

Biology

Bachelor of Science in Environmental Health Science (47)

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Assessment Progress Report

Degree Program: Environmental Health Sciences

Department and College: Biology/CSAM

Circle one: AA AS BA **BS** BBA Master's EdS JD EdD PhD

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Assessment Plan No. 47

ANNUAL REPORT

July 1, 2005 - June 30, 2006

USE OF ASSESSMENT FOR PROGRAM BUILDING AND IMPROVEMENT:

1. Describe how you have used assessment results to understand, improve, and/or make decisions regarding the program. What changes to your program (if any) have you made or does your information suggest you make?

Based on assessment data and a recently conducted program review, the ENHS Program Director is recommending the following changes: (1) revision of the ENHS program; (2) development of an exit examination; and (3) formation of an advisory committee.

Although the current program has served UALR and the environmental professional community very well, it needs to be updated, refocused and streamlined. Most courses are already in place or have been previously taught as special topics. However, there are some new undergraduate and graduate courses that will be proposed. The title of the program will be changed to better reflect integration of the environmental sciences and toxicology. Also, the existing degree name, Environmental Health Sciences does not provide enough differentiation between the Health Sciences degrees. The focus of the Environmental Health Sciences program curriculum is different than the Health Sciences program. However, this is not as distinguishable to prospective students and/or employers.

Development of an exit examination for the Environmental Sciences and Toxicology program is suggested. A national level certification examination is available. A determination will need to be made by the program director in consultation with the advisory committee as to the appropriateness of the national examination for the revised program.

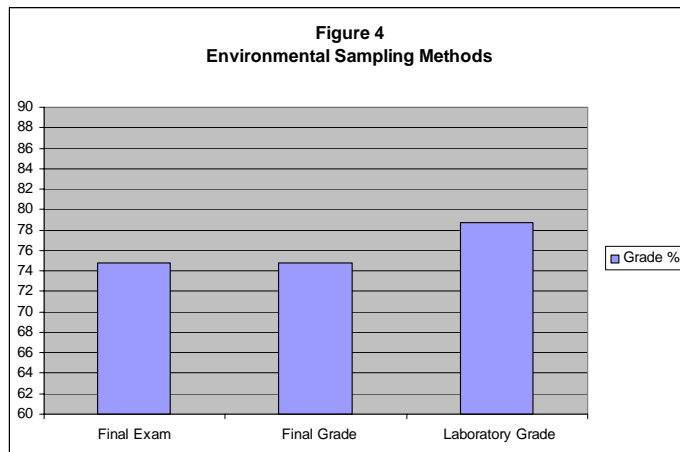
To improve Faculty & Stakeholder input, it is suggested that an advisory committee be formed for the environmental program. The committee membership will consist of graduates, current majors, and representative employers. A committee of 6-8 persons is envisioned. This committee will provide guidance for revision of the program and assist in developing strategies for stakeholder involvement.

2. Describe the findings of the past twelve months' assessment activities. Explain how you interpret these findings.

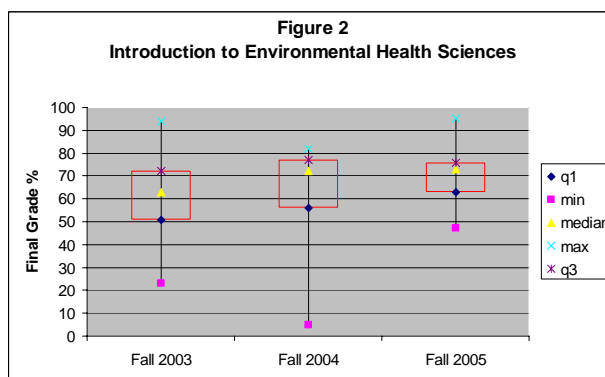
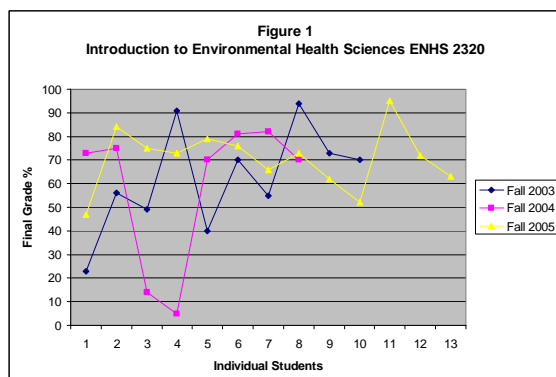
a) **SLO₁**: Feedback was obtained for 4 students enrolled in Enhs 4399 and 4199 (lecture and laboratory), Environmental Sampling Methods, during the Summer 2 term. The focus of this student learning objective is on developing skills in environmental media sampling and use of environmental statistics, environmental sampling instrumentation, and computer databases. A comprehensive lecture final examination was used to measure knowledge attained in the areas identified above. The average score on the lecture examination was 74.8 % with a standard error of 3.50. Scores ranged from a maximum of 84% to a minimum of 68%. The 95% confidence interval for these data is 74.8 % + or – 6.99%. Kurtosis and skewness are -.1308 and +0.8440, respectively. One student was below the minimum target score of 70%. However, the final grades were at 70% and above for all 4 students.

The average score on the laboratory component was 78.8% with a standard error of 6.54. Scores ranged from a maximum of 90% to a minimum of 61%. Kurtosis and skewness are 0.1841 and -1.0778, respectively. One student was below the minimum target score of 70%. Figure 4 compares the average final lecture examination and final grade scores to the final scores for the laboratory component of ENHS 4399 and ENHS 4199, respectively.

The assessment data for **SLO₁** demonstrates a strong relationship between the final examination scores and final grades for Environmental Sampling Methods. Since the same student scored the minimum on both the lecture final examination and the laboratory grade, courses completed and grades were reviewed. Statistics had not been completed by this student prior to enrollment in Environmental Sampling Methods. Prerequisites will be reviewed when the program revisions are drafted.

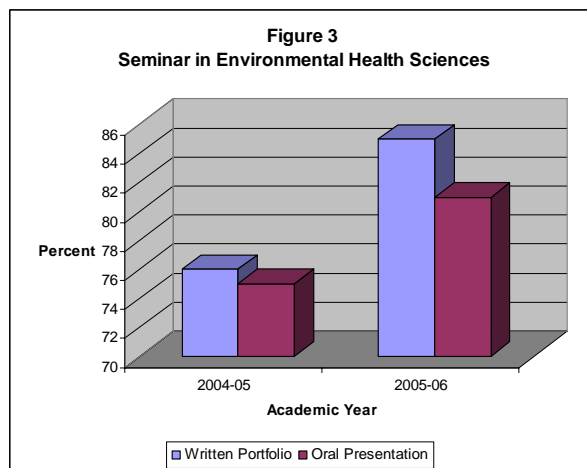


c) **SLO₂**: A comparative analysis of final grades in ENHS 2320, Introduction to Environmental Health Sciences, was conducted for the past three fall semesters, 2003 to 2005. Results from this analysis are shown below in Figures 1 and 2. The box plot in Figure 2 shows that outlier values are present in the Fall 2004 data. Figure 1 shows these values which were 14 and 4 percent. These low values represented two students that did not drop the course and stopped attending class. As shown in Figure 2, median values increased from 63 in Fall 2004 to 73 in Fall 2005. 1st quartile scores have improved consistently with scores of 51, 56 and 63 for fall 2003 to 2005, respectively. These increases reflect students entering ENHS 2320 with greater numbers of science courses completed and better writing competencies. This information will be used to establish prerequisites for the revised program in Environmental Sciences and Toxicology.



b) **SLO₅**: Figure 3 displays portfolio and oral presentation results for ENHS majors enrolled in Seminar in Environmental Health Sciences for the years of 2004-05 and 2005-06. Feedback was obtained for two students for the Fall 2005 semester. The average score on the written portfolio component was 85%, ranging from a low of 76% to a high of 94%. This reflects an increase of 9% over the students assessed in 2004-05. Students scored an average of 81% on the oral presentation component. Scores for this component ranged from a low of 72% to a high of 90%. The average score increased by 6% from the previous assessment average of 71%. These data show significant increases in both the written and oral components as compared to the last

assessment. No students scored below the minimum requirement of 70% for the oral and written components. These accomplishments are a reflection of a greater emphasis on written and oral presentations in prerequisite courses.



FACULTY AND STAKEHOLDER INVOLVEMENT:

3. Describe how the faculty in your program were involved during the year in the assessment process and in decisions made as a result of assessment.

The Program Director still remains the only full-time faculty member serving the Environmental Health Sciences program with part-time (adjunct) faculty representing the only other resources directly involved in the ENHS program. Informal meetings are held with part-time faculty to get their feedback concerning assessment of the ENHS program. Suggestions from these individuals are very helpful because they represent prospective employers in the private and public sectors. Additional interaction also occurs between full-time faculty within the Biology degree programs. The Department of Biology is planning a survey which will include the ENHS program.

4. Describe how other stakeholders (e.g., students, alumni, employers) were involved during the year in the assessment process and in decisions made as a result of assessment.

Students and alumni are involved in assessment of the ENHS program through two mechanisms: (1) a committee of the Student Chapter of the National Association of Environmental Professionals provides feedback concerning the assessment process and makes recommendations concerning curricular matters; and (2) email has been used extensively by the Program Director to maintain contact with program alumni. Alumni are asked to provide feedback concerning their academic preparation and relevancy to their jobs. Employers are involved in the assessment process through the existing cooperative education and internship programs.

Results of ENHS assessment activities are distributed to program stakeholders through the channels above. The Program Director will continue to evaluate the effectiveness of internet conferencing for distributing assessment information and receiving feedback. If successful, it

will be expanded to form an advisory committee for the ENHS program consisting of alumni, current students and employers.

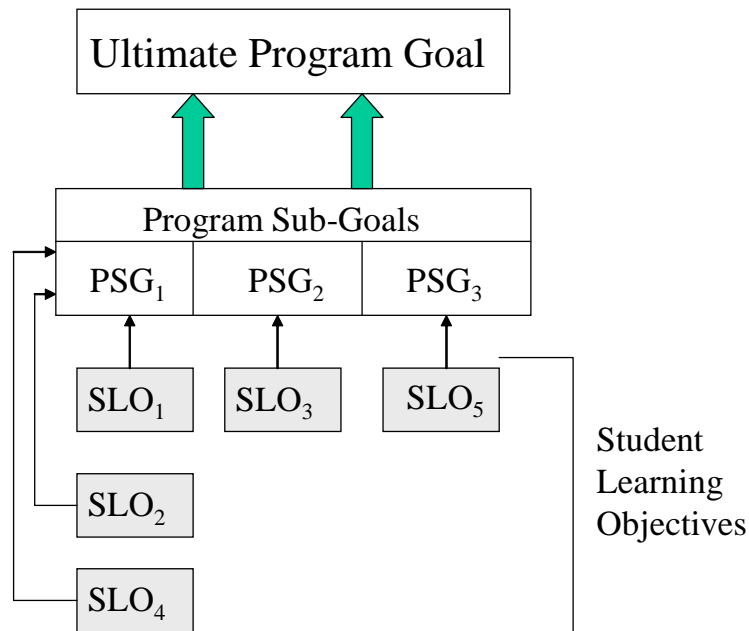
APPROACH:

5. State the goals of your program.

The ultimate goal of the Environmental Health Sciences Program (ENHSP) is to provide graduates with interdisciplinary knowledge and skills necessary to address critical environmental issues and promote sustainability of human and natural ecosystems. Technical and analytical skills are key components of the ENHSP. Social and cultural awareness as they relate to environmental problems are also emphasized in the program. Application of knowledge and skills attained by students is promoted through the curriculum, community research projects, environmental education activities in schools, and internships and cooperative education opportunities at the local, state and national levels. These program activities coincide with the comprehensive mission of UALR to serve the community and state. The ENHSP program further supports UALR's mission through inclusion of international environmental issues in its curriculum. Figure 1 presents a schematic of the assessment program model for Environmental Health Sciences.

Goals and Objectives Model

Figure 1



Specific program sub-goals (PSGs) are as follows:

PSG₁: provide students with technical knowledge and skills deemed appropriate for environmental professionals

PSG₂: promote a sense of environmental professionalism within each student

PSG₃: each student will demonstrate proficiency in written and oral communication skills required of environmental professionals

6. State the central student learning objectives (SLOs) of the program.

SLO₁: to show competencies in environmental sampling system design and application for individual and multimedia site requirements

Assessment will be conducted using a combination of a faculty-constructed examination and site-simulated demonstration methods. **The written portion of the assessment must be passed by each student to qualify for the demonstration component.** Assessment will consist of a closed-book multiple choice examination with 40 questions each in the following content areas:

sampling statistics, air media, water media, solid & hazardous waste and soil media. A minimum score of 70% is required for each of the five content areas. Students failing to achieve a score of 70% on any component will be allowed to retake the examination for the appropriate component(s).

The demonstration component will be open-book with a scenario that integrates the five content areas. Based on this scenario, each student will be required to prepare a comprehensive environmental sampling plan. Grading of the demonstration component will be conducted using a scaled environmental sampling plan criteria checklist. A minimum score of 70% is required to pass the demonstration component.

SLO₂: to gain an understanding of environmental concepts and skills establishing the basis for human and natural ecosystem interaction

Assessment will be accomplished using an examination provided by the Institute of Professional Environmental Practice (IPEP). This examination is closed-book and consists of multiple choice questions designated as general environmental science. Students will take this examination during their senior year. A passing score of 70% must be achieved on all content sections of this examination. A failing score requires that the examination be repeated. Students passing the examination will be given the designation of “Environmental Professional Intern” (EPI) when evidence that they have completed the baccalaureate degree is received at the IPEP.

SLO₃: to increase awareness concerning environmental professionalism and its associated responsibilities

Assessment will be accomplished using observation of student behaviors and interaction with faculty and other students. Observation will be conducted in course settings and at meetings of environmental professionals. Internship and Cooperative Education experiences will also provide opportunities to assess student professionalism. Assessment of behaviors will be conducted through laboratory/field courses within the ENHSP curriculum that require extensive group interaction. The UALR Chapter of the National Association (NAEP) and attendance at seminars and meetings of environmental professionals will be used to assess interaction outside the academic setting. Internship and Cooperative Education experiences are already available as assessment tools within the ENHSP.

SLO₄: to develop skills in environmental risk analysis and use of environmental statistics, environmental epidemiological methods, and computer databases

Assessment will be accomplished by using performance-based assessment methodologies. A series of environmental problems will be assigned to each student that require epidemiological designs, manipulation of data files and statistical analysis using computer-based methods. Problems will include demonstration of risk assessment methodologies.

SLO₅: to show proficiency in environmental report writing, document preparation and associated oral communication skills

Assessment will be accomplished using a combination of performance measures and a portfolio. Research and oral communication skills will be measured through the Seminar in Environmental Health Sciences (ENHS 4190) which is required of all ENHSP majors. Students will also demonstrate environmental report writing and document preparation by assembling a portfolio of work required for the Seminar.

7. Explain the method(s) used to measure the objective(s) assessed this year, explaining (a) the rationale for the method; (b) the procedures used for collecting the data, including decisions regarding which students were assessed and when; (c) the procedures and criteria used for evaluating the data; and (d) how reliability and validity were addressed in regard to this method.

SLO₁ measurement was accomplished by using both written and performance-based assessment methodologies. A series of environmental problems will be assigned to each student that require environmental sampling designs, manipulation of data files and statistical analysis using computer-based methods. The comprehensive final examination administered in Enhs 4399 and 4199 (lecture and laboratory), Environmental Sampling Methods, was used to assess performance of **SLO₁**.

SLO₂ was measured using the average of 4 module examinations administered in ENHS 2320, Introduction to Environmental Health Sciences, over a period of three years. This course will be modified in the revised program curriculum. The assessment approach will also need to be modified and will include pretest and exit examination components.

SLO₅ assessment includes a portfolio and oral presentation of each student's research results. The portfolio was selected for two reasons: (1) The entire research process completed by each student can be readily evaluated; and (2) Each student can use the portfolio as evidence of their independent research and writing skills when requested by employers or graduate schools. The oral portion is assessed by the Program Director using the evaluation form previously submitted with assessment materials. All majors in the Environmental Health Sciences program are required to complete the Seminar course during their senior year. A total of two students were assessed during the fall 2005 semester. These students completed ENHS 4190, Seminar in Environmental Health Sciences, which required preparation of a research portfolio and oral power point presentation of the research findings.

8. Summarize last year's feedback. Explain any changes you made in your approach to assessment, either in response to this feedback or for other reasons.

The ENHS programs assessment scores for 2004-05 were 2.0, 2.2 and 2.9 for Use, Faculty & Stakeholder, and Approach, respectively. This compares to the overall CSAM averages of 2.4, 3.2 and 2.9 respectively. Therefore, the assessment approach is reasonable, but Use and Faculty

& Stakeholder are limited. A concerted effort was made this year to focus on the “Use” component.

9. Provide a time frame for your assessment activities by indicating which objective(s) the program faculty assessed in the past few years, which objective(s) were assessed this year, and which objective(s) will be assessed in the next few years.

Assessment SLOs and Student Learning Sub-objectives (SLSOs) for 2005-06

- **SLO₁: to show competencies in environmental sampling system design and application for individual and multimedia site requirements**

SLSO_{1.1} - a minimum score of 70% on both the written and demonstration components as administered in Enhs 4399 and 4199, Environmental Sampling Methods (lecture and laboratory), will be achieved by all students taking this examination.

- **SLO₂: to gain an understanding of environmental concepts and skills establishing the basis for human and natural ecosystem interaction**

SLSO_{2.1} - the median final grade score for those students completing ENHS 2320, Introduction to Environmental Health Sciences shall be 70% or greater.

- **SLO₅: to demonstrate proficiency in environmental report writing, document preparation and associated oral communication skills**

SLSO_{5.1} - a minimum score of 70% will be achieved by all students on the written portfolio component required for Seminar in Environmental Health Sciences (ENHS 4190)

SLSO_{5.2} - a minimum score of 70% will be achieved by all students on the oral presentation component required for Seminar in Environmental Sciences Health Sciences (ENHS 4190)

Objective Assessment Time Chart

Student Learning Objectives	2003-04	2004-05	2005-06	2006-07	2007-08
SLO ₁			X	X	
SLO ₂	X			X	X
SLO ₃					
SLO ₄		X		X	X
SLO ₅	X	X	X		X

ASSESSING ASSESSMENT:

10. Evaluate your assessment progress: what are the strengths and weaknesses of your work thus far?

Strengths

The assessment plan for the ENHS program contains objectives that are measurable and blend both performance-based outcomes with those representing technical knowledge and communication skills. These objectives have a strong linkage to the overall ENHS program goals. This is reflected through the excellent employment success of ENHS program graduates.

Weaknesses

As last year, more effort needs to be extended to develop methods for collection and analysis of data associated with the ENHS program assessment. However, additional time was spent by the Program Director conducting data analysis in response to the limited evaluation of the “Use” component for the 2004-05 assessment. Revision of the environmental program will be conducted with a more strategic focus on key program measurement points.

11. Estimate the amount of time and money that you spent this year on assessment. If you received funding, please list the amounts and sources. What additional resources would be helpful, and what would you do with such resources?

A total of \$600 was spent to develop Geographic Information Systems (GIS) capability in the Biology Department computer laboratory. This GIS software will support assessment activities for the ENHS degree program as well as the Biology degree program. Approximately 24 hours (includes assessment activities for the Biology 1400 core course) were spent by the Program Director on ENHS program assessment related activities this past year. In the past, requests for assessments funds to the support the Environmental Health Sciences program have been

combined with those of the total Biology Department. It would be beneficial to provide a separate allocation for the Environmental Health Sciences Program.

12. What changes, if any, would you recommend to the assessment process in your college or in the university as a whole?

It is suggested that assessment for each program be conducted every other year. This would mean that data would be collected for two years as opposed to the current one year cycle. It is very difficult to make changes based on recommendations of the reviewers, collect data and plan for future assessment activities within a one year time frame. Also, the ability to hire students to work on assessment tasks would be very helpful. The linkage of program reviews, strategic plans and program assessments would offer some important benefits.