Student Learning Outcomes Assessment Summary

Physics MS

UAF CNSM

2016-18

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1. Assessment information collected

The graduate SLOA process in the Department of Physics has been revised in 2016. Therefore only a short record of data collection exists and this report still suffers from data gaps that we hope to fill by a more rigorously planned collection effort in the coming years. The metrics and tools used in this report are

(1) Annual progress assessment form

(2)Attachment to annual report

(3)Thesis evaluation form

(4)Teaching/communication evaluation form

(5)Exit survey form

(6)Alumni survey form

Annual progress assessment. This assessment is completed at every student's annual committee meeting and any other event (e.g. defenses and oral comprehensive exams). The assessment categories range from general knowledge of the field to knowledge of the publication process.

Attachment to annual report. Information about student publications, presentations, awards, applications, proposals, and teaching activities is collected electronically.

The **thesis evaluation** is completed by all advisory committee members and the department chair. It is anonymous and not used to grade individual students. Evaluation categories cover all the major aspects of original scholarly activities from literature survey to quality of writing.

Teaching/communications evaluation. Most incoming graduate students undergo ~1 week of training followed by 2 semester-long teaching seminar classes of 1 credit each. The purpose of the training and seminar classes is: 1) Improve teaching skills (partially to turn students into good TAs but also good teachers), 2) introduce students to active

learning techniques, 3) Improve ability to communicate to all audiences (from Physics PhD to general public to professional groups). The students are all evaluated based on an evaluation rubric during that first week, in the middle of the first semester, in the middle of the second semester and at the end of the second semester. In addition direct input from the students on what works and does not work is taken at the end of each semester.

Exit survey. A survey of all graduating students, as well as those who leave the program without a degree. Data on the Exit Survey are sparse, because it was not consistently completed in the review period. This is partly due to administrative changes.

Alumni survey. An alumni survey has been developed based on the American Institute of Physics template. The survey is anonymous and questions range from alumni's assessment of advisors to their preparedness for various professional activities.

2. **Conclusions drawn from the information summarized above**

Annual progress assessment. We evaluate students in the following categories:

1) General Knowledge of Field
2) Specific Knowledge of Literature
3) Ability to Critically Analyze Literature
4) Technical Abilities
5) Analytical Abilities
6) Oral Presentation Skills
7) Written Communication Skills
8) Knowledge of Peer-reviewed Publication Process

These assessments are done at each Annual Committee Meeting and at the MS defense. We analyzed 13 responses that covered the full range from first year to graduating students. We find that a large proportion of students meet or exceed expectations in the various categories (ranging from 89% to 100%). The weakest categories were 'Written Communication Skills' and 'Knowledge of Peer-reviewed Publication Process'. These received one rating of 'Below Expectations' each. These might very well be outliers, but the categories should be watched in future reports to see if results are consistent. In the last SLOA, this metric was not yet in place, so we do not have earlier data to compare to.

Attachment to annual report. Each graduate student is asked to fill out an annual survey in which we collect information on papers published, conferences attended, honors/ awards received, and grants applied to. This survey is primarily targeted at PhD students, whom we expect to produce peer-reviewed papers and presented at meetings. Data collection was problematic for this category, and we have only one response.

Thesis evaluation. Each MS thesis is evaluated by committee members and the department chair with a score ranging from 'Fair' (score of 1) to 'Excellent' (score of 5) in the following categories:

1) Introduction
2) Literature Survey
3) Motivation for the Study
4) Methodology
5) Description of Experiment
6) Results of Publishable Quality?
7) Discussion of Results
8) Conclusions Supported by Results
9) Format
10) Quality of Diagrams
11) Quality of Writing

For the Physics MS we only have 4 responses to evaluate. The responses range from an average of 3.9 (for 'Motivation for the Study') to 2.6 (for 'Format'). The two weakest categories ('Format' and 'Quality of Writing') perform much better in the other Physics graduate degree programs (PhD Physics and PhD Space Physics), which leads us to believe that this is an outlier.

Teaching/communications evaluation. All TA's are evaluated at the beginning, in the middle, and at the end of the academic year according to an evaluation rubric that covers presentation skills, preparedness, content, and answering questions. While scores at the beginning of the semester vary greatly, we consistently observe improved in all students during the year. We therefore judge our TA training as successful and effective.

Exit survey. We only have one single Exit Interview that was carried out. In it we query about a number of issues regarding satisfaction with the Physics program, UAF in

general, and resources and help provided. The response to these questions was overwhelmingly positive (average of 4.5 out of 5).

Alumni survey. We surveyed 3 Alumni who had spent between 3 and 4 years at UAF. One of them currently holds a job in private industry, while the other two work at educational institutions. Two alumni indicated that "if they had to do it again" they would again choose the Physics MS program at UAF. However, one response indicated that the alumnus would choose a different subject, because she/he felt that a MS degree in Physics provides few employment opportunities outside of high school teaching.

All respondents were employed in their current jobs after a year or less past graduation. They responded to the following questions on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree):

- My advisor encouraged me in my academic goals (5)
- My advisor encouraged me in my career goals (4.3)
- My advisor encouraged me to excel in research (4.7)
- My advisor was accessible (4.7)
- My advisor was easy to discuss ideas with (4)
- My coursework was challenging and engaging (4.7)
- The breadth of my coursework was adequate (4.3)
- My coursework prepared me for research (3.7)
- My coursework was vital for my professional and/or post-graduate activities (2)
- Was your graduate degree appropriate for the position (4.3)

This generally indicates a high satisfaction with the degree program and shows that students are well-prepared for their future jobs.

We also asked alumni about specific tasks in their jobs (from customer interaction and teamwork to applying specific skills in physics, programming, problem solving, etc. No consistent theme emerged from those answers, except that two out the three respondents rated 'Knowledge of basic Physics' as very important in their current job.

3. **Curricular changes resulting from conclusions drawn above**

At this stage we are not proposing any curricular changes. Generally, the program appears to be doing well in all assessment categories. This assessment does suffer from low number statistics, however. These responses should therefore also be evaluated in the longer term, now that assessment plans and strategies for data collection are in place.

4. **Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting**

The department continues to consider all aspects of the SLOA process, up to and including the proposal and implementation of curricular changes, as a body of the whole. Discussions on curricular assessment are taken up via regular agenda item at the beginning of each fall, subsequent to the receipt and compilation of student surveys and evaluations.
The graduate SLOA committee consists of Martin Truffer (chair), David Newman, and Peter Delamere.

5. **Has your SLOA plan been updated to include assessment of the program's Communication Plan, as required by Faculty Senate motion? (required for baccalaureate programs only)**

N/A