



Part V

FGCU Quality Enhancement Plan Impact Report

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1: Title and brief description of the QEP as originally presented.

Quality Enhancement Plan Title: *Develop in students an ecological perspective and foster community involvement through experiential learning, scholarly dialogue, and interdisciplinary engagement.*

The founding mission statement for Florida Gulf Coast University (FGCU) noted that “study of the environment” would be a central focus and that “student volunteer service” would complement the teaching and service missions of the university. These two concepts—ecological perspective and civic engagement—have become integral parts of the university’s identity and were reaffirmed when a new mission statement was adopted in December 2002 and most recently when the FGCU University Board of Trustees renewed the (2002) university mission statement in January 2010.

The ultimate goal of FGCU’s Quality Enhancement Plan (QEP) was to improve student learning in two of the university’s Undergraduate Student Learning Outcomes, specifically #3 “An Ecological Perspective” and #9 “Community Awareness and Involvement” by employing teaching and learning strategies that emphasize experiential learning, scholarly dialogue, and interdisciplinary engagement. As part of the University’s commitment to the QEP, an office was established with a staff led by a QEP director and resources to facilitate the initiative.

Initially, several courses in the undergraduate curriculum were chosen as the foci of the curricular revision effort necessary to achieve the goals of the QEP: IDS 1301 Styles and Ways of Learning; IDS 2110 Connections; and IDS 3920 University Colloquium. These courses were selected because they were required of all native students and covered a developmental sequence from first year through completion of the general education curriculum to senior year. Several assessments were identified for use that would demonstrate learning gains achieved by students completing the sequence of the three courses.

2. List of the initial goals and intended outcomes of the QEP.

The initial focus of the QEP was on undergraduate student learning with respect to two undergraduate learning outcomes—**ecological perspective** and **community awareness and involvement**. The primary task of the QEP was to facilitate and assess improvement in student learning. As indicators of student learning, the QEP established two broad goals and six objectives (intended outcomes) related to the learning outcomes of ecological perspective and community involvement.

QEP Goal 1: Develop an ecological perspective.

Objective 1a: Demonstrate knowledge of the issues related to economic, social, and environmental sustainability.

Objective 1b: Demonstrate the ability to analyze local and global environmental issues.

Objective 1c: Participate in collaborative projects requiring analysis of environmental issues.

QEP Goal 2: Exhibit community involvement.

Objective 2a: Demonstrate understanding of the complex relationships between individuals and communities.

Objective 2b: Demonstrate the ability to analyze sustainability within the context of community.

Objective 2c: Participate in collaborative service-learning projects that foster an ecological perspective.

3. Discussion of changes made to the QEP and the reasons for those changes.

Curricular change (content and delivery)

Almost immediately upon implementation it became evident that the scope of curricular revision and assessment originally envisioned would have to be greatly circumscribed due to the dynamic growth of the institution. As the student body was still growing by roughly 10% a year and new degree programs with competing academic requirements were expanding, the efficacy of two of the mandatory introductory general education courses, IDS 1301 and 2110, was questioned. It was determined that these two courses would no longer be required. Consequently, the focus of the QEP became the only course that every undergraduate (both native and transfer student) was required to take: IDS 3920, University Colloquium. Indeed, approximately 2500 students take this course every year.

University Colloquium began with the inception of the university in 1997. The University Colloquium brings together students from all five colleges of the university in a series of interdisciplinary learning experiences. These experiences are designed to address the ecological perspective outcome in relations to other university outcomes and guiding principles. Critical thinking and communication skills are enhanced through field trips, discussion, projects, and a journal to be maintained by each student.

Although students were very likely to encounter these two learning goals in courses taken at the university before enrolling in IDS 3920, a series of 10 steps were taken to ensure that this course would provide the opportunity for students to be exposed to the two learning goals that were the subject of the QEP:

- The QEP project including the administration of IDS 3920 (formerly within the College of Arts and Sciences) was located within the newly-established Office of Curriculum and Instruction to ensure attention to resource needs and emphasize the university-wide nature of the course and its intended learning outcomes.
- A standardized syllabus was developed and disseminated to ensure consistency of approach and syllabus components were mapped to the intended learning objectives.
- The reader for the course was revised to address course learning outcomes more closely.
- An environmentally focused student service-learning requirement of ten hours was added to the course.
- An enrollment cap of 25 students per section was established to ensure the efficiency of course-content delivery.
- A full-time faculty coordinator was hired following a national search to ensure coordination of course delivery.
- The content of field trips was focused to ensure in-depth coverage of four environments (e.g., marine, agricultural, urban, and fresh-water).
- Bussing to field trip sites was implemented to reduce carbon footprint and to allow for pre- and post-trip dialogue.

- The university's campus student naturalist program was integrated with the course to expand course support and improve student leadership development.
- A formal training program for instructors was developed and instituted to enhance pedagogy and expand the number of faculty eligible to teach the course.
- Two additional full-time faculty were hired in the past year with a third hire planned for this year.

Assessment Protocol Changes

The assessment protocol of intended learning outcomes evolved over time to adjust for the change of focus in the QEP from a developmental sequence to a single course. The assessment instruments themselves underwent modifications to more closely match the content of the course. The QEP originally intended to use two established instruments: the **Community Service Attitudes Scale (CSAS)** created by Shiarella, McCarthy, and Tucker (2000) to assess the intended outcomes under QEP Goal 2; and the **Environmental Literacy and Citizenship Assessment Inventory (ELCAI)** (McKeown-Ice, 1997) used to assess the intended outcomes under QEP Goal 1.

Community Service Attitudes Scale

The CSAS, a validated, reliable assessment of community service (Bingle, Phillips, & Hudson; 2004) was initially modified slightly to reflect commonly used FGCU terminology related to service-learning and FGCU's focus on ecological perspective. Initial assessments in 2005 and 2006 confirmed the reliability of the CSAS instrument in the FGCU student population. Continued assessments to all IDS 3920 students completing the course over the next few years showed that students exhibited positive attitudes towards community service and altruism. As there were no statistically significant changes in scores (the # of 46 CSAS items that indicated altruism) from term to term, the impact of the course on the shaping of altruism in the context of community service was still not known. By the fall of 2009, it was decided that a pre-test/post-test regimen needed to be implemented to determine the impact of the course itself on student attitudes toward community awareness and involvement. The results showed no statistically significant improvement in total score; analysis indicated that test fatigue associated with the administration of the test and lack of motivation likely masked the impact of the course. A further revision (see combined assessment below) and the establishment of benchmarks to gauge improvement based upon an analysis of historical data were determined in November 2009 by the University Colloquium Advisory Committee, a university-wide body charged to oversee the course content and assessment of IDS 3920.

Environmental Literacy and Citizenship Assessment Inventory (ELCAI) and Embedded Assessment of Ecological Literacy

The pursuit of an appropriate instrument to assess development of an ecological perspective tailored to IDS 3920 proved more problematic. Originally the ELCAI was thought to be an instrument suitable for use by the QEP since it had established validity and reliability. Upon implementation, however, it quickly became apparent that the instrument did not map well to the single course, assessed concepts not taught in the IDS 3920 course, was only available online, was intended for students majoring in environmental science, and required too much time to complete. Over the 2006-2007 academic year, IDS 3920 faculty, working with a faculty member skilled in educational measurement, developed an in-house Ecological Literacy Instrument (ELI) that was more closely associated with the course content. The embedded assessment instrument was tested in

2007-2008 and narrowed to items demonstrating both the items with best fit were included. This revised ELI included 47 knowledge and 23 attitude/behavior items. In fall of 2009, a pre-test/post-test regimen was introduced to determine the impact of the course on student learning of the QEP objectives. To reduce the length of test administration, the assessments were divided into three sections (CSAS, ELI Knowledge, or ELI Attitudes/Behaviors) and sections of University Colloquium were assigned one of the three sections by simple random sampling. Although post-test scores for the knowledge section were statistically significantly higher than pre-test scores (mean difference = 2.831 items of 47 total items; $t=8.241$, $df=177$, $p<0.001$), overall scores were lower than expected. Test fatigue and lack of motivation were believed to be masking learning gains. As University Colloquium faculty had, in the 2008-2009 AY, further revised required readings used in the course to ensure only relevant material was covered, the ELI required further revision to align with the content of only those readings.

Combined Assessment

Ultimately, the University Colloquium Advisory Council combined the ten CSAS and 30 ELI items (ten attitude and behavior items, 20 knowledge items based on current core readings) into a single assessment instrument that could be completed within forty minutes to avoid fatigue. This combined instrument had the advantage of assessing every University Colloquium student's achievement of each QEP objective and was brief enough to reduce test fatigue compared to previous instruments. The items chosen from the CSAS and the ELI attitudes/behaviors items demonstrated the highest pre-post test z-scores (these best reflected change over a one semester period).) Fourteen ELI Knowledge items from the existing instrument were supplemented with six additional items written by two full time Colloquium faculty and reviewed by a third full time faculty member who teaches Colloquium regularly for content and construct validity. The content of these 20 items was included in core required course components; most of these were from the required course readings, several were based on field experiences. Two strategies were implemented to ensure motivation: 1) completion of the pre-test (first two weeks of class) and post-test (last week of class) were necessary to pass the course, and 2) the 20 knowledge-based items assessing ecological literacy would be worth 5% of the student's final grade. This was the final assessment protocol adopted in spring 2010 and was administered to all students enrolled in IDS 3920 ($n= 831$ valid pre and post-test scores).

4. Direct impact of the QEP on student learning

The University Colloquium course content and the QEP assessment instrument are directly related to the QEP goals and objectives. Tables 1 and 2 below illustrate 1) how the intended learning outcomes under the two goals of the QEP were covered in the content of University Colloquium and 2) how the items of the final assessment instrument adopted for spring 2010 mapped to the objectives.

Table 1. QEP Learning Objectives and University Colloquium Course Content

Learning Goal	Related Readings & Activities*	Related Assignments
QEP Goal 1: Develop an ecological perspective.		
Objective 1a: Demonstrate knowledge of the issues related to economic, social, and environmental sustainability.	Readings: Grunwald, <i>The Earth Charter</i> , Orr, Gardner	Paper #2 Global Challenges

	Field Trip: ECHO (agricultural)	Paper #3 Floridiana Final Project
Objective 1b: Demonstrate the ability to analyze local and global environmental issues.	Readings: <i>State of the World</i> Field Trip: ECHO (agricultural)	Paper #2 Global Challenges Paper #3 Floridiana
Objective 1c: Participate in collaborative projects requiring analysis of environmental issues.	Class Discussion (Colloquia)	Final Project
QEP Goal 2: Exhibit community involvement.		
Objective 2a: Demonstrate understanding of the complex relationships between individuals and communities.	Readings: Dewey, Louv, Leopold, Stoneman Douglas Field Trip: Corkscrew Swamp Sanctuary (fresh water), Downtown Ft. Myers (urban)	Paper #1 Education and Experience
Objective 2b: Demonstrate the ability to analyze sustainability within the context of community.	Field Trip: Matanzas Pass (marine) Field Trip: ECHO (agricultural)	Reflective Journal, Paper #4 Education for Sustainability
Objective 2c: Participate in collaborative service-learning projects that foster an ecological perspective.	Service Learning	Reflective Journal, Final Project

*Listed in order of appearance in course packet and standard syllabus

Table 2. QEP Learning Objectives and Assessment Items Measuring Student Attainment of Objectives

Learning Goal	Ecological Knowledge	Ecological Attitude/ Behavior	Community Awareness
QEP Goal 1: Develop an ecological perspective.			
QEP Objective 1a: Demonstrate knowledge of the issues related to economic, social, and environmental sustainability.	4, 5, 12, 13, 19, 36, 37	8, 18	
QEP Objective 1b: Demonstrate the ability to analyze local and global environmental issues.	10, 20, 23, 27	2, 21	
QEP Objective 1c: Participate in collaborative projects requiring analysis of environmental issues.	24, 25		11, 32
QEP Goal 2: Exhibit community involvement.			
QEP Objective 2a: Demonstrate understanding of the complex relationships between individuals and communities.	9, 28	7, 40	3, 17, 26
QEP Objective 2b: Demonstrate the ability to analyze sustainability within the context of community.	33,34	1, 15, 16	6
QEP Objective 2c: Participate in collaborative service-learning projects that foster an ecological perspective.	29, 31, 38	39	14, 22, 30, 35

Benchmarks

As approved by the University Colloquium Advisory Committee on November 16, 2009, the benchmarks for this assessment were:

ELI Knowledge Items: Mean score will be 70% overall: a passing score on the knowledge test items (14 items of 20 items total).

ELI Attitude/Behavior Items: Mean post-test score will be a statistically significant increase using a one-tailed paired samples t-test.

CSAS Items: Mean post-test score will be a statistically significant increase using a one-tailed paired samples t-test.

Results

Students in University Colloquium achieved each benchmark. Table 3 documents the pre-test and post-test scores achieved by the students in IDS 3920. With the issues of assessment protocol, instrument length, and student motivation addressed, highly statistically significant gains in learning were demonstrated in terms of positive attitude toward community awareness and ecological perspective and knowledge demonstrating ecological literacy. On the ELI knowledge items, the mean score of 14.13 exceeded the benchmark of 14.0 (63.3% of students, n=463, scored 70% or higher on the post-test). On the ELI Attitude/Behavior items, both the parametric and non-parametric tests indicate a statistically significant increase in the number of responses indicating acceptance of personal responsibility for preserving the natural environment. On the CSAS items, both the parametric and non-parametric tests indicate a statistically significant increase in the number of responses indicating altruism or an orientation to community service.

Table 3. Fall 2010 Pre and Post-test Scores and for ELI Knowledge, ELI Attitudes/Behaviors, and CSAS

	Pretest	Post-test	Post-test – Pretest Difference ⁺⁺⁺
ELI Knowledge (n) ⁺⁺⁺⁺	(792)	(731)	(710)
Median # correct of 20 Items	12.0	14.0	2.0 (z=16.089, df=709, p < 0.001)
Mean # correct of 20 Items (s.d.)	12.01 (2.70)	14.13 (2.67)	2.092 (t=19.357, df=709, p<0.001)
ELI Attitudes/Behaviors (n)	(792)	(731)	(710)
Median Score ⁺ on Ten Items	8.0	9.0	1.0 (z=15.248, df=709, p < 0.001)
Mean Score ⁺ on Ten Items (s.d.)	7.48 (2.14)	8.81 (1.69)	1.313 (t=17.849, df=709, p < 0.001)
CSAS Items (n)	(792)	(731)	(710)
Median Score ⁺⁺ on Ten Items	8.0	9.0	1.0 (z=10.152, df=709, p < 0.001)
Mean Score ⁺⁺ on Ten Items (s.d.)	7.44 (2.50)	8.38 (2.27)	0.941 (t=10.467, df=709, p < 0.001)

⁺ Each item was coded as 1 if response indicated acceptance of personal responsibility for preserving the natural environment, 0 otherwise.

⁺⁺ Each item was coded as 1 if response indicated altruism or an orientation to community service, 0 otherwise.

⁺⁺⁺ It is appropriate to compare mean test scores with a paired samples t-test and median test scores with the non-parametric Wilcoxin test (Kang, 1993). Although the sample size is large and meets the assumptions of the t-test, the non-parametric test is provided because the original attitude/behavior items were ordinal level.

⁺⁺⁺⁺ Paired scores based on smaller sample than pre-test and post-test scores due to students missing testing deadlines, dropping the course, or not completing the course.

Comparison of Campus and Distance Learning Delivery of University Colloquium

IDS 3920 is delivered in person and through distance learning in a virtual classroom setting. The same course content that comprises the in-person sections, including field trips and service learning, is provided through the university's online Angel Learning Management System to virtual sections.

Table 4 provides a comparison of pre-test/post-test performance of the students in virtual sections of University Colloquium with the students who took the course in the traditional classroom setting. Virtual students scored statistically significantly higher on the ELI knowledge component of the combined assessment than on campus students did. There is no significant difference in scores on either attitude/behavior component of the combined assessment.

Table 4. Difference in Pre and Post-test Scores of Distance Learning and On Campus University Colloquium Students

	Virtual ⁺	On Campus	Virtual/Campus Difference ⁺⁺
ELI Knowledge (n) ⁺⁺⁺	(97)	(612)	
Median Post-test - Pretest Score	4.0	2.0	2.0 (z=6.035, p < 0.001)
Mean Post-test - Pretest Score (s.d.)	3.82 (3.142)	1.82 (2.741)	2.009 (t=6.569, df=707, p<0.001)
ELI Attitudes/Behaviors (n)	(97)	(612)	
Median Post-test - Pretest Score	1.0	1.0	0.0 (z=0.005, p < 0.996)
Mean Post-test - Pretest Score (s.d.)	1.35 (1.94)	1.31 (1.97)	0.045 (t=0.210, df=707, p < 0.834)
CSAS Items (n)	(97)	(612)	(710)
Median Post-test - Pretest Score	0.0	1.0	1.0 (z=0.509, p < 0.611)
Mean Post-test - Pretest Score (s.d.)	0.96 (1.93)	0.94 (2.46)	0.021 (t=0.095, df=707, p < 0.925)

⁺Combined assessment was administered online to virtual sections of University Colloquium.

⁺⁺ It is appropriate to compare mean differences in test scores for these groups using an independent samples t-test and median test scores with the non-parametric Mann-Whitney U (Kang, 1993). Although the sample size is large and meets the assumptions of the t-test, the non-parametric test is provided because the original attitude/behavior items were ordinal level.

⁺⁺⁺ Paired scores based on smaller sample than pre-test and post-test scores due to students missing testing deadlines, dropping the course, or not completing the course.

Unanticipated Outcomes

Additionally, there have been a number of other positive results of the QEP that occurred either directly or indirectly associated with the university's emphasis on these two learning goals. A new general education course HUM 2395 Environmental Humanities was introduced in 2007 and readings on the environment have been added along with student reflective essays in two introductory English composition courses. These courses provide a developmental sequence similar to that originally planned for the QEP over five years ago.

Summary

IDS 3920 University Colloquium has become the focal point for ensuring that university learning goals related to community awareness and involvement and ecological perspective are presented to all FGCU undergraduates. An effective assessment protocol has been established and

will be revised to keep pace with ongoing curricular revision associated with the continuing growth of the student body. The university has committed over \$200,000 annually for the continuation of the course which each year enrolls several thousand students and involves the offering of about 90 discrete course sections, more than some academic departments. The University Colloquium Advisory Council continues to provide guidance to the content and assessment of the course; there are three permanent full-time faculty (one designated University Colloquium Coordinator); and one business officer exclusively assigned to the course. None of this infrastructure existed before the QEP.

FGCU's commitment to environmental perspective and community involvement remain fundamental to its mission and to what it believes an FGCU graduate should possess and practice.

References Cited:

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- Kanji, G. K. (1993). *100 statistical tests*. London: Sage Publications.
- McKeown-Ice, R. (1997). Environmental literacy and citizenship assessment instrument: Sample packet. Knoxville, TN: University of Tennessee.
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APPENDIX

Spring 2010 QEP Assessment Instrument*

Your responses regarding Ecological Literacy Knowledge, Attitudes, and Behaviors & Service to the Community

This assessment covers ecological literacy (knowledge, attitudes, and behaviors) and service to the community. Your answers on the pre-test **will not** impact your course grade, but you are required to complete the pre-test. On the post-test, the knowledge questions (not the attitude and behavior questions) will count for 5% of your grade.

We are trying to measure changes in your knowledge, attitudes, and behaviors this semester. As part of that, we are trying to understand your willingness to donate your time regularly in service in the community. By service in the community, we mean a project in which you would volunteer on a regular basis and use your skills and knowledge (more than just volunteering time stuffing envelopes). We are also interested in your attitudes and behaviors regarding the environment and sustainability. Finally, we would like to test your knowledge regarding Colloquium materials (mostly the required readings).

Please choose the best answer for each question.

1. I recycle household products. [Never; Seldom; Often; Always] hereafter [N; S; O; A]

2. Do you believe that we have an ethical responsibility to protect biological diversity and the function of natural ecosystems? [Strongly disagree; Disagree; Neutral; Agree; Strongly agree] hereafter [SD; D;N; A; SA]
3. If you were going to volunteer for a service project in the community sometime in the next year. How likely do you feel it is that you would gain valuable experience for your resume? [Extremely unlikely; Unlikely; Neutral; Likely; Extremely likely]
4. *David Orr looks into the future of the problem of sustainability and says that three crises are looming and include [lack of enough food, exhaustion of fossil fuels, and global climate change]*
5. *In The Land Ethic by Aldo Leopold, which of the following was **NOT** one of the three basic ideas that we should keep in mind when considering human impacts on the environment? [Releasing carbon sequestered in fossil fuels is elevating the risk of climate change]*
6. I am responsible for doing something about improving the community. [SD; D;N; A; SA]
7. In purchasing decorative plants for my yard I would prefer to plant native vegetation over exotic vegetation...[N; S; O; A]
8. When I come across an article in the newspaper, on line, or in a magazine related to conservation of natural resources I would be more inclined to read it... ...[N; S; O; A]
9. *Which of the following characterizes how traditional education is distinguished from progressive education in accordance with the philosophy of John Dewey? [Subject matter consists of bodies of information and skills from the past; The job of the school is to transmit information and skills from the past to the new generation; It imposes adult standards, subject-matter, and methods upon the young; All of the above]*
10. *David Orr provides that there are at least five causes of the crisis of sustainability including the crisis as a "social trap" which is where [people are lured by short-term rewards which have long-term destructive outcomes]*
11. It is important to me to have a sense of contribution and helpfulness through participating in service in the community. [SD; D; N; A; SA]
12. *According to Marjory Stoneman Douglas, where do the Everglades begin? [Lake Okeechobee]*
13. *Everglades restoration is a/an [collection of projects designed to restore the quality and quantity of water flow to the Everglades ecosystem]*
14. I will participate in a service project in the community next year [SD; D; N; A; SA]
15. How frequently will you use your knowledge of ecology to help make decisions on who and what to vote for? [N; S; O; A]
16. How frequently will you use your knowledge of ecology to help guide decisions in your personal life about the use of resources? [N; S; O; A]
17. Without service in the community, today's disadvantaged citizens have no hope. [SD; D; N; A; SA]
18. How frequently will you continue to actively learn about ecological issues? [N; S; O; A]
19. *The underlying surface of the Everglades is [Oölitic limestone or Miami limestone]*
20. *The book that raised concerns about the Everglades and initiated the process for its establishment as a National Park is [River of Grass by Marjorie Stoneman Douglas]*
21. When external or third-party costs are ignored markets tend to overproduce polluting items? [Strongly Disagree; Disagree; Neutral; Agree; Strongly Agree] hereafter [SD; D;A; SA]

22. Service in the community is necessary to making our communities better. [SD; D; N; A; SA]
23. *David Orr wrote that ecological literacy is becoming more difficult because there is/are [less opportunity for direct experience]*
24. *Experiential learning is a phrase coined by David Orr and is popularly associated with [learning by doing]*
25. *David Orr states that the primary difference between being a resident or inhabitant of a place is primarily the [intimacy of the relationship to the place.]*
26. It is critical that citizens become involved in helping their communities. [SD; D; N; A; SA]
27. *According to Richard Louv, we are seeing the emergence of what he calls **nature-deficit disorder** which is a/an [reduction in the amount of time children spend in nature and the apparent repercussions]*
28. *Exotic species in the Florida ecosystem can have a negative impact on native ecosystems because [they may become dominant and monopolize resources]*
29. *Which of the following is NOT an Earth Charter principle? [Technological solutions]*
30. Service in the community is a crucial component of the solution to community problems. [SD; D; N; A; SA]
31. *The Earth Charter was written to be a declaration of [fundamental principles for building a just, sustainable, and peaceful global society]*
32. My contribution to the community will make a real difference. [SD; D; SD; ND; SA; A; SA]
33. *The essence of Aldo Leopold's philosophy of the concept of a land ethic came from evaluating what ethics are and to whom we extend ethical consideration; therefore, if an individual were to develop a land ethic he/she would [consider the effects of our actions on the environment; view ourselves as temporary stewards of the land we 'own'; support government and private initiatives that protect natural resources; all of the above]*
34. *Aldo Leopold's philosophy of the land ethic simply enlarges the boundaries of the community to include collectively [soils, waters, plants, and animals]*
35. I will seek out an opportunity to do service in the community in the next year. [SD; D; N; A; SA]
36. *The dominant marsh vegetation in the Everglades is [saw grass]*
37. *Sustainable living is manifested in the premise of [reduce, reuse, and recycle]*
38. *IDS 3920 University Colloquium supports the premise of sustainable living which is defined as a lifestyle that [does not exhaust natural resources]*
39. Through ecology, we better understand our world. [SD; D; A; SA]
40. Field trips are necessary for helping students to connect theory and practice. [SD; D; A; SA]

*Due to space constraints, knowledge items (in italics) are followed by only the correct response; four choices were given to each knowledge item.