Academic Program
Assessment Report

Marine Science	Fall 2011 to Spring 2012
Academic Program	**Assessment Period Covered**
(x) Formative Assessment	Fall 2012
(x) Summative Assessment	**Date Submitted**

Academic Evaluation Question 1

Are students able to state the factors that influence the primary productivity in the oceans and illustrate how it affects the biomass of living forms in the ocean realm?

First Means of Assessment for Evaluation Question Identified Above:

1a. Means of Unit Assessment & Criteria for Success: ***Oceanography Fall 11 and Spring 12*** Examination: MR 240: Evaluation of examination questions to determine the level of student knowledge gained.

1a. Summary of Assessment Data Collected:

Some background knowledge is needed before students can be expected to accurately comprehend the above academic evaluation question. Nevertheless, the outcomes SLO 5.3 and 7.2 (Oceanography MR-240) were retained as a means to directly assess the students on this rubric. Both F11 and Sp12 sessions are covered in the present analysis. There were 4 tests given per semester in each course. When pooling all questions contained in the 4 tests within a given session, students obtained an average of 31.7% in F11 as opposed to 59.0% in Sp12 for SLO 5.3. The significant rise in the average grade in Sp12 is likely due to the fact that more emphasis was placed on this particular outcome during the lectures in Sp12. Relative to SLO 7.2, similar averages were obtained in both sessions: 52.1% in F11 as opposed to 52.0% in Sp12. But overall, these averages remain low.

A number of reasons could explain these relatively weak averages for both SLOs. One of the challenges facing the COM-FSM students is their difficulty in making "associations" between concepts. In turn, this weakness hinders their capacity of gaining an "overall" view of a given problematic and in seeing the "interconnectedness" between various concepts. Another problem students need to overcome is the written skills. Many students have difficulty is expressing both in written and oral format chain of events and well-structured texts. Another problem is that a number of students simply do not engage seriously in their studies. This is well observed when giving home quizzes. Some will not even bother turning in the assignments or if turned in, the assignment is only half done. Others will simply copy from colleagues. Other examples are class quizzes. Students are advised in advance of the quiz and they are guided on the specifics covered on the upcoming quiz. Yet, many students will do very poorly. The only explanation for this is that they simply have not bothered to study. A number of times, I asked them directly how come that failed on the quiz. They usually answer that they did not prepare for it. Finally, another element which impacts the overall grades in a number of marine related courses is that some of these courses are listed as "open electives" which means that any student needing a 4 credit science (science with lab) elective can follow such courses. This is the case with oceanography (MR-240) and

marine biology (MR-120). Consequently, a number of students registered to these courses "non-major" and are not necessarily interested in the content. They are simply there to get the credits for their degree. They know that they will not continue on in the field.

1a: Use of Results to Improve Unit Services:

A way which might give positive results would be to promote and encourage students to use the student support services available to them such as the writing center associated with the literature language division. Another way could be to give them a number of practical assignments where they need find answers to practical questions. Again, as we have done in previous semesters, emphasis will be placed on having the students assimilate and master the associated scientific vocabulary hoping that it will enhance their overall understanding and capabilities of expressing the given concepts.

Second Means of Assessment for Evaluation Question Identified Above:

1b. Means of Unit Assessment & Criteria for Success: ***Fisheries Biology (MR-250) Spring 12***

Examination: MR 250: Evaluation of examination questions to determine the level of student knowledge gained.

1b. Summary of Assessment Data Collected:

As in the previous comment given for Oceanography (MR-24), some background knowledge is needed before students can be expected to sufficiently comprehend the above academic evaluation question. In Fisheries Biology, this rubric is measured through the General-Student Learning Outcome 2 (G-SLO 2). Various questions linked to this G-SLO 2 have appeared in various tests over the course of the semester. When pooling these questions, the average grade obtained was 70%. This percentage reflects a marked difference from the much poorer results compiled in the Oceanography course. There is a relatively simple explanation to this difference. As mentioned above, some background knowledge is needed before students can master a concept. Since Fisheries Biology, is a more advanced course with a number of required pre-requisites, such background knowledge has now been gained and students are better tooled to grasp the concept and to be capable of describing it either in written or oral format.

1b: Use of Results to Improve Unit Services:

At this academic level, the students show greater maturity and are more enthusiastic in learning. They appear to better comprehend the value of the knowledge acquired and how it will be useful in their future endeavor. One way to enhance the course would be to multiply the number of examples showing the intimate link between the ocean productivity and the economic gains derived by such wealth, in particular the fishing industry. This is particularly true for the FSM where their major source of income derives directly from the fisheries: their offshore fisheries being so productive because of the equatorial upwelling system; while their inshore (coastal) fisheries being productive because of the coral reef ecosystem, one of the most highly productive marine ecosystems.

Academic Evaluation Question 2

Do students communicate biological/scientific information effectively in written, oral, or visual presentation formats?

First Means of Assessment for Evaluation Question Identified Above:

2a. Means of Unit Assessment & Criteria for Success: ***MR 254 Field Study Spring 12***

Students will report data and conclusions in visual/presentation format. Rubrics used to score coral reef survey projects emphasizing communication of scientific knowledge in a PowerPoint presentation. Completion and demonstration of the basic components of scientific methodology including the expression and interpretation of scientific data collected by the students should be seen as effective communication for this outcome.

2a. Summary of Assessment Data Collected:

Six of the seven students successfully completed this outcome (86%) however, as with most assignments there was tremendous variation in the level of submitted work. Rubric scores relating to this outcome reflected a mean score of 19.3/25 possible points not including the one student that did not complete this project.

2a: Use of Results to Improve Unit Services:

The range of scores here was highly varied and increased consistency may lead to greater overall demonstration of this important outcome. Students are encouraged to see the instructor during office hours for review of their projects as they are progressing….this is rare however. Requiring students to meet rather than just recommending this would force students to make beneficial edits to their projects, theoretically increasing their understanding and interpretation of their results. Other means to improve the success of this outcome may include having students present and answer questions from more of their peers at the college, not just those in their class. Stricter deadlines may also need to be enforced on future projects, allowing students to complete their project in several steps, each of which is graded along the way.

Second Means of Assessment for Evaluation Question Identified Above (from your approved assessment plan):

2b. Means of Unit Assessment & Criteria for Success: ***Oceanography Fall 2011 and Spring 2012***

Lab Assignment in MR 240 Oceanography: Students collect temperature and salinity data at 4 stations along an estuary situated near Kolonia town (Dausokele Bay); students use the field data to produce a scientific paper pertaining to the water mixing patterns observed in the estuary. Through this practical exercise, the students learn to elaborate a hypothesis, gather data in the field, compile the data into table and figure formats, analyze and discuss the results in light of a literature review. Finally, they write a paper respecting the scientific methodology.

2b. Summary of Assessment Data Collected:

Once the students have gone in the field to collect the data, they have weekly assignments related to this report. Each assignment is corrected, evaluated, and returned to the students within a week of submission. In this manner, the students have the opportunity to bring the necessary corrections to each section of the report before submitting the compiled document at the end of the session. The report is corrected according to a well detailed rubric which the students equally have on hand. When comparing the average grades on the report between Fall 2011 and Spring 2012, a marked difference is observed: a class average of 54.9% in F11 as opposed to 70.6% in Sp12. In the Fall 2011 only 47% (n=15) had a passing grade on the report while in Spring 2012, this number reached 77%. The likely reason for this major difference in evaluation is linked to a close monitoring of the weekly assignments and a regular

follow up in the progression of the report over the semester. Although this was extremely demanding and time consuming for the professor, it has given extremely positive results.

2b. Use of Results to Improve Unit Services:

A similar approach will be repeated during the next session i.e. to maintain close follow up on the weekly assignments. A draft of the report will equally need to be submitted a few weeks before the final report is due. In this way, the students will not be constraint by the last minute rush of putting all the components of the document together. Furthermore, it will permit the teacher to detect the weak sections that need to be revised.

Third Means of Assessment for Evaluation Question Identified Above:

2c. Means of Unit Assessment & Criteria for Success: ***Ichthyology Fall 11***

Students will report data and conclusions in oral format. Rubrics used to score Fish Family projects emphasizing communication of scientific knowledge in an oral presentation.

2c. Summary of Assessment Data Collected:

Though many aspects of the completed projects were scored by the rubric, I based this evaluation on the section of the rubric that scored "Communication." This section of the rubric specifically measures demonstration of scientific methodology and communicating science. A total of 14 students completed this task. The mean score on this part of the rubric was 17.6 out of 25 points (i.e. 70.4%).

2c: Use of Results to Improve Unit Services:

Effective scientific communication comes with practice and familiarity with the science being communicated. The more time spent working with and reviewing science leads to greater student understanding. Perhaps more emphasis on reviewing of scientific papers may increase the ability of students to communicate effectively in this area. In addition, allowing students more opportunities to present their work orally to their peers may also promote increased aptitude regarding this valuable skill.

Academic Evaluation Question 3

Are our program graduates finding employment and/or transferring to 4-year degree programs?

First Means of Assessment for Evaluation Question Identified Above:

3a. Means of Unit Assessment & Criteria for Success:

Facebook, e-mail communications, 3rd person accounts, and other ambiguous and non-comprehensive sources. Successful completion of this would mean we are able to track nearly all of our graduates.

3a. Summary of Assessment Data Collected:

Data is only a loose assemblage of notes taken over the past few years sprinkled with frequent communications regarding the work and education status of those graduates that have made some effort to remain in contact. The only reason this is even slightly effective is because of the close-knit ties we all have to the community living on such a small island. I **estimate** I can accurately describe the post college status of our graduates to about 75% within a 5-year window. Beyond the initial 5 years after graduation, I **estimate** this percentage to drop drastically.

3a: Use of Results to Improve Unit Services:
This really needs to become more of an institutional tracking effort. Instructors do what they can but this becomes something we do on our own time and varies considerably depending on the individual graduate and each instructor and each program until COM-FSM institutes some form of common, standardized means of tracking our graduates.

Academic Evaluation Question 4

Are students able to able to demonstrate knowledge of the diversity of marine life?

First Means of Assessment for Evaluation Question Identified Above:

4a. Means of Unit Assessment & Criteria for Success: Marine Biology Class Examination (Spring and Summer 12) Using the MR 120 Outcome 7.3," The student will be able to list, describe the characteristics of, and classify marine organisms by domain, kingdom, phylum/division, and class," students we assessed on the taxonomic classification of marine organisms. Though somewhat arbitrary, we deem 75% recognition or higher to be considered outcome mastery and a reasonable goal for our students to achieve.

4a. Summary of Assessment Data Collected: This outcome is very broad and difficult of assess individually as it covers material that spans more than half of the semester. Some students pick up on some of the taxa but not others therefore making evaluation of mastery-level understanding difficult to ascertain. As a proxy to this outcome, I have chosen to evaluate this outcome using only a single Phylum (Echinodermata) with the complete understanding that this is not necessarily reflective of the students understanding of this whole outcome…..I proceed anyway using sections from both regular exams and the final exams from both semesters in order to provide some form of fair assessment to this outcome. On multiple tests over the two semesters, I asked the students to match Echinoderm classes to their respective organisms. These matching questions (5 in all) were the first aspect of the outcome of this assessment. For the second part of assessing this outcome, both semesters had to answer the question 'Identify and describe 4 defense mechanisms associated with the Phylum Echinodermata.' Again, this is a stretch to assume that this covers the entire realm of marine biodiversity, but this assessment of a single Phylum can serve as an indicator of overall taxonomic understanding….Echinoderms were taught the same as all the other Phyla and should be representative. Results: In the Spring, of the 4 matching questions, (assuming scoring ¾ would be considered mastery of this part of the outcome), only 27/33 (81%) achieved mastery level while 10/14 (71%) did so for the summer. For the short answer question, I consider 4/6 points to have achieved mastery level; the Spring semester had 24/33 (72%) reaching mastery level while the summer class had 10/14 (71%) reach this level. The scores at the left reflect an overall average for each semester.

4a: Use of Results to Improve Unit Services:
Though time is generally provided at the end of lab periods to review the taxonomy and identify specimens, this time if often blown off by the students. Finding ways to better integrate this portion of the lab into the rest of the lab may prove highly beneficial to the student's ability to lean this important component.

Second Means of Assessment for Evaluation Question Identified Above (from your approved assessment plan):

4b. Means of Unit Assessment & Criteria for Success: ***MR 230 Ichthyology Fall 11:***
Examination as evidence of students identifying the most common reef fishes by taxonomic Family. 70% correct identification rate may be a worthy goal to shoot for and considered a success.

4b. Summary of Assessment Data Collected:
Using a 50 point lab practical examination at the end of the semester requiring students (n=14) to correctly identify families of reef fish specimens provided by the instructor, students scored a mean of 33.8/50 (67.6%) with a range of scores from 10-44. The range seems to be the item that stands out the most. While the majority of the students did achieve the 70% goal, the lower outliers pulled the average down below our proposed level of success.

4b: Use of Results to Improve Unit Services:
Increased attention to those students that are struggling to learn the taxonomic names may be in order. I would recommend more peer tutoring to assist in this area.

Academic Evaluation Question 5

Are students able to apply fundamental knowledge of marine sciences towards identifying and solving regional and global problems relating to marine systems?

First Means of Assessment for Evaluation Question Identified Above:

5a. Means of Unit Assessment & Criteria for Success: ***Aquaculture Spring 2012***
Students in MR 201 Aquaculture will design a sustainable aquaculture business plan feasible for regional application. Projects will be scored by rubric.

5a. Summary of Assessment Data Collected: Results from this project are somewhat misleading as this business plan project was done in groups and therefore group project grades may not necessarily reflect the success of individual students. Of the 17 students (5 groups) successfully demonstrated a feasible, sustainable aquaculture business plan that could potentially increase regional food security, promote sustainable development, and could potentially be marketed for profit within the FSM or abroad. The mean score of this assignment was 83.3 with 100% completion of the assigned project.

5a: Use of Results to Improve Unit Services:
While this score and percentage are inflated, surely some individuals would stumble in attempting to reach this outcome if left to their own designs. To better assess this outcome, future attempts should be made using individual assignments rather than group projects.