Program Assessment Report (PAR)

Environmental Sciences (ENVS) Doctoral Degree

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ACADEMIC YEAR COVERED BY THIS REPORT: [AcademicYear]

I. PROGRAM LEARNING OUTCOMES

1. Graduates will be proficient in laboratory methods and strategies appropriate for their area of investigation within the environmental sciences. 2. Graduates will have a mastery of knowledge appropriate to their course of study in core courses, advanced courses, and from the scientific literature. 3. The student will have a background in the interrelationships of biology, chemistry, and geology. They will possess an understanding of fundamental ecological processes applicable to environmental resources management. 4. The student will have an awareness of public health, environmental regulations and management issues associated with environmental quality, as well as the skills to address these issues with practical solutions. 5. The student will process analytical skills to create informed solutions. They will have skills to define problems, formulate hypotheses, design and carry out experiments, and interpret environmental data.

II. PROCEDURES USED FOR ASSESSMENT

A. Direct Assessment

We examined oral and written performance on preliminary exams and proposal defenses for the students who attempted these important milestones during the year. We assessed graduating students at their defense using a defense rubric, and solicited exit surveys from them. We looked at other performance indicators in all students across the program, including numbers of papers, presentations, and outreach activities. The dissertation committees of each student perform many of these assessments, with the the program administrators doing the rest.

B. Scoring of Student Work

We first examine performance on the preliminary exam, which primarily addresses outcomes 2 and 5 of our current list. The preliminary exam is multifaceted. It consists of a ~25 page written paper on a topic assigned by the dissertation committee of the student. In the written document, students are asked to do a literature review on a topic related to the dissertation research, identify gaps in our knowledge, and propose approaches for addressing those gaps. The written component tests knowledge of content, critical thinking, hypothesis generation, experimental design, and writing ability. The students are also required to give an oral presentation of the exam and defend their work orally to the committee. Thus, it also tests the ability to produce an effective presentation, communicate orally, and answer questions on subjects pertinent to the student's scientific area of emphasis. The dissertation committee of five faculty members (including one external to Wright State) critically evaluates each component, providing a score of pass, fail, or defer subject to revision on both the oral and written component. We examined first-time passage rate and overall passage rate, and reviewed the comments provided by each committee in their reports to the program office. Occasionally, preliminary exam documents have been revised for publication as a review paper. We also assessed passage rates on proposal defenses which also assess components 2 and 5 of the program learning outcomes, and additionally, adds outcome 1 which is more focused on technical or methodological aspects of a student's program. Finally, an overall assessment of the learning outcomes obtained by the student throughout their program is performed at the dissertation defense for each student. The dissertation committee assesses each student using an extensive rubric with each element on a four point scale. The rubric addresses nonverbal and verbal skills, enthusiasm, physical content, terminology, logic, data analysis and presentation, student knowledge, effectiveness and mechanics of the presentation and conclusions.

C. Indirect Assessment

All students are asked to submit an exit questionaire at their graduation as an indirect assessment of student learning.

III. ASSESSMENT RESULTS/INFORMATION:

One student attempted the preliminary exam and passed the oral component, but was asked to revise aspects of the written document and thus were weaker in at least one aspect of the exercise. This student was successful in their second attempt. Two of two students passed their proposal defense during the reporting period. Scores on the defense assessment using our rubric averaged 2.59/3 for the five students who defended their dissertation during the reporting period, with a score of 3 indicating "exemplary" performance on an indicator. The current overall average is 2.42/3 across the eight years that we have utilized this tool. Overall scores on exit surveys from three students graduating during the reporting period averaged 3.81/4 (with 4 being a response of "strongly agree") on a series of questions about program quality and the student learning experience (see attached). The current overall average across all years is

3.49/4, indicating that satisfaction of recent graduates is slightly higher than the historical average. Students were co-authors on approximately 25 papers during the reporting period and 20 presentations. Attendance at scientific meetings was affected by Covid-19 restrictions. Students participated in numerous outreach activities, including sharing knowledge and expertise with school and community groups, museums, 4H clubs, and various online outlets for scientific news. Several students were active and some successful at grant writing and recieved small grants from organizations like the Graduate Student Assembly at Wright State.

All student attempting their preliminary exam or proposals passed during the reporting period. Students defending their dissertations have typically recieved high scores on the defense rubric that we administer, indicating excellent achievement of learning outcomes by our students, as judged by their disertation committees. Exit surveys of students indicate a high degree of satisfaction in the program by the students. While there is variation in productivity (e.g., papers, presentations, outreach, grant submissions) among students and discliplines represented in the program, there is a particularly high degree of productivity in many of our senior students as they near the end of their program that also extends for a year of two afterward. This is an important "stamp of approval" by the larger scientific community.

By all measures, our students are generally showing high attainment of desired learning outcomes.

IV. ACTIONS TO IMPROVE STUDENT LEARNING

Performance of our students has generally been commendable, and all students who attempted the preliminary exam or proposal defenses during the year were ultimately successful even if revision was necessary. Most current students are productive, although this varies somewhat from laboratory to laboratory, and graduating students have a very favorable view of the program. Should significant issues arise, we will address them as needed. At the moment, further efforts on assessment will include revising the program assessment plan to match our current areas of expertise, as well as further implementation of new assessment tools to use in our core courses. These findings will be shared with program faculty and administrators.

V. SUPPORTING DOCUMENTS

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.