drawn from the ideas Orr presented here. He suggests five environmental impact areas on which universities might be assessed and ranked. All of the areas recommended for assessment by Orr are applicable (with modifications) to the high school setting. The five areas discussed by Orr are listed below followed by an analysis of how they might be applied to the high school setting:

1.   What quantity of material goods does the school consume on a per capita basis? This of course requires defining which materials will be quantified. It may be too time consuming a task for many of the high school sustainability assessment teams but might be a good class or club project.

2. What are the school management policies for materials, waste, recycling, purchasing, landscaping, energy use and construction?

Policies such as these can be a part of a school sustainability plan and could be assessed. The assessment questions regarding policies should be flexible so as to allow for individual differences but framed well enough to allow for ratings and cross-institutional comparisons. The responsibility for determining individual focused assessment policies could be divided between assessment sub-committees.

3. Does the curriculum engender ecological literacy? This question could be incorporated in the SAQ by specifying policies implemented. For example, the assessment could ask whether an environmental class is an elective, a requirement, or not offered at all.

Specific tests to measure eco-literacy are not yet implemented at most schools. The standardized SAT and ACT do include environmental science but no breakout of scoring is yet available. Currently, assessment of this area will likely need to be based on actions

implemented rather than actual test results. This does not preclude a school from developing and utilizing their own eco-literacy testing mechanism. To instigate the idea of self-testing, the assessment could ask if the school does eco-literacy testing for all seniors and/or alumni.

4. Do school finances help build sustainable regional economies?

While the impacts of a high school in this area would be much less significant than most higher education facilities, it could still be assessed. At the high school level, measurement would not include investment activities. Purchasing could be included.

5. What do the graduates do in the world?

This assessment refers to measuring positive and negative environmental impacts of graduates throughout their lives. Of course this longitudinal question is difficult to measure. SAQ's in Higher education often ask how many graduates move on to environmentally oriented work. This does not preclude schools at any

level from doing alumni surveys regarding sustainability actions and attitudes.

Most of Orr's ideas for assessing sustainability at higher educational institutions transfer well to the high school setting. Management policies, curriculum, materials use, and alumni environmental impact could all be part of a high school sustainability assessment questionnaire.

Institutional Assessment Tools for Sustainability in Higher Education, Michael Shriberg, 2002

This is a recent and key work that analyzes, compares, and evaluates state of the art higher education sustainability assessment tools and SAQ's. Many of the ideas Shriberg presents could be applicable to the design of SAQ's for the high school level.

He recommends five areas SAQ's should focus on so they are effective at measuring sustainability and may be used for cross-institutional comparisons. These recommendations are applicable to the high school setting as well as the university setting they were designed for. The recommendations are:

1. SAQ's should identify important issues. SAQ's must identify issues with broad effects while framing the assessment so specific measurement is still possible.

2. Effective SAQ's should be calculable and comparable. Because no ideal sustainable campus has been clearly defined, measuring sustainability is a difficult task. According to Shriberg, both qualitative and quantitative data must be included...AThe key is to find measurement methods that are flexible enough to capture organizational complexities and differences, yet specific enough to be calculable and comparable."

3. SAQ's must move beyond eco-efficiency. Shriberg states that a common pitfall of assessment tools is that they measure eco-efficiency instead of true sustainability. The difference is that eco-efficiency looks at reaching an incremental and often mandated goal (for example: 25% reduction of waste). Sustainability as a process must be measured by indicators at the "...nexus of the environment, society, and economy with the goal of zero negative impacts." A simple measure of eco-efficiency indicators can give the appearance that something significant has been done when that may not be the case. For example "...an eco-efficiency energy indicator

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would measure energy conservation while a sustainability indicator would measure total greenhouse gas emissions against a goal of zero."

4. SAQ's should measure processes and motivations. Sustainability is a process rather than an end. To measure sustainability an assessment "...must look at decision-making by asking about mission, rewards, incentives, and other process oriented outcomes...To identify levers for organizational change, assessment tools must ask why and how campuses pursue sustainability in addition to what they are currently doing." Such processes and motivations can be included in SAQ's for a high school setting.

5. SAQ's need to stress comprehensibility. The SAQ's and what they measure must be understandable to stakeholders with a variety of backgrounds. Shriberg does not mean that complex but more accurate methods should be left out so all stakeholders can understand the assessment. He does mean that complicated calculations, if used, must be translated into an easy to understand summary.

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Shriberg concludes that developers of SAQ's have a difficult task. They need to try to show a "snapshot" of the current status of an institution's sustainability effort while "...integrating motivations, processes, and outcomes into a comparable, understandable, and calculable framework that moves far beyond eco-efficiency." Shriberg points out that many of the popular SAQ's in current use in the higher education setting do some of these things well. None of them do all of these things well.

It should be noted that because little or no work on outcome results or quantifiable effects of SAQ's has been done in this young field, most measurement, and Shriberg's evaluations, analyze processes and practices implemented rather than numerical results. None-the- less, a high school SAQ should integrate these important SAQ concepts.

<u>Bright Ideas: A Total Resource Management Guide for Schools, Bonnie Cornwall, 1989</u>

"Bright Ideas" provides guidelines for a focused SAQ involving energy management in the K-12 setting. Based on research of successful money and energy saving programs, this guide identifies twelve elements of most successful programs. The "Bright Ideas" would probably transfer well to a comprehensive environmental assessment. The guide includes a forty-item-focused assessment of recommended

energy management strategies for K-12 schools. It has an emphasis on eco-efficiency rather than sustainability. The format for assessment is comprehensive without being unwieldy and could be completed by a school team.

From Science to Policy: Assessing the Assessment Process, William Cash and William Clark, 2001

This paper is part of the Harvard University Faculty Research Series. The authors are part of the "Research and Assessment Systems for Sustainability" program. Cash and Clark analyze environmental assessments in general and make what seem to be common sense recommendations as to why some are more successful than others.

Some of these general ideas on sustainability assessment are relevant to designing effective high school assessments. They include:

1. The assessment process is a social process, not just a product. Much of what makes some assessments more useful than others is that they are viewed as a social communication process through which assessors, practitioners, and others interact to define relevant questions, and interpret findings in particular ways. Such communication helps assure that assessment recommendations are likely to be implemented as

practitioners and policymakers are involved in
the assessment rather than receiving a report
from assessors they are unfamiliar with.

2. Three characteristics that distinguish more
effective from less effective assessments are
"saliency," "credibility," and "legitimacy."
"Saliency" is the perceived relevance of the
assessment to the groups who might use it to
influence policy change. "Credibility" is
defined by the authors as "the perceived
believability of the technical dimensions of the
assessment to the users." "Legitimacy" is the
perceived fairness of the assessment process.

The authors point out that an assessment can be made
more "salient," "credible," and "legitimate" by making the
endeavor a process which equally involves the assessment
makers and those who will make policy as a result of it.

It therefore should be recommended in an SAQ designed
for the high school setting, that the assessment be done
by an internal team of various stakeholders (teachers,
administrators, students, staff). That same team should
make policy recommendations based on the results of the
assessment. Because the school board and/or superintendent
would eventually approve recommended policy, it would be

prudent to be trying to include those stakeholders in as much of the process as possible rather than simply presenting them a report with policies for approval.

A primary purpose of a pre-made SAQ is to provide a useable time saving framework for a high school team. However, to help assure the salience, credibility, and legitimacy that Cash and Clark recommend, the SAQ must allow the school team flexibility to tailor the effort to their unique institutional setting.

State of the Campus Environment: A National Report Card on Environmental Performance and Sustainability in Higher Education, M. McIntosh et al., 2001

This report was completed by a consulting firm for the National Wildlife Federation (NWF) Campus Ecology program. The Campus Ecology program is a leading organization in the campus environmental stewardship effort. The report analyzes findings of a survey of environmental management in the U.S. higher education sector. It describes environmental performance in higher education and "best practice" in environmental management. It also suggests specific environmental management components.

The report does a good job of identifying important aspects of environmental management at universities.

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However it does not distinguish between eco-efficiency and sustainability. Furthermore it does not consider sustainable education to be much more than involvement in learning about the environment in a specific class.

Works Related to Sustainability Assessment for the K-12 School Setting

Environmental Management System Self Assessment
   Checklist (Version 1.0), Campus Consortium for
   Environmental Excellence, 2000

This assessment is aimed at higher education environmental management officials rather than an assessment team that would also include teachers, students and administrators. It consists of thirty-three questions and uses a four-point scale for each question. It emphasizes assessment of ongoing processes more than most SAQ's. No assessment of curriculum or student involvement is included. The process areas it measures could likely be included as one section in a high school SAQ. The five major areas assessed are policy, planning, implementation and operations, checking and corrective action, and management review.

Energy Management Benchmarking Software (EMBS)
    for Windows (Version 1.0 CDROM), Higher
    Education Funding Council for England (HEFCE),
    1996

This easy to use software was developed to help universities figure school specific energy management benchmarks. It could be a valuable tool to a school district facility planner involved in school energy use assessment.

Campus Sustainability Selected Indicators
    Snapshot and Guide, New Jersey Higher Education
    Partnership for Sustainability, 2001

Though this questionnaire uses the term sustainability it does not attempt to measure much more than eco-efficiency (as defined in "definition of terms" for this bibliography). It emphasizes things like lighting retro-fits and other focused actions. It does not attempt to assess processes or motivations. It can give a campus a fast assessment that may help officials set action priorities in the ten categories it assesses.

Most of the ten assessment areas are applicable to the high school setting.

Campus Ecology: A Guide to Assessing
    Environmental Quality and Creating Strategies
    for Change, April Smith and the Student
    Environmental Action Coalition, 1993

This is one of the first and most widely used sustainability assessment questionnaires aimed at the

higher education setting. It includes a 202-question assessment. Most of the questionnaire is applicable to the high school setting as the categories assessed are also relevant to high schools. The detailed assessment of research and investment activities, however, does not pertain to most high schools. A team approach could be used with this assessment. It has an emphasis on eco-efficiency rather than sustainability. Sustainability education is not directly addressed. It appears comprehensive without being unwieldy.

Sustainability Assessment Questionnaire (SAQ) for Colleges and Universities, University Leaders for a Sustainable Future (ULSD), 1999

This widely used questionnaire largely measures qualitative characteristics of a higher education sustainability effort. It clearly focuses on sustainability rather than eco-efficiency. This is evidenced by assessing areas like responsibility in investing and source reduction. It is meant to be completed by a campus team led by a facilitator from the University Leaders for a Sustainable future (ULSD). Because the SAQ is focused more on qualitative measures, it would be difficult to use it to compare or rate institutions (Shriberg 2002, 257).

EarthScore: Your Personal Environmental Audit and
   Guide, Don Lotter, 1993

   This is one of the first and most comprehensive works
that is aimed at measuring an individual's environmental
impact. Lotter's exhaustive but comprehensive
questionnaire takes days to complete and much research. A
condensed version of Lotter's system might be included as
a section in SAQ's that wish to measure the individual
sustainability efforts of students and/or alumni.

Green School Guidelines, Center for Environmental
   Education, 2003

   This web site produced by Antioch (New England)
Graduate Environmental Studies Department recommends six
areas for assessment by K-12 schools. It then provides
links to other Internet resources that might be helpful to
a school assessing these areas. It does define and focus
on sustainability but lacks a framework that a school team
could use to do that assessment.

Blueprint for a Green School, Jayni Chase, 1995

   This study is a massive work that suggests various
environmentally related areas that might be assessed in a
K-12 school. The ABlueprint emphasizes environmental
health and eco-efficiency but not sustainability. It is
unspecific on who should perform the assessment(s). It has
long descriptions of areas that might be included in an

assessment, but no questionnaire or checklist is provided
as a framework. It is one of few works designed
specifically for the K-12 setting.

Stories from our Common Roots: Strategies for
    Building an Ecologically Sustainable Way of
    Learning, Joseph Kiefer and Martin Kemple, 1999

Kiefer and Kemple describe their Common Roots program
that is a model "Ecological Education" approach in several
Vermont Public Schools. It is a strategy where learning
about the local environment and culture is at the center
of the school curriculum. This approach is an attempt to
allow students to learn holistically. That is, the basics
of reading, writing and arithmetic are taught in an
interwoven fashion as students explore their local
surroundings. This strategy is based on the idea that the
traditional approach of teaching subjects as isolated
fragments of a curriculum is ineffective and out of touch
with the natural world in which we exist. It proposes that
such traditional learning about the world through
fragments with little relation to the local environment is
a root cause of our environmental problems. Ecological
education and the Common Roots program propose that if
schools are to prepare students for being responsible
citizens, then schools must help students understand how
to learn about the real world around them rather than

studying a mishmash of fragmented subjects inside of school walls. Responsible citizens understand how to care for the environment that sustains them, and the Common Roots approach proposes to foster such understanding by immersing students in understanding localized social and environmental functioning and problems.

SAQ designers could easily include some of the basic curriculum principles of this approach. Such holistic, place based learning more naturally emulates the natural world that sustainable development seeks to copy.

Environmental Education Guidelines: School
   Environmental Management Plans and School
   Audits, Royal National Park, 2001

This work provides sample audits for students to complete and an overall ASEMP (School Environmental Management Plan). The audits and plan are designed to assist schools in complying with the mandated Australian Environmental Education policy.

The policy requires schools to investigate ways of becoming sustainable by developing a school environmental management plan.

The SEMP is aimed at K-12 schools. It provides focused assessments of water, energy, solid waste, and bio-diversity that are specifically for students to complete. The plan clearly defines and emphasizes

sustainability rather than eco-efficiency. The assessments could be used to determine needs for future planning sessions. It is comprehensive without being cumbersome.

Re-engaging Culture and Ecology, Gregory A. Smith
  and Dilafruz R. Williams, 1999

Smith and Williams lay out their principles of "Ecological Education." Ecological education moves beyond environmental education, which may simply attempt to add on to the already crowded plate of subjects found in the traditional curriculum of K-12 schools. Instead of adding on, Ecological Education seeks to be the middle of the curriculum. Students are immersed in learning about their local environment while also learning traditional subjects (math, science, history and reading) in the process. Ecological education emphasizes the idea that human beings are a part of natural systems. As clearly stated by the authors "...rather than seeing nature as other — a set of phenomena capable of being manipulated like parts of a machine — the practice of ecological education requires viewing human beings as one part of the natural world and humans as an outgrowth of interactions between our species and particular places."

The seven principles of ecological education described by the authors could be included in an SAQ that

attempts to determine how deeply a school is committed to placing ecological understanding at the heart of the curriculum.

Summary and Conclusions

Most works on environmental assessment in educational settings focus on higher education. Works that do address the topic for high school settings usually focus on eco-efficiency rather than sustainability as an ongoing process (Chase 1995; Cornwall 1989). While it may be important to build on the existing eco-efficiency efforts in place, true sustainability seeks to eliminate waste rather than simply reaching the mandated goals that govern eco-efficiency. True sustainability would move beyond eco-efficiency and continue to identify and eliminate waste where eco-efficiency would end upon reaching a legally defined single goal.

As well, works that do address sustainability for the K-12 setting are either so general that they do not provide a time saving framework that can be easily completed by a school team (Chase 1995; Center for Environmental Education 2003), or only focus on specific aspects of sustainability like energy management (Cornwall 1989).

Because of these deficits in current works on sustainability assessment at the K-12 level, a more effective assessment questionnaire is needed. If effective and comprehensive sustainability assessment is to be done at the high school level, ideas must be drawn from works in higher education, from non-educational settings, and from the focused works specifically for the secondary setting.

The literature identifies the following as the most important factors for sustainability assessment at the high school level:

- Sustainability is an ongoing process rather than an end. The means used to work towards sustainability need to be assessed along with focused content aspects of sustainability like energy use (Shriberg 2001, 256).

- The field of sustainability assessment is relatively young with most work for educational institutions being completed in the last five years. Therefore, most assessment focuses on process rather than outcomes (Shriberg 2001, 256).

- A team approach to assessment that involves multiple stakeholders is a critical component of

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effective sustainability assessment (Cash and Clark 2001, 3; Cornwall 1989, 20).

- Areas included in comprehensive assessments include: energy use, water use, environmental hazards, grounds management, solid waste, strategies for teaching sustainability, outreach, the process of sustainability at the institution, transportation, and indirect effects such as alumni careers and attitudes (Chase 1995; Keniry 1995; Smith 1993).

- Involvement, support, and commitment of school administration are important in making the assessment process successful (Keniry 1995, 189; Cornwall 1989, 8).

- SAQ's need to be broad enough to be comprehensive because sustainability is a broad process. At the same time assessments must try to be calculable and comparable so outcomes are measurable and comparable. (Shriberg 2001, 254; Keniry 1995, 199).

The Sustainability Assessment Questionnaire that was developed for this project attempts to incorporate the preceding content and guidelines. Future use, subsequent evaluation, and continual revision of the questionnaire as

part of the sustainability process can help it evolve into
a more effective tool.

APPENDIX A

DEFINITION OF TERMS

DEFINITION OF TERMS

Sustainability - This is a broad term with many definitions that need to be considered when trying to interpret the various works in the annotated bibliography. As used by this author in this project, sustainability is defined as: an ongoing process where there is "reconciliation of society's developmental goals with its environmental limits over the long term" (World Commission on Environment and Development 1987).

Eco-Efficiency - A Measurement of indicators of materials utilization for regulatory compliance. This may promote incremental change in contrast to the systemic process change of true sustainability (Shriberg 2002, 3).

Sustainability Assessment Questionnaire (SAQ) - A structured attempt to assess quantitatively and/or qualitatively one or more aspects of an institution's direct and indirect effects on the environment (Nixon 2002, 17).

Focused SAQ - A Sustainability Assessment Questionnaire that is limited to one aspect of an institution's policies and practices (e.g. energy or water use); or is limited to practices and policies in one physical area of an institution (an office or department) (Nixon 2002, 17).

Comprehensive SAQ - A SAQ that analyzes multiple aspects (energy, education, water, etc.) of an entire institution's policies and practices (Nixon 2002, 17).

HSSAQ - High School Sustainability Assessment Questionnaire. A SAQ for the high school setting. The goal of this project is to develop a state of the art HSSAQ.

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APPENDIX B

THE SUSTAINABLE SCHOOL

The Sustainable School:
A Sustainability Assessment Questionnaire
For High Schools

Introduction and guidelines for completing this questionnaire

This sustainability assessment questionnaire was designed for use by a school team comprised of teachers, students, administrators, and maintenance and operations personnel. It is meant to be part an ongoing school sustainability process. After determining needs via this assessment, the school would normally draft or update a school sustainability plan. It is recommended that the same team that completes this assessment also be involved in producing or updating the school sustainability plan.

The questionnaire was produced by the author based on research and experience in the field of sustainability assessment in educational settings. The referenced works (page 58) provided ideas that helped the author to identify important characteristics and components for this questionnaire. Because most work on comprehensive sustainability assessment in educational settings focuses on higher education, ideas from the referenced works were adapted by the author for use in this questionnaire for the high school setting.

Research indicates that time constraints can prevent schools from assessing and planning for a sustainability program at their school. Therefore, this assessment provides a solid framework for a school assessment team to help save them time (Cornwall 1989, 21).

Research also shows that if needs are to be effectively transformed into implemented policies, the assessors, policy makers and stakeholders who implement policy need to work closely together during the entire process (Cash and Clark 2001, 3; Cornwall 1989, 20). This assessment includes open-ended questions so that the assessment and planning team can work together to discuss, answer questions, and identify needs unique to their school.

Time and money available for assessment and planning will vary considerably between schools and districts. So, also

included in this questionnaire are optional extension questions where the team (time permitting) can utilize additional information resources to complete more detailed assessments in specific areas of sustainability.

It is recommended that the team meet initially to determine research responsibilities (both internal and external). Subsequent meetings may be spent discussing school sustainability and completing the questionnaire.

The following additional concepts and recommendations concerning the sustainability assessment process are based on sustainability research in educational and other organizations:

- Sustainability is an ongoing process. A primary goal of the process is to work continuously toward elimination of waste and environmental hazards at the school (Shriberg 2002, 257). The second goal of the process is to model and teach sustainability to all involved (Kifer and Kemple 1999, 42; Cornwall 1989, 17).

- The sustainability process can be more effective by involving multiple stakeholders (students, teachers, administration, community members, administration, and school board members) as early and as much as possible (Cash and Clark 2001, 3).

- The process can be more effective if the support of school district administration is obtained prior to starting the assessment. Such approval would ideally include a school board resolution and administrative commitment for staff time and basic funding. (Keniry 1995, 189; Cornwall, 1989).

- The level of detail that the team decides to go into during the assessment should, of course, correspond to personnel, time, and fiscal resources available.

- This questionnaire provides three levels of questions to assess school sustainability. Basic questions for assessing sustainability via maintenance and operations, education, and

administrative and management strategies are
provided. Also included are open ended questions
where the team researches a topic and
brainstorms measures that would be unique to
their school. Extension questions are provided
for school teams having time to further research
and assess sustainability in a more focused
manner.

School Sustainability Assessment Questionnaire

Section 1: Buildings and Operations for Sustainability

1.1 Solid Waste (discarded paper, glass, metals, other waste).

1.11 Does your school determine the cost for solid waste disposal each school year?

A.____ Yes
B.____ No: this has been done before but it is not done each year
C.____ No: this has not been done at our school

If 1.11 is Yes: How much did solid waste disposal cost your school last school year? _____

1.12 If 1.11 is Yes: How much did solid waste cost per student last school year at your school?

____per student

1.12 Has there been a study of the components of your school waste?

A.____ Yes
B.____ No

1.13 If 1.12 is Yes, record the total pounds and percentage of the total for the various wastes at your school for the last three years:

_____

_____

_____

1.14 Does your school have a recycling program?

A.____ Yes
B.____ No

1.15 If 1.14 is Yes, how many pounds of each of the following materials were recycled during the last year?

glass:_____ office paper:____ mixed paper:_____
cardboard:____ plastic:_____ newsprint:_____
aluminum:_____ other metals:___ other materials:___

1.16 Does the school have any strategies to reduce waste?

A.____ Yes
B.____ No

1.17 After the team discusses recycling and waste at your school, identify/brainstorm a list of five to ten measures that could be implemented to help eliminate solid waste at your school.

1. _____ 2. _____
3. _____ 4. _____
5. _____ 6. _____
7. _____ 8. _____
9. _____ 10. _____

Waste Management Extension Question:

1.18 Has the school completed the state of Oregon rating assessment for school waste management (http://www.oregongreenschools.org/guide.html)?

A.____ Yes
B.____ No

1.2/1.3   Environmental Hazards

1.21 Has an accredited inspector determined the location(s) and condition of asbestos at the school?

A.____ Yes
B.____ No

1.22 Are non-toxic cleaning products used at the school?

A.____ Yes
B.____ No

1.23 Is the school periodically tested for Radon gas?

A.____ Yes
B.____ No

1.24 Is the mitigation and/or elimination of Radon, cleaning supplies, science chemicals, and pesticides addressed in the school sustainability plan?

    A.____ Yes: elimination/mitigation of all of these hazards are addressed if present

    B.____ No: elimination/mitigation of some, but not all of these hazards are addressed if present

    C.____ No: elimination/mitigation of these hazards, if present, are not addressed

1.25 Are non-hazardous building materials considered (beyond legal compliance) for new construction?

    A.____ Yes

    B.____ No

1.26 Is smoking prohibited on campus?

    A.____ Yes

    B.____ No

1.27 Are running vehicles with exhaust fumes (buses, cars) prohibited from parking near the school to prevent fumes from entering through windows and ventilation systems?

    A.____ Yes

    B.____ No

1.28 Is the school ventilation system maintained on an on-going basis (including filter changes)?

    A.____ Yes

    B.____ No

1.29 Are art and other school supplies provided to students non-toxic?

    A.____ Yes

    B.____ No

1.30 As an assessment team, research and then brainstorm to identify five to ten strategies (not listed in previous questions) that the school could use to help eliminate environmental hazards at the school.

1. _____   2. _____
3. _____   4. _____
5. _____   6. _____
7. _____   8. _____
9. _____ 10. _____

Environmental Hazards Extension Assessment Question:

1.31 Does the school annually utilize the school indoor air quality assessment system provided by the US Environmental Protection Agency? The system is available at:
http://www.epa.gov/iaq/schools/tools4s2.html.

A.____ Yes
B.____ No

1.4 Energy Management

1.41 Is a detailed energy audit completed and reviewed at least annually?

A.____ Yes
B.____ No

1.42 Is the energy cost and use data analyzed in a software program that produces a weather corrected cost per square foot?

A.____ Yes
B.____ No: it is tracked but not analyzed by square footage or weather variances.
B.____ No

1.43 If the energy data is calculated as described in 1.42, what is the cost per square foot for the school?

_____

1.44 Have more than half of the following quick-fix measures been implemented? (install energy saving lamps; install time clocks on HVAC systems; install lockouts/economizers on HVAC system; install time clocks or photocells for exterior lighting; install motion sensors for lighting in appropriate areas; de-lamping and de-ballasting in over-lit hallways, staff student awareness program).

A.____ Yes
B.____ No

1.45 Is transportation maintenance, routing, and fleet use examined (at least) annually for waste elimination?

A.____ Yes
B.____ No: It was examined once but not on an ongoing basis.
C.____ No: we do not and have not examined our transportation operations for waste elimination.

1.46 Is there a dark campus policy implemented (all lights out at night) for better security and waste elimination)?

A.____ Yes
B.____ No

1.47 Are the life cycle costs and wastes associated with energy use included in new construction decision-making and planning?

A.____ Yes
B.____ No

1.48 As an assessment team, research and then brainstorm to identify five to ten strategies (not listed in previous questions) that the school could use to help eliminate energy waste and lower energy costs.

1. _____   2. _____
3. _____   4. _____
5. _____   6. _____
7. _____   8. _____
9. _____   10. _____

Energy Management Extension Assessment Questions:

1.49 Has the school been certified by the Leadership in Energy Design (LEED) Green Building rating system (available on-line from: http://www.usgbc.org/LEED/LEED_main.asp)?

A.____ Yes
B.____ No

1.5 Water Waste Elimination

1.51 If known list below how much water, in gallons, your school used last school year? If this is not known check line B.

A.____ gallons last year
B.____ unknown

1.52 Has the school implemented measures to eliminate water waste?

A.____ Yes
B.____ No

1.53 If question 1.52 is Yes, how much did the school save last year in water and in dollars by decreasing water waste? If there is were no measures taken, or saved amounts are unknown, check box B.

A._____ gallons saved last school year
_____ dollars saved last school year
B._____ this has not been tracked

1.54 Does the school involve staff, students, and teachers in planning and educational experiences regarding strategies to decrease wasted water?

A.____ Yes
B.____ No

1.55 Does the school have a system for reclaiming/re-using water?

A.____ Yes
B.____ No

1.56 Does the school have a active policy to identify and repair water leaks?

A.____ Yes
B.____ No

1.57 Has the school installed low flow shower heads?

A.____ Yes
B.____ No

1.58 Does the school use Xeriscape landscape techniques(native plant and low water landscaping)?

A.____ Yes
B.____ No

1.59 Does the school utilize a low use irrigation system (or is there no irrigation)?

A.____ Yes
B.____ No

1.60 As an assessment team, research and then brainstorm to identify five to ten measures (not listed in previous questions) that could be implemented to help eliminate water waste at the school:

1. _____   2. _____
3. _____   4. _____
5. _____   6. _____
7. _____   8. _____
9. _____   10. _____

1.7 Purchasing for Sustainability

1.71 Does the school (or district) have a policy for purchasing food from local sources?

A.____ Yes
B.____ No

1.72 Does the school have an organic food purchasing program?

A.____ Yes
B.____ No

1.73 Does the school have a coordinator that analyzes products for impact on sustainability?

    A.____ Yes
    B.____ No

1.74 Does the school have a program to purchase recycled paper?

    A.____ Yes, nearly all the paper purchased is recycled, from 100% post consumer waste, and chlorine free.
    B.____ Most of the paper purchased is recycled.
    C.____ Some, but not most of paper purchased is recycled in some way.

After individual research, brainstorm/identify as an assessment team, five to ten additional purchasing measures that can contribute to sustainability.

1. _____   2. _____
3. _____   4. _____
5. _____   6. _____
7. _____   8. _____
9. _____   10. _____

Section 2: Administration and Management for Sustainability

2.1 Relation between Overall School Plan and School Sustainability Plan

2.11 Does the overall mission statement of the school incorporate the concept of sustainability?

    A.___ Yes: definitely

    B.___ Yes: somewhat

    C.___ No: our school mission statement does not include the concept of sustainability or we do not have a school mission statement.

2.12 Does the overall school plan include goals and objectives that move the school towards sustainability?

    1.___ Yes: definitely

    2.___ Yes: there are some aspects of school plan that address some aspects of sustainability

    3.___ No: our overall school plan does not include sustainability

2.2 School Sustainability Plan

2.21-2.22 Does the process used to manage sustainability operate in a sustainable manner in its own right?

2.21 Is the sustainability planning and implementation process ongoing?

    A.___ Yes

    B.___ Somewhat but could be better

    C.___ No the process is not ongoing

2.22 Is there a team approach in assessing, planning, and evaluating the school plan for sustainability?

A.____ Yes: a team composed of administration, teachers, building and operations, students, and other staff meets to plan and evaluate sustainability at our school.

B.____ Yes: a team meets but more than two of the listed types of team members are not a part of the team.

C.____ Yes: a team meets but they are all from the same category of team member (e.g., all from administration)

D.____ No: just one or two people assess and plan for sustainability at our school

E.____ No: no team meets to assess and plan for sustainability at our school

2.23 Is there a comprehensive school plan for sustainability (a plan that includes multiple aspects of sustainability rather than a single focused one)?

A.____ Yes: there is a comprehensive plan

B.____ No: there is a plan but it is not comprehensive

C.____ No: there is no school plan for sustainability

2.24 Is there a mission statement specifically for the school or district sustainability program?

A.____ Yes: there is a mission statement specifically for the school or district sustainability program.

B.____ No: there is no mission statement specifically for the school or district sustainability program.

2.25 Are monies returned to the school if it lowers operating costs through improved sustainability?

A.____ Yes

B.____ No

2.26 Can departments, individuals, clubs, classes, staff, and faculty be recognized and/or rewarded for helping the school operate more sustainably?

A.___ Yes: all of the above can be recognized or rewarded

B.___ No: some but not all can be recognized or rewarded

C.___ No: no plan recognizes or rewards those who contribute to school sustainability

2.27 Is there a coordinator for the school sustainability program?

A.___ Yes: there is a full time coordinator for the program

B.___ Yes: a coordinator is designated who spends at least ½ of their time on the program

C.___ Yes: there is a coordinator but they spend less than ½ of their time on the program

D.___ No: there is no coordinator for the school sustainability program

2.28 Is there a publicity and public relations component used to promote the school sustainability program inside and outside of the school?

A.___ Yes: definitely

B.___ Yes: it is part of the plan but rarely or never used

C.___ No: there is no effort to publicize or promote the program

2.3 Modeling and Teaching Sustainability through Management and Administration

2.31 Is the school sustainability plan incorporated into classroom curriculum at the school.

A.___ Yes

B.___ No

2.32 Is the general student population encouraged to contribute ideas to the school sustainability plan?

A.___ Yes

B.___ No

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Section 3: Education for Sustainability

3.1 Sustainability Education for Students:

3.11 Are students involved in and aware of the school sustainability process?

    A.____ Yes
    B.____ No

3.12 Is the school utilized as a research laboratory where students study various aspects of the environment and sustainability (energy management, water waste elimination, etc.)?

    A.____ Yes: all students are involved
    B.____ Yes: most students are involved
    C.____ No: some but not most students are involved
    D.____ No: no students study this at our school

3.13 Are students involved in studying the local outdoor environment so they may develop an affinity for the nature?

    A.____ Yes: all students are involved
    B.____ Yes: most students are involved
    C.____ No: some but not most students are involve
    D.____ No: students do not study the local outdoor environment

3.14 Are the concepts of sustainability and the environment a central organizing point around which studies are centered?

    A.____ Yes: Our school uses the environment and sustainability as a central organizing point of studies
    B.____ No: We have integrated the study of the environment and sustainability into our existing curriculum
    C.____ Sustainability and the environment is studied in some but not most of our classes
    D.____ We do not study the environment and sustainability in our school

3.15 Do students at the school study the local community and area history and culture?

    A.___ Yes: all students at the school study local community and area history.

    B.___ most of the students study the local history and community at the school.

    C.___ some but not most of the students study local community and area history

    D.___ students from our school do not study the local community and area history

3.16 Do students have the opportunity to investigate, monitor, and attempt to solve environmental problems in the local region?

    A.___ Yes: all students have the opportunity to do this

    B.___ No: this opportunity is not available to our students

3.17 Is there an extracurricular club at the school where students can become involved in environmental sustainability issues and approaches beyond the regular school curriculum?

    A.___ Yes

    B.___ No

3.18 Does the school curriculum provide the opportunity for students to become familiar with occupations that contribute to preservation of local cultures and the natural environment?

    A.___ Yes

    B.___ No

3.19 Does the school evaluate student environmental knowledge, attitudes, and problem solving abilities?

    A.___ Yes

    B.___ No

3.20 Does the school evaluate alumni sustainability actions and understandings by surveying their attitudes, careers, and environmental literacy?

    A.___ Yes

    B.___ No

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Education for Sustainability Assessment Extension Question:

3.21 Does the school participate in the National Environthon competition (available on-line from: http://www.envirothon.org/)?

    A.____ Yes
    B.____ No

3.22 Do students and teachers at the school utilize the Youth for Environmental Sanity (YES) Green Schools Manual and program for energy sustainability? (Available online from: http://www.yes@yesworld.org/info/GreenSchoolsManual.pdf)

    A.____ Yes
    B.____ No

3.3 Sustainability Education for Teachers:

3.31 Is money allocated for teachers to attend training on sustainability in educational settings?

    A.____ Yes
    B.____ No

3.32 Is familiarity with sustainability in educational settings considered when hiring a new teacher?

    A.____ Yes
    B.____ No

3.33 Are sustainability related presentations part of teacher in-service programs?

    A.____ Yes
    B.____ No

3.4 Sustainability Education for Staff:

Note: Staff are considered to be all non-administrative or non-certificated personnel (custodians, maintenance, operations and food service personnel, facilities planning personnel.

3.41 Are training sessions regarding school sustainability offered to staff?

    A.____ Yes
    B.____ No

3.42 Are staff encouraged (and provided funding for) attending school sustainability related training sessions?

A.____ Yes
B.____ No

3.43 Are staff actively involved in assessing, planning, and implementing sustainability at the school?

A.____ Yes
B.____ No

Continuing the Sustainability Process

The preceding questionnaire was designed to provide an assessment team with a point-in-time look at the process of sustainability at their school. It was also designed to help the team explore areas that might be included in a school sustainability plan.

As detailed in the introduction, it is highly recommended that the assessment team also be involved in the next aspect of the sustainability process --developing (or updating) the school sustainability plan based on results of this assessment. Annual assessments are recommended to provide a comparison with previous years.

As the sustainability plan is continually refined, it should guide the school towards elimination of waste as it models and teaches sustainability to the multiple stakeholders involved.

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