Learning about Sustainability: The Contribution of the Global Seminar Educational Model

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Abstract

Environmental sustainability issues have gained great popularity and focus on university campuses in recent years. It is increasingly common to find universities experimenting with organizational, administrative and curricular changes in the search for greater emphasis in programs supporting environmental sustainability. Steptoe (2007) states that "over 200 schools now offer either courses, certifications, concentrations, undergraduate degrees, or post-grad studies on the subject" (para. 3). One specific example of a curricular opportunity on sustainability is the Global Seminar Project (GSP) - an international collaborative effort that offers a course on environmental sustainability to undergraduate and graduate students in over 45 institutions in five continents. The primary purpose of this study was to determine whether or not GSP had been a successful educational model for learning about sustainability. To accomplish this purpose, the researchers used a modified Delphi technique as described in agricultural and extension education by Dobbins (1999), Mykerezi (2003), and the Agricultural Education Assessment Project [AEAP] (2006). Panelists reached consensus on the level of significance of 75 statements regarding strengths, weaknesses, and strategies for improvement of the model. Of these, 51 statements had a mean of 4 (agree) or higher (strongly agree) in the ratings by the panelists. The three themes that emerged in the content analysis were: 1. Global Seminar Planning Procedures and Policy, 2. Curriculum & Program Development and Teaching-Learning Process, and 3. Professional Development and Research.

Keywords: International, Sustainability, Constructivist Approach, Modified Delphi Study

Introduction

Environmental sustainability issues have gained great popularity and focus on university campuses in recent years. According to Steptoe (2007), for example:

> On a growing number of campuses across the U.S., a relatively new idea known as sustainability – an interdisciplinary concept incorporating values, systems and activities that are ecologically sound, socially just and economically viable – is becoming a driving force in institutions' missions, a guiding principle of campus operations and an academic discipline in its own right. (para. 3)

Steptoe (2007) also states that "over 200 schools now offer either courses, certifications, concentrations, undergraduate degrees, or post-grad studies on the subject" (para 3). Examples include the Center for Sustainability at Aquinas College; campus wide sustainability programs at University of California – Berkley; The Institute for Community Development at Cornell University; certificates, undergraduate and graduate degrees at Arizona State University; and a Master of Science degree in Conservation Ecology and Sustainable Development at the University of Georgia.

It is increasingly common to find universities experimenting with organizational, administrative and curricular changes in the search for greater emphasis in programs supporting environmental sustainability. Curricular changes include both formal and operational dimensions, with formal including course content and materials, and operational including teaching and learning methods, and location (Navarro, 2004). Rowe (2007) argues that:

> Sustainability needs to be a main focus of our efforts in education. Given the educational and research capacity, the external partnerships, and the position of higher education as an influential voice in society, there is ample opportunity for higher education to help shift societal norms toward a healthier environmental sustainability. (p. 324)

One specific example of an undergraduate and graduate student curricular offering on sustainability is the Global Seminar Project that is coordinated from the campus of Virginia Tech.

The Global Seminar Project (GSP) is an international collaborative effort that offers a course to undergraduate and graduate students in over 45 institutions on five continents. The objectives of the GSP include: 1) Develop and organize an interdisciplinary knowledge base in the form of modular case studies on the environment and sustainable food systems; 2) Foster participation and build linkages between institutions and faculty around the world; 3) Assist students in developing higher order cognitive and learning skills needed to address problems of global proportion and to enhance their awareness of critical issues of sustainability; and 4) Develop delivery systems to incrementally make this seminar accessible across the globe (GSP, 2008)

Theoretical Framework

The conceptual framework for the Global Seminar is based on a constructivist approach to teaching and learning, that promotes critical reflection and experiential learning based on real global problems. For the purpose of this study, the researchers summarize the crux of constructivism with the following tenets of the philosophy, as quoted by Doolittle and Camp (1999):

1. Knowledge is not passively accumulated, but rather is the result of active cognizing by the individual;

2. Cognition is an adaptive process that functions to make an individual's behavior more viable given a particular environment;
3. Cognition organizes and makes sense of one's experience, and is not a process to render an accurate representation of reality; and
4. Knowing has roots both in biological/neurological construction, and in social, cultural, and language-based interactions. (Constructivism Section, para 2-5)

In addition to the tenets of constructivism, this study was also guided by the factors of constructivist pedagogy highlighted by Doolittle and Camp (1999). The following factors are essential to constructivist teaching and learning, but also important for understanding how a distance program similar to the GSP is a theoretically effective instrument for teaching about sustainability (Doolittle & Camp, 1999):

> Learning should take place in authentic, real world environments. . . . Learning should involve social negotiation and mediation. . . . Content skills should be made relevant to the learner. . . . Content skills should be understood within the framework of the learner's prior knowledge. . . . Students should be assessed formatively, serving to inform future learning experiences. . . . Students should be encouraged to become self-regulatory, self-mediated, and self-aware. . . . Teachers serve primarily as guides and facilitators of learning, not instructors. . . . [and] Teachers should provide for and encourage multiple perspectives and representations of content. (Essential factors of constructivist pedagogy section, para. 1- 18)

The GSP embodies the necessary factors of constructivist pedagogy, providing for real, social, relevant, reflective, self-regulatory, and multiple venues for understanding sustainability, and accommodates a range of student learning styles with the use of case studies of real events and people (GPS, 2008).

The GSP groups five – six institutions in a cohort working together around a common theme – sustainability and the environment. The case studies focus on real events and people to investigate key concepts and policy issues of worldwide importance.

Students from participating institutions in each cohort study and analyze the same case study for approximately three weeks. During the three week cycle students participate in guest lectures at their home institution, read documents related to the case study, and participate in international discussion boards and chat sessions that focus on key issues pertaining to each case study. Then, all students come together for a live videoconference that is structured around the main themes/issues related to each case study. During the videoconferences each institution either takes a specific position toward the theme/issues or is allowed to freely discuss their thoughts, concerns, beliefs, etc. After the videoconference students prepare a reflective paper on the case study and videoconference for their respective institution. Figure 1 provides an illustration of the Global Seminar learning model.

In summary, with the use of case studies, the GSP promotes reflection, enhances interdisciplinary learning, and accommodates a wide range of student learning styles. "Through sharing stories of how people have made a difference in society and by providing assignments that focus on solving real sustainability issues, educators can engage students and help institutions and the larger society turn toward more sustainable policy norms" (Rowe, 2007, p 324).

Since its inception more than 12 years ago, the GSP has successfully integrated pedagogy and multiple technologies into the learning environment. A case study approach to content, international student teams, the use of Internet, satellite, and telephone technologies, meet the challenge of delivering an educational program to a virtual global classroom in multiple educational centers around the world.

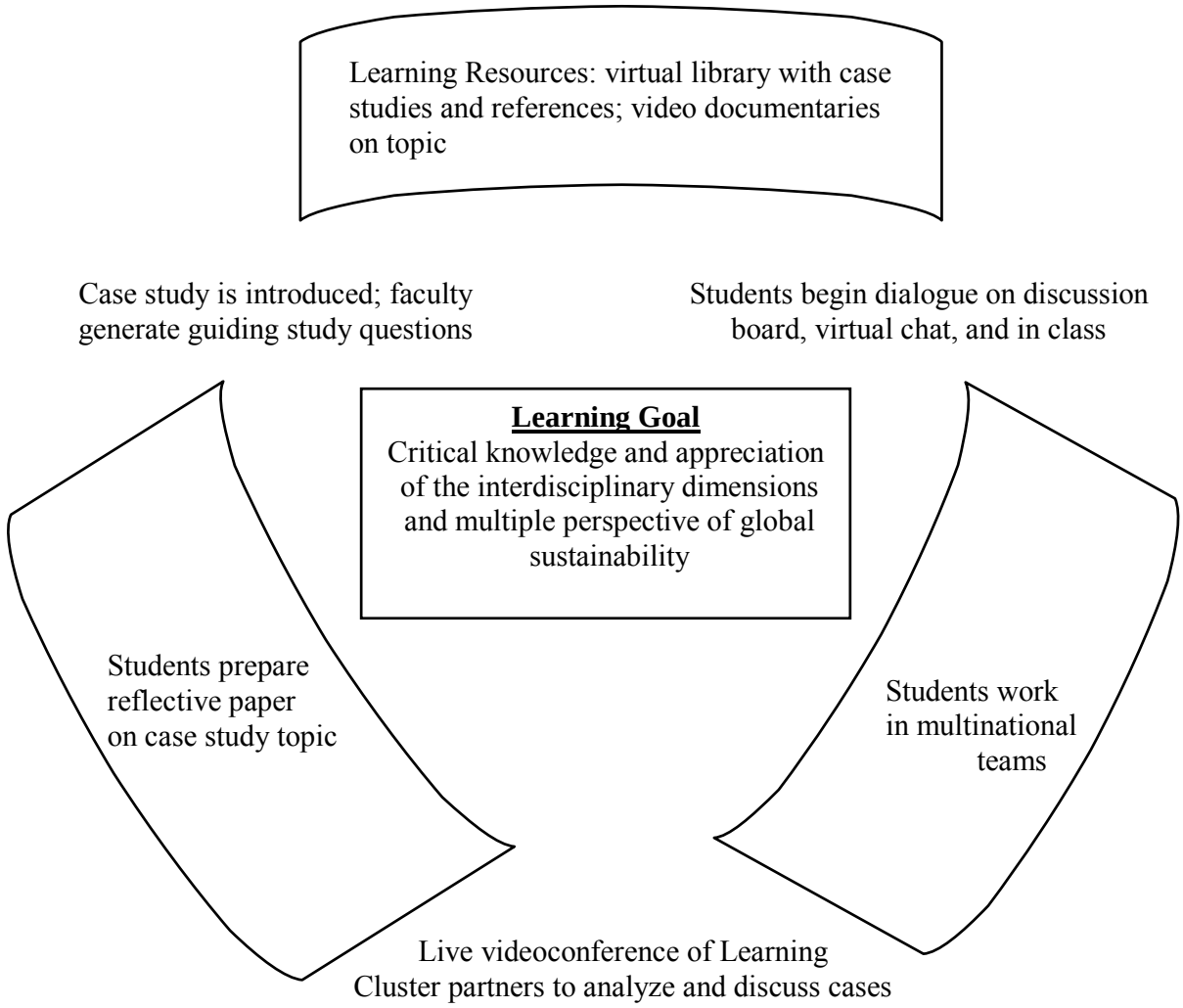

Figure 1. Global Seminar learning model (Modified from GSP (2008)).

Purpose of the Study

The primary purpose of this study was to determine whether or not GSP had been a successful educational model for learning about sustainability. To accomplish this purpose, the following objectives were identified:

1. Identify strengths and weaknesses of the GSP, as well as possible strategies to improve the model; and
2. Reach consensus among experts regarding the level of significance of these strengths, weaknesses, and strategies.

Methodology

The researchers chose to use a modified Delphi technique. Since its inception in the 1960's (Dalkey & Helmer, 1963), the Delphi technique has undergone "a number of substantive refinements and additions [as well as] less consequential variations . . . as each researcher adjusts the procedure to suit himself" (Hill & Fowles, 1975, p. 179). For the purpose of this study, the researchers used a modified Delphi technique as described in agricultural and extension education by Dobbins (1999), Mykerezi (2003), and the Agricultural Education Assessment Project [AEAP] (2006).

The choice of a modified Delphi technique was made because it is a good "tool for drawing forth ideas, options, alternatives, diagnosis, etc." (Coates, 1975, p. 194) and "is effective in obtaining consensus among a purposively selected group of experts" (Stufflebeam, McCormick, Binkerhoff, & Nelson, 1985, as cited in Roberts & Dyer, 2004, p. 84). As with many other modified Delphi's, "the investigation was conducted in … [several] phases, each phase moving closer to satisfying the objectives" (Buriak & Shinn, 1989, p. 14):

Phase 0 (pre-data): Identification of experts and probe development

The identification and selection of participants is a very critical phase (Ludwig, 1997). The frame from which the experts were identified was that of instructors who had participated in the GSP for a minimum of two years. To minimize threats to validity due to poor choice of experts, the researcher also reviewed literature of GSP and asked references from professionals and administrators in GSP regarding the instructors to invite to the panel. A total of 13 experts participated in the modified Delphi study, representing all clusters in the GSP. These 13 experts participated in the Delphi probe, but only 12 participated in Round I and Round II.

Phase I: Modified Delphi Probe

The Delphi Probe was developed as an open-ended questionnaire to promote thoughtful and creative responses from the panel. The experts were asked to list ten statements to reflect their perception on the contributions that GSP could make as an educational model for learning about sustainability. The example given in the probe suggested that the panel members could contribute statements regarding strengths, weaknesses, and ideas of possible strategies for improvement of the GSP model. All panel members participated in the probe, and all provided 10 statements. Many authors suggest that a minimum of 6 responses be given by each member in the probe phase to help generate enough ideas and creativity (Mykerezi, 2003), and may reduce threats to validity of the process.

There were 130 statements proposed by the panelists. After combination of equivalent statements, the resulting 105 statements were reviewed for grammar, clarity, and accuracy by two experts.

Phase 2: Round 1 of modified Delphi

With the 105 reviewed statements, the researcher created an electronic survey. Panelists were asked to indicate whether or not they agreed with the statements using a Likert-type scale (1 = strongly disagree (SD), 2 = disagree (D), 3 = neutral (N), 4 = agree (A), 5 = strongly agree (SA).

Once the responses of Round I were collected, the researcher calculated the mean and standard deviation of the responses to each statement. The modified Delphi technique described by Dobbins (1999), Mykerezi (2003), and the Agricultural Education Assessment Project [AEAP] (2006) indicates that the researcher should use a predetermined standard for assessing consensus, and, if consensus is reached for any statement according to that standard, that statement should not be used in subsequent rounds of the modified Delphi (consensus is already

attained). The advantages of proceeding this way are two-fold. First, according to Hill & Fowles, the use of a predetermined "statistically-derived standard for assessing consensus" (Hill & Fowles, 1975, p. 184) would help in increasing the reliability of the Delphi, and second, the possibility of determining consensus for some statements before the end of the process allows for a reduction of materials and information to be discussed throughout the different Delphi rounds; therefore, simplifying the process and minimizing participant attrition (thus also minimizing another threat to reliability of the study) (Hill & Fowles, 1975).

In the study, the predetermined standard was a standard deviation equal to, or less than 1.00. Sixty-five statements met the criteria. The researcher took the 40 statements for which the panelists had not reached consensus (standard deviation greater than 1.00), and prepared a second instrument, the one used in Round II of the modified Delphi.

Phase 3: Round II of modified Delphi

Round II instrument was a survey with the remaining 40 statements. Panelists were asked again to indicate whether or not they agreed with the statement using a Likert-type scale (1 = strongly disagree (SD), 2 = disagree (D), 3 = neutral (N), 4 = agree (A), 5 = strongly agree (SA). In addition, panelists were given feedback and information to help them move toward consensus with the rest of the panelists. This information consisted of their ratings to each of the 40 statements in the previous round as well as the group's mean and standard deviation for each statement. In addition, the researchers made phone or e-mail contact with panelists to clarify questions or comments.

After this round, 10 more statements reached consensus. The researchers decided to stop the iterations here because it was assumed that a minimal amount of useful information was going to be gained in subsequent rounds of the process (Mykerezi, 2003).

The results of Round II were used with the results of Round I to compile and rank by mean and standard deviation the list of statements for which there was consensus among the panel members (standard deviation equal to or less than 1 either in Round I or Round II)

Phase 4: Content analysis

In order to gain a better understanding of the implications that the statements might have on the future quality of the Global Seminar, a content analysis was conducted on the statements for which consensus was attained. This process involved identifying keywords in each statement and then grouping the statements by themes.

Results

Panelists proposed 105 statements to respond to whether or not GSP had been a successful educational model for learning about sustainability. The statements focused mostly on strengths, weaknesses, and strategies for improvement of the GSP model for teaching about sustainability. Panelists reached consensus on 75 statements (65 in Round I and 10 in Round II) regarding the level of significance of these statements. Of these, 51 statements had a mean of 4 (agree) or higher (up to 5 – strongly agree) in the rating by the panelists. Table 1 shows these 51 statements, together with the mean rating by panelists, and the standard deviation of the ratings. Table 1 also shows if the consensus was reached in Round I or Round II, and also indicates in what theme the statement was grouped as a result of the content analysis. The three themes that emerged in the content analysis were: 1. Global Seminar Planning Procedures and Policy (Global), 2. Curriculum & Program Development and Teaching-Learning Process (Curriculum), and 3. Professional Development and Research (Professional). The "Global" theme included 12

statements that reached consensus with a mean equal to or higher than 4, the "Curriculum" theme had 26 statements, and the "Professional" theme had 13 statements.

Table 1

Panelists' Statements that Reached Consensus (SD Equal or Smaller than One) and had a Mean Equal to or Greater than Four after Two Rounds of Modified Delphi Technique

Theme	Statements	Mean	*SD*	Round
Global	The internal organization of the project must be discussed by the member institutions and agreed upon by all.	5.00	0.00	II
Global	Home campus publicity is important, making students on campus aware of GS interactions.	4.67	0.65	I
Global	National differences in academic tradition and legislation must be respected by all participants.	4.67	1.0	I
Professional	Each institution within the cluster should take full responsibility for the quality of the course.	4.67	0.49	I
Curriculum	Case studies should be deliberately interdisciplinary, to encourage students to consider many aspects of sustainability.	4.58	0.51	I
Curriculum	Standards for grading all aspects of the course, such as ISG projects, participation, and individual work, should be developed and given to students at the beginning of the course.	4.58	0.51	I
Global	Course incorporation into existing local curricula is important, so that the course is able to recruit sufficient enrollment.	4.58	0.67	I
Global	One university should be coordinator of each cluster.	4.58	0.9	I
Professional	The GS course would be more effective by allowing each cluster to be responsible for its own destiny whilst constantly refining process through consultation with the other clusters.	4.5	0.67	I
Professional	The professors from each site should interact once a month to discuss how the course is progressing.	4.5	0.9	I
Professional	Annual international symposium for faculty on university collaboration is an important activity.	4.5	0.9	I
Curriculum	The professors at each site should help the students in their discussions and understanding of the required readings for each video conference (VC).	4.42	0.67	I
Global	A policy for using and administrating the course information should be presented.	4.42	0.67	I
Curriculum	The professors from each site should help their students be more tolerant of students at other sites, in regards to their culture and understanding of the English language.	4.33	0.65	I

Theme	Statements	Mean	*SD*	Round
Curriculum	There should be sufficient lead time in class at the beginning of semester to get the theme of Sustainability introduced /debated satisfactorily and for students to become familiar with the learning process involved.	4.33	0.98	I
Curriculum	All students at each site must actively participate in the activities of the course (ISGs, Discussion Board, VCs, etc.)	4.33	0.98	I
Professional	The GS should encourage partners to develop new case studies using local issues.	4.33	0.65	I
Professional	The GS would be more effective through agreed levels of institutional support from each partner.	4.33	0.78	I
Professional	Instructors should familiarize themselves with the case study teaching method so that they can use it more effectively.	4.33	0.78	I
Global	The Global Seminar (GS) course would be more effective if the maximum number of institutions for each cluster is six (6).	4.33	0.65	II
Curriculum	The teachers should come from different disciplines as biology, agriculture, social sciences and education such that different views can be shared with the students.	4.25	0.62	I
Curriculum	The GS operates on the issues that are all interrelated (population, biodiversity, etc.)	4.25	0.62	I
Curriculum	Technology problems associated with VC must be centralized and some help should be provided to new members.	4.25	0.62	I
Curriculum	The GS emphasizes consensus building type of education – not a textbook/lecture format.	4.25	0.87	I
Curriculum	Case studies should avoid reinforcing stereotypes of particular groups.	4.25	0.87	I
Curriculum	The VC of the GS should be highly organized and moderated.	4.25	0.97	I
Global	The universities included in every cluster should be from different continents or sub-continents.	4.25	0.95	I
Professional	The courseware (i.e., Blackboard) should be continually evaluated for usefulness and usability for the GS project.	4.25	0.97	I
Curriculum	The momentum and energy level created among students taking the GS can be capitalized on further if the course concludes with an activity which focuses on action towards sustainability at individual, local and global levels.	4.25	0.75	II
Global	The GS course would be more effective if all internationals are confirmed participants and not observers.	4.2	0.92	I

Theme	Statements	Mean	*SD*	Round
Curriculum	The GS course supports learning communities that provide global dialog.	4.17	0.72	I
Curriculum	The GS course develops problem solving skills in an international context among students.	4.17	0.72	I
Curriculum	The GS would meet the needs of many advanced students if opportunities are created for depth and quality in the level of discussions and debates, in addition to the breadth that is included.	4.17	0.83	I
Curriculum	The GS would increase the quality of educational experience through commonality of student expectations across sites.	4.17	0.83	I
Global	The GS administration and partners should reevaluate the inclusion of partners who don't or can't participate in the activities.	4.17	0.83	I
Curriculum	Pre-course and post-course student assessments to measure changes in understanding of sustainability issues will help for a more effective GS course.	4.08	0.51	I
Curriculum	The set of four case studies for each semester should be a mix of social, political, environmental and economic issues.	4.08	0.79	I
Curriculum	Case studies must be used as an instructional methodology in GS course.	4.08	0.9	I
Global	Individual class size should be optimized around 15 for a semester long unit, with a minimum of 10 and maximum of 20 students.	4.08	1	I
Professional	The GS should increase the opportunity for collaborative research among the partners, when researchers post a summary of each of their research projects as a link to the course.	4.08	0.79	I
Professional	The same set of case studies should not be used continuously by a cluster of universities in order to avoid faculty settling into routines and thus missing an opportunity to actively improve performance.	4.08	0.79	I
Curriculum	The GS develops analytical skills when dealing with current issues.	4	0.6	I
Curriculum	The GS course can help build team work skills.	4	0.6	I
Curriculum	The GS exposes students to and helping them to deal with sustainability.	4	0.6	I
Curriculum	All partners should have agreed-upon times for interaction in weekly chats and should be "present" at the specified times.	4	0.85	I
Curriculum	The GS course presents new model for teaching and learning that utilizes the latest educational technology and methodology.	4	0.85	I

Theme	Statements	Mean	*SD*	Round
Global	Elaboration of articulations with foreign institutions is important for the quality of GS.	4	0.89	I
Professional	The GS helps developing a basis for international student and faculty exchange.	4	0.85	I
Professional	Cross-cluster interaction between institutions/students should be encouraged.	4	1	I
Curriculum	There should be one VC every three weeks, not every two weeks, to allow students more time to prepare.	4	0.74	II
Professional	Group projects that apply to local situations should be encouraged and should involve local examples.	4	0.6	II

Conclusions and Recommendations

The primary purpose of this study begun in 2004 but with implementation and continued analysis and evaluation still continuing in 2008 was to determine whether or not GSP had been a successful educational model for learning about sustainability. Based "on the principle that several heads are better than one . . . and that experts will make conjectures based upon rational judgment rather than merely guessing"(Weaver, 1971, p. 268), the researchers used a modified Delphi technique to request a panel of experts to reach consensus.

Panelists focused their answers on statements that addressed strengths, weaknesses, and strategies for improvement of the Global Seminar Project model. The three themes that emerged in the content analysis of the panel's statements were: 1. Global Seminar Planning Procedures and Policy (Global), 2. Curriculum & Program Development and Teaching-Learning Process (Curriculum), and 3. Professional Development and Research (Professional). The top four statements as agreed upon by the panelists focused on developing and promoting a successful course: 1) Communication among all members; 2) Promoting the GS course on home campuses; 3) Respecting cultural differences on each campus; and 4) Each institution should take responsibility for the quality of their course. One may argue that the aforementioned statements are very important when designing and implementing successful courses that reach students from multiple cultures and countries.

Results also indicate that the decentralization of leadership structure and delegating more responsibility to the cluster and institutional level will create greater sense of ownership of the project at each institution and by faculty. Furthermore, results indicate that the structure of each cluster (number of institutions, status of participation, time calendars, number of students in each site) plays an important role in the quality of the course.

Results suggest that professional development for all instructors regarding the case study teaching approach, with annual training sessions, and collaborative research within and between clusters should be implemented. Findings support the argument that case studies should be deliberately interdisciplinary and reflect global perspectives. Panelists also agreed that standards for student participation, readings, using technology, group work, and grading play a great role in the quality of the course.

Educational Importance

This study will assist GS faculty (both new and tenured) in developing and/or improving the content and process of the GSP. The program can be used and adapted by university

administration and faculty to continue enhancing and expanding the educational opportunities offered to college students on sustainability. "Students can learn and practice how to be more environmentally, economically, and socially responsible and how support policies and legislation that support a sustainable future" (Rowe, 2007, p. 324). As previously mentioned, the GSP promotes reflection, enhances interdisciplinary learning, and accommodates a wide range of student learning styles using case studies, the latest in pedagogical technology, and a cadre of expert resources. Dewey stated in his pedagogic creed, first published in 1897 - "the only true education comes through the stimulation of a student's powers by the demands of the social situations in which he finds himself" (as cited in Infed, para. 2). Dewey further states that "through these demands he is stimulated to act as a member of a unity, to emerge from his original narrowness of action and feeling, and to conceive of himself from the standpoint of the welfare of the group to which he belongs" (as cited in Infed, para. 2) This quote sums up one of the four objectives of the GSP - assists students in developing higher order cognitive and learning skills needed to address problems of global proportion and to enhance their awareness of critical issues of sustainability.

References

Agricultural Education Assessment Project. (2006). The Delphi study. Retrieved January 2, 2008, from http://www.cerp.cornell.edu/aeap/pages/delphi.htm

Buriak, P., & Shinn, G. C. (1989). Mission, initiatives, and obstacles to research in agricultural education: A national Delphi using external decision-makers. *Journal of Agricultural Education, 30*(4), 14-23.

Coates, J. F. (1975). In defense of Delphi: A review of Delphi assessment, expert opinion, forecasting, and group processes by H. Sackman. [Electronic version] *Technological forecasting and social change 7*(2), 193-194.

Dalkey, N. C., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science, 9*(3), 458-467.

Dobbins, T. R. (1999). *Clinical experiences for agricultural teacher education programs in North Carolina, South Carolina, and Virginia.* Doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg. Retrieved December 29, 2007, from http://scholar.lib.vt.edu/theses/available/etd-090799-094331/

Doolittle, P. E., & Camp, W. G. (1999). Constructivism: The career and technical education perspective. *Journal of Vocational and Technical Education, 16*(1). Retrieved, December 23, 2007, from http://scholar.lib.vt.edu/ejournals/JVTE/v16n1/doolittle.html

Global Seminar Project (2008). Global Seminar web site. Retrieved January 4, 2008, from http://www.globalseminar.org

Hill, K. Q., & Fowles, J. (1975). The methodological worth of the Delphi forecasting technique [Electronic version]. *Technological Forecasting and Social Change, 7*(2), 179-192.

Infec, n.d. *Reproduction of J. Dewey (1897) pedagogic creed*. Retrieved December 9, 2007, from http://www.infed.org/archives/e-texts/e-dew-pc.htm

Ludwig, B. (1997). Predicting the future: Have you considered using the Delphi methodology? *Journal of Extension 35*(5). Retrieved, January 2, 2008, from http://www.joe.org/joe/2005june/iw1.shtml

Mykerezi, P. K. (2003). *The potential contribution of vocational and technical education to the future social-economic development of Albania.* Doctoral dissertation, Virginia

Polytechnic Institute and State University. Retrieved December 29, 2007, from http://scholar.lib.vt.edu/theses/available/etd-04252003-153149.

Navarro, M. (2004). *Analysis of factors affecting participation of faculty and choice of strategies for the internationalization of the undergraduate agricultural curriculum: The case in two land grant universities.* Doctoral dissertation, Texas A&M University. Retrieved October 2, 2007, from http://txspace.tamu.edu/handle/1969/580?mode=simple

Roberts, T. G. & Dyer, J. E. (2004). Characteristics of effective agriculture teachers. *Journal of Agricultural Education, 45*(4), 82-95.

Rowe, D. (2007). Sustainability: Education for a sustainable future [Electronic version]. *Science, 317*(5836), 323324.

Steptoe, S. (2007). Getting schools to think and act green. *Time, August 10, 2007.* Retrieved January 4, 2008, from http://www.time.com/time/specials/2007/article/0,28804,1651473_1651472_1652067,00.html

Weaver, W. T. (1971). The Delphi forecasting method. *Phi Delta Kappan, 52*(5), 267-273.