MS in Molecular Biotechnology 2019-20 Learning Outcome Assessment Report

Learning Outcome 1 – Mastery of Field

Methods

We assessed students' mastery of their field using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey addressing this learning outcome included "Mastery of Field" and "Mastery of Current Literature in Field", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Because our current data set for MS Biotech students for Learning Outcome #1 is very small, with information for only a single student from 2019, we combined the data for 2019 with the two students assessed from the 2018-19 time period for a total of three students. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

Results

Two of the three MS-Biotech students completing their program in 2017-2019 obtained a minimum mean score of 3.0 from their committee members on the "Mastery of Field" question (67%), but only one obtained a minimum of 3.0 on the "Mastery of Current Literature" question (33%). The average score across the two students was 3.11 for "Mastery of Field" and 2.78 for "Mastery of Current Literature". The proportion of students (67% and 33%) meeting the minimum standard falls below our stated goal of 75% for both questions.

2019-20 MS-Biotech Program Learning Outcome Assessment - Mastery of Field

Student	1	2	3	Mean
Mastery of Field	2.33	3.00	4.00	3.11
Mastery of Current Literature	1.67	2.67	4.00	2.78

Total number of students	3
Students scoring ≥ 3.0 on Q1	2
Percent of students, Q1	**67%**
Students scoring ≥ 3.0 on Q2	1
Percent of students, Q2	**33%**

Learning Outcome 2 – Mastery of Research Design and Methods

Methods

We assessed students' mastery of research design and methods using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey addressing this learning outcome included "Mastery of Research Design" and "Mastery of Research Design and Execution", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Because our current data set for MS Biotech students for Learning Outcome #2 is very small, with information for only a single student from 2019, we combined the data for 2019 with the two students assessed from the 2018-19 time period for a total of three students. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

Results

In 2017-2019, two of the three MS-Biotech students completing their program in Biological Sciences obtained a mean score of at least 3.0 from their committee members on the "Mastery of Research Design" and the "Mastery of Research Design and Execution" questions. The average score across the three students was 2724 for "Mastery of Research Design" and 2.67 for "Mastery of Research Design and Execution". The proportion of students (67%) meeting the minimum standard for each question falls below our stated goal of 85%.

2019-20 MS-Biotech Program Learning Outcome Assessment - Mastery of Research Design and Methods

Student	1	2	3	Mean
Mastery of Research Design	1.67	3.00	3.50	2.72
Mastery of Research Design and Execution	2.00	3.00	3.00	2.67

Total number of students	3
Students scoring ≥ 3.0 on Q1	2
Percent of students, Q1	**67%**
Students scoring ≥ 3.0 on Q2	2
Percent of students, Q2	**67%**

Learning Outcome 3 – Mastery of Communication

Methods

We assessed students' mastery of research design and methods using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey addressing this learning outcome included "Mastery of Communication" and "Mastery of Written Communication", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding). We also distributed an exit survey will be given to each student to report the number of national or regional conferences they attended, the number of posters or oral presentations given, and the number of publications they had submitted or accepted in peer-reviewed journals at the time of their defense.

Because our current data set for MS Biotech students for Learning Outcome #3 is very small, with information for only a single student from 2019, we combined the data for 2019 with the two students assessed from the 2018-19 time period for a total of three students. Scores were averaged across respondents for each of the questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here. The percent of students meeting the minimum criteria for meetings attended, presentations given, and publications submitted or accepted in peer-reviewed journals will be reported.

Results

Only 67% of MS-Biotech students completing their program in 2017-2019 obtained a mean score of at least 3.0 from their thesis committee members on the “Mastery of Communication” and for the goals and results portions of the “Mastery of Written Communication” questions. The average score across the eight students was 3.22 for “Mastery of Communication” and 3.33 and 2.94 for the goals and results portion of the “Mastery of Written Communication” questions, respectively. Only one student (33%) obtained a satisfactory score for the methodology portion of the “Mastery of Written Communication”. All questions fell below our stated goal of 80% for this Learning Outcome.

2019-20 MS-Biotech Program Learning Outcome Assessment - Mastery of Communication

Student	1	2	3	Mean
Mastery of Communication	2.67	3.00	4.00	3.22
Mastery of Written Communication: Goals	2.00	4.00	4.00	3.33
Mastery of Written Communication: Methods	2.33	2.50	4.00	2.94
Mastery of Written Communication: Results	2.33	3.00	3.50	2.94

Total number of students	3
Students scoring ≥ 3.0 on Q1	2
Percent of students, Q1	**67%**
Students scoring ≥ 3.0 on Q2.1	2
Precent of students, Q2.1	**67%**
Students scoring ≥ 3.0 on Q2.2	1
Percent of students, Q2.2	**33%**
Students scoring ≥ 3.0 on Q2.3	2
Percent of students, Q2.3	**67%**

Two of the three MS-Biotech students attended a regional or national meeting during the course of their program (short of our goal), but all three gave at least one presentation (meeting our goal). Only one of the three students published or submitted a paper at the time of their defense.

2019-20 MS-Biotech Program Learning Outcome Assessment - Mastery of Communication

Student	1	2	3	Mean
# Meetings Attended	0	1	1	0.67
# Posters + Talks	4	3	1	2.67
# Publications Accepted + Submitted	0	0	1	0.33

Total number of students	3
Students with a meeting attended	2
Percent of students, meetings	**67%**
Students with a presentation	3
Precent of students, presentations	**100%**
Students with a paper	1
Percent of students, papers	**33%**

Learning Outcome 4 – Mastery of Work

Methods

We assessed students' mastery of their work using a survey distributed to the thesis committee within 10 days of the thesis defense. The question on the survey addressing this learning outcome included "Mastery of Work", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Because our current data set for MS Biotech students for Learning Outcome #4 is very small, with information for only a single student from 2019, we combined the data for 2019 with the two students assessed from the 2018-19 time period for a total of three students. Scores were averaged across respondents for each of the questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

Results

One of the MS-Biotech students (33%) completing their program in 2017-2019 obtained a minimum mean score of 3.0 from their committee members on the "Mastery of Work" question; the average score across the two students was 2.83. This proportion of students meeting the minimum standard falls below our stated goal of 70%.

2019-20 MS-Biotech Program Learning Outcome Assessment - Mastery of Work

Student	1	2	3	Mean
Mastery of Work	2.33	2.67	3.50	2.83

Total number of students	3
Students scoring ≥ 3.0 on Q1	1
Percent of students, Q1	**33%**

2020-21 Action Plan

Data were too few from the 2018-20 assessment results to determine rigid action plans, and thus our three action items for the 2020-21 academic year remain unchanged from last year's report:

1. Continued and improved emphasis on student familiarity with the current literature and the major issues in their fields. Emphasis will take place in coursework where possible but also within individual laboratories.
2. Continued emphasis on communication of research by students, particularly oral communication in the form of presentations at meetings. We note a significant number of publications among the MS students, but fewer opportunities to present their research compared to our PhD students.

3. Continued and improved emphasis students' mastery of their work, as evidenced by their ability to openly reason and answer probing questions of their research.

Timeline for Action Plan

A timeline for the implementation of the action plan for the 2020-21 academic year remains similar to last year, as follows:

1. Student familiarity with the current literature and the major issues in their fields will continue to be emphasized in courses and individual laboratories. The department will emphasize the importance of these issues to all PIs having MS students in their labs, with significant improvements expected within 3 years.
2. The department will continue to emphasize the importance of presenting MS students with oral opportunities to present their research in Fall 2020.
3. Student mastery of their work will continue to be emphasized in courses and individual laboratories. The department will continue to emphasize the importance of MS students' abilities to reason and answer questions about their research, with significant improvements expected within 3 years.