Statistics Department   [Mission Statement-55771]
Mission Statement:
The mission of the Department of Statistics is to advance the science of statistics through innovative research, teaching, consulting, and service; to produce high quality graduates with BS, MS, and PhD degrees; and to serve the Florida State University, the State of Florida, and the nation with statistical expertise.

Bachelors in Statistics   [Mission Statement-55780]
Mission Statement:
The mission of the undergraduate program in Statistics is to produce high quality students who can use their statistical expertise toward useful and relevant purposes in society.

Performing comprehensive data analysis   [Student Learning Outcome-55781]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to perform a comprehensive data analysis consisting of multiple investigations and interpretations of a data set. This will be assessed upon completion of assignments within core undergraduate courses.

Assessment and Evaluation Process:
There will be a faculty-reviewed assessment for projects in STA 3024, a required core course for statistics majors. The assessment will be used to evaluate students' ability to select appropriate statistical tools as well as create and organize a complete statistical analysis. At least 75% of the students must score at or above 80% on this component. Method(s): Class Performance or Presentation.

Results:
Of the twenty-six statistics majors enrolled in our two offerings of STA 3024, twenty-three of them (88.5%) were able to satisfactorily complete the elements of a comprehensive data analysis in their course project. The average score was 89% for statistics majors. This was considerably higher than the non-majors taking the class. One student was unable to complete the project due to extenuating circumstances and the other two students receiving fewer than 80% for this category missed opportunities to apply more appropriate techniques to their data.

Improvements Made or Action Plan Based on Analysis of Results:
The grading rubric modifications better identified whether the expectations for a comprehensive data analysis were being met. The vast majority of students were able to apply techniques that they learned in the course to their projects; however, a few students still missed opportunities to do better. The action plan involves improving the

planning of the final project. Students will now be asked to submit a project proposal which will have them list the data anticipated to be used and the techniques to be applied to the data. The instructor will them provide feedback as to whether the student is on track. It is anticipated that this will allow for better communication of expectations by the instructor.

Writing statistical analyses of problems   [Student Learning Outcome-55782]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to produce a written explanation of a complex problem from a discipline outside of statistics in a manner that explains the essence of the problem in a non-technical way. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
There will be a faculty-reviewed assessment for projects in STA 3024, a required core course for statistics majors. The assessment will be used to evaluate students' ability using written communications to break down discipline-specific issues in a conceptual way. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Written Report or Essay.

Results:
Twenty-five out of twenty-six (96.2%) students successfully produced a non-technical written description of their project problems and goals. The average score of 89% was pulled down by one student if the fall who did not attempt any of the project. That same student enrolled again in the spring and performed at a high level. We found the model project write-ups presented to the students were effective and increased the number of students exceeding the requirement compared to last year. We believe that the reason for this being one of the highest objective success rates is due to the fact the assignments given throughout the semester provided ample practice on this activity.

Improvements Made or Action Plan Based on Analysis of Results:
We will continue to show more examples of non-technical problem descriptions so that students will be gather a better idea of what is expected with the written documents. One way to improve here is to use examples which emphasize concise explanations. Some students, although arriving at a written result accurately, could do so in a more efficient manner. A grade element will be added to the project grading rubric to directly evaluate conciseness.

Applying statistical analysis to problems   [Student Learning Outcome-55783]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Critical Thinking Skills, Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to define a problem from an outside area and translate it into an accurately formulated statistical problem. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
There will be a faculty-reviewed assessment for projects in STA 3024, a required core course for statistics majors. The assessment will be used to evaluate students' ability to communicate in writing how a solution to a real-world problem made be approached statistically. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Written Report or Essay.

Results:
Twenty-five of the twenty-six statistics majors (96.3%) scored above 80% for component of translating a real-world problem into a statistical problem on the STA3024 project. The average score on this element was 96.3% among the statistics majors which was significantly higher than non-majors taking the course. The average would have been even higher had it not been for the student who did not attempt the project. This is something that is rare but we should anticipate this happening from time to time. This objective is another aspect the students have the opportunity to get practice by completing assignments that lead up to the project.

Improvements Made or Action Plan Based on Analysis of Results:
The discrepancy of scores between majors and non-majors toward the translation of real-world problems into a statistical problems objective indicates that these two populations may demand different levels of difficulties. This would require separating out majors form non-majors. Potential solutions will be discussed with the faculty such as having a majors-only section or developing an entirely different course. This was not plausible previously as we needed non-majors to have enough students to offer the course. However, due to the increase in the number of statistics majors, such offerings may be possible. One major roadblock is that our department is short on faculty and extra course offerings may be difficult to cover.

Writing statistical decisions (non-technical)   [Student Learning Outcome-55784]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills, Critical Thinking Skills, Content/Discipline Knowledge & Skills

Define Outcome:

Upon completion of core undergraduate courses, the student will be able to compose a statistical decision in a manner that is appropriate for and understandable by non-technical audiences. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
There will be a faculty-reviewed assessment of projects in STA 3024, a required core course for statistics majors. The assessment will be used to evaluate students' ability to take the results of the statistical solution to a problem and produce actionable recommendations written in a non-technical way. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Written Report or Essay.

Results:
Twenty-four out of twenty-six (92.3%) of statistics majors in STA 3024 effectively reported a summary of their project's statistical analysis in a non-technical way. Their average score on these written elements for the majors was 90%. The lowest sub-component of this score average had to do with the explanation of how model assumptions were being met. Several chose to ignore this discussion because of its very technical nature. However, there are ways (e.g., the use of graphics) to present this information in an intuitive manner.

Improvements Made or Action Plan Based on Analysis of Results:
The overall performance on this objective was reasonably high; however, improvement can be made in some of the smaller details of this objective. It was discovered that the model write-ups provided to students focused on most areas on the rubric but did not demonstrate a few of elements very well. The model write-ups will be modified to show how the discussion of meeting statistical model assumptions can be demonstrated to a non-statistical audience through graphical displays.

Presenting statistical analysis orally   [Student Learning Outcome-55785]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills, Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to logically discuss the elements of a statistically analysis in an oral presentation to an audience. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
This will be based on a standard grading rubric used in courses that require an oral presentation. Oral presentations are given in STA 3024, a required core course for statistics majors. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Class Performance or Presentation.

Results:
Twenty-four out of twenty-six (92.3%) of the statistics majors in STA 3024 successfully presented their project results verbally to classmates. The average score among statistics majors was 88% which was lowered by the one student that did not complete the project and by one student choosing not to participate in the verbal portion of the project. The lowest grade categories involved the explanations of their approach to analyzing the data and explaining the findings accurately. We believe this is more of a function of the time allotted for the presentation. Due to the popularity of STA3024, the larger class sizes mean less time per student for the verbal presentation. In the fall, only about four minutes presentations were given making corners cutting prevalent. More time would give students the opportunity to address their studies more thoroughly.

Improvements Made or Action Plan Based on Analysis of Results:
The immediate action plan is to allow more class time for students to make presentations. This will require cutting some material out of the course but, at least for the present, this seems to be a reasonable tradeoff. We will pursue with the faculty's guidance a way where we might create a majors-only section or new course. This approach would be more beneficial in meeting this goal in the long term.

Presenting statistical conclusions (non-technical)   [Student Learning Outcome-55786]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to interpret the conclusions of a statistical study in an oral presentation in such a way that non-technical audiences may understand it. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
This will be based on a standard grading rubric used in courses that require an oral presentation. Oral presentations are given in STA 3024, a required core course for statistics majors. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Class Performance or Presentation.

Results:
Twenty-five of the twenty-six (96.2%) statistics majors in STA3024 were able to explain project results in non-technical terms. The average score on this element was a respectable 95%. We feel the way the presentation guidelines were restructured to make the orally presentation emphasize more concepts directly led to improvement of this category compared to previous years. In general students seemed to take ownership of this project and are, therefore, motivated to give their perspective on it in

an engaging way. Consequently, students tended to do extremely well at the creative side of the presentation especially through graphical displays. Excelling in this area may have come at a price, however, because the logical steps of analysis tended to be emphasized less.

Improvements Made or Action Plan Based on Analysis of Results:
Although pleased with the improvement in this area, we believed that other aspects of presenting the project results may have been diminished. We will try to strike a better balance in the verbal presentation guidelines as to maintain the generally good explanations of the project motivation and conclusion that were apparent this year, while trying to have them include better discuss ion about the path they took to analyze the data and get results. We feel a longer presentation time allotment will also help in this area.

Using statistical software   [Student Learning Outcome-55787]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of core undergraduate courses, the student will be able to apply modern statistical software to implement statistical methods, analyze data, and solve problems. This will be assessed upon completion of core undergraduate courses.

Assessment and Evaluation Process:
We will use faculty-reviewed course embedded data analysis assignments requiring the use of statistical software. Projects and other course embedded assignments in STA 3024, a required core course for statistics majors, will be used to assess students' ability to use statistical software to analyze data and solve problems. At least 75% of the students must score at or above 80% on this component. Method(s): Project Evaluation and Problem-Solving Exercise.

Results:
Twenty-one out of the twenty-six (80.8%) statistics majors in STA 3024 scored at 80% or higher in the application of statistical software component. The average among statistics majors was 86%. By far, this objective had lowest success rate compared to the others. According to our standards, this was still acceptable; however, we believe that this does not reflect upon the software mastery achieved by students in this course. We would have predicted better results based on the majors' performances on the assignments leading up to the project. Because the project is used to evaluate so many aspects, the statistical programming may be perceived as taking a lesser role in the project.

Improvements Made or Action Plan Based on Analysis of Results:
Planned project proposals to be completed by the students will be instituted so that

feedback may be given by the instructor prior to the start of the project that will be designed. Students will be required to submit a plan outlining the techniques planned to be used and how they plan to implement these techniques in SAS as well as considering any challenges that might impose. The instructor can provide feedback and alert the student to any potential issues that they may not have considered.

Production of graduates   [Program Outcome-55788]

Start Date: 08-25-10
End Date: 08-06-11

Define Outcome:
By completion of the program, undergraduate majors will have gained the knowledge of the theories of statistics and the ability to apply statistical methods including the use of statistical software so that they are able to use the skills they have learned in the job force (academia, government, or industry) or in graduate study.

Assessment and Evaluation Process:
For students who complete the program successfully, we expect 80% or more to gain employment in field or to be accepted into graduate school as evidenced by department assessment.

Results:
Seventeen out of the nineteen (89.5%) of graduating statistics majors responded to the exit survey stating that that they already have a job (7), are actively searching for a job in a statistically-related profession (4), or are going to graduate school (6). Two left the response blank. Besides graduate school, the positions mentioned included jobs in the actuarial field, the military, testing preparation services, and the State of Florida. Many respondents were double majors with their primary major being something other than statistics but many still would like to have some statistical aspect involved in their careers.

Improvements Made or Action Plan Based on Analysis of Results:
Based on our evaluation of previous years the department started an undergraduate statistics club to serve as a vehicle to expose students to the many possibilities a career in statistics affords. In its first year of existence the club has primarily had graduate students present research providing a flavor of graduate school to the undergraduates. The club plans to invite speakers form industry and government to address our undergraduates in order to provide them with some insights from outside the academic environment.

Masters in Statistics   [Mission Statement-55776]
Mission Statement:
The mission of the MS program is to enhance the students' understanding of statistics, teach them how to learn to continue learning statistics, and produce high quality students with expertise that is attractive to government, industry, and academia, with the aim of improving society and the human condition.

Statistical methods and software   [Student Learning Outcome-55779]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of the course of instruction, the student will be able to employ modern statistical techniques and software effectively to solve problems and analyze data.

Assessment and Evaluation Process:
Projects and course embedded assignments within the required courses STA 5166 and STA 5167 (Statistics in Applications I and II) will be used to test students' knowledge of modern statistical techniques and their ability to use statistical software to work with data and solve problems. These courses are required of all MS Statistics students. Our goal is 90% of students receive a score of 76% or better in these courses. Method(s): Project Evaluation and Course Embedded Assignment (Often in tandem with exam question bank).

Results:
In the fall of 2010, 84% of the students in STA 5166 received a score of 76% or better. In the following spring, 100% of the students in STA 5167 earned scores of 76% or better. For the year-long sequence, we had 92% at or above a score of 76%.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the level of achievement of our graduate students with respect to this student learning outcome. We expect our students to continue to display this high performance level in the future.

Since this learning outcome was first proposed, our department has created a four-course professional graduate certificate in statistical computer analysis. In the future, we will use completion rates of our graduate students in this certificate program as our measure of a student's ability to use software with modern statistical techniques analyze data and solve problems.

Ability to communicate statistical analyses   [Student Learning Outcome-55777]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Upon completion of the course of instruction, the student will be able to express statistical results and inferences in writing and orally to both technical and non-technical

audiences.

Assessment and Evaluation Process:
Communication skills are analyzed through written and oral work required of all students in the statistics MS program. Each student must give a 30 minute presentation on a relevant statistical topic. A written project to accompany this presentation is also required. We use the course STA 5167, a required course for statistics MS students, to measure this. Our goal is that 90% of the students receive a score of 76% or more. Method(s): Project Evaluation and Class Performance or Presentation.

Results:
In spring 2011, 100% of the STA 5167 students received a score 76% or better.

Improvements Made or Action Plan Based on Analysis of Results:
We are pleased that our students meet our basic requirement for this learning outcome. We intend to make two changes to our measure of success for it. First, in the future we desire that 90% of our graduate students will successfully complete this requirement with a score of 85% or better, the previous score being 76% or better. Second, we will require that the students analyze and present their projects using real world data, rather than textbook sets. In particular, we will begin using data brought to our department's statistical consulting center. This will ensure that the analyses and presentations made by these students are timely and relevant.

Maintain the number of US MS students [Program Outcome-55778]

Start Date: 08-25-10
End Date: 08-06-11

Define Outcome:
Maintain the proportion of our students who are US citizens to be at least 2/3 and at least one of those a minority student. We measure the percentage of US students and US minority students in the MS programs in Statistics enrolled in fall.

Assessment and Evaluation Process:
We will determine if at least 2/3 of the graduates students are US citizens and at least one is a minority student as evidenced by enrollment statistics.

Results:
Our goal continues to be that 2/3 of admitted graduate students are US citizens. For US citizens in minority groups, we desire that at least one minority student is admitted each year.

In the 2010 / 2011 academic year, our department admitted fourteen new graduate students. Eleven (79%) of these students were US citizens and five (45%) of these eleven US students belong to minority groups. This meets our goals.

Note that we admit students into our graduate program without making a distinction for which degree program they will select (MS vs PhD, statistics vs biostatistics). Thus, this outcome is common to all four of the graduate degree programs. They are tracked and evaluated as a group, rather than individually. All PhD students must possess an MS in statistics.

We maintain this balance through our current admission policies and efforts. In particular, we separate international applicants from domestic applicants and consider and weight them separately. We intentionally admit more domestic students to attain the above stated goals. Additionally, we separate and give special consideration to applications from domestic minority students.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the current mix of domestic, international and minority graduate students. We intend to maintain this balance in the future by continuing our current admission policies and efforts.

Doctorate in Statistics   [Mission Statement-55772]
Mission Statement:
The mission of the PhD program is to train and create graduates who will be employed in industry, government, or academia who can continue to make fundamental contributions to the methodology and theory of statistics so as to advance the field and society.

Statistical methods   [Student Learning Outcome-55773]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Critical Thinking Skills, Content/Discipline Knowledge & Skills

Define Outcome:
By the end of the course of instruction, PhD students in statistics and biostatistics will be able to generate modern graduate level methods and theory, including using software and writing code in various computer languages, to resolve issues and solve problems within the discipline. In addition, students should be able to develop new statistical and computational methods.

Assessment and Evaluation Process:
Students are expected to expound on modern methods and theory within the PhD thesis. These works will be evaluated by individual faculty, committee, or both to determine the competency and scholarly innovation achieved by PhD students. Students must also pass the department's PhD written qualifying exam. The goal is that 80% of the PhD students will be successful in passing the PhD written qualifying examination. Method(s): Faculty Committee Evaluation of Dissertation, Thesis or Treatise, and Faculty Designed Comprehensive or Capstone Examination and

Assignment.

Results:
Eleven students took the written qualifying exam during the academic year 2010 / 2011. Of these, eight of them passed. This is 73% success rate. While below are goal rate of 80%, it is only one student away from attaining our goal, i.e., had nine, rather than eight, students passed we would have an 82% pass rate. Additionally, all fourteen students who presented a dissertation defense in this period passed the defense exam (100% pass rate).

The above numbers are for both PhD programs, biostatistics and statistics. Two of the PhD dissertation defenses were from biostatistics students, the remainder were statistics students.

The written exam is identical for students in either the statistics or the biostatistics program. Additionally, the written exam is taken before the doctoral students choose whether they will pursue a PhD in statistics or biostatistics. So, the written exam results cannot be broken down into biostatistics vs statistics students.

Improvements Made or Action Plan Based on Analysis of Results:
The department is pleased with our doctoral students' consistent high rate of passing the written qualifying exam and dissertation defense exam. We will continue to expect these high standards of competence from our students. We feel that this high rate of achievement among our students is now part of the department's academic culture and will no longer monitor these metrics.

In the future, we intend to monitor our students' abilities with regards to these outcome categories by creating and tracking a new goal: publishing research in professional, externally reviewed scholarly journals and proceedings. This will begin with the current academic year (2011/2012).

Ability to communicate statistical analyses   [Student Learning Outcome-55774]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Students completing the PhD program should have the ability to discuss statistical results in writing and orally to both technical and non-technical people one-to-one and in groups.

Assessment and Evaluation Process:
Effectively communicating statistical results is defined by a student achieving a unanimous "pass" performance on the Ph.D. Essay exam which consists of a written essay containing technical statistical results and an oral presentation of that material.

Effective communication of statistical results is further defined and examined via the Ph.D. Defense Exam which consists of a written Ph.D. thesis containing statistical results and an oral presentation of that material. Assessment and Evaluation of both the Ph.D. Essay Exam (which is held at least 6 months prior to the Ph.D. Defense Exam) and the Ph.D. Defense Exam is evaluated by a 4-person committee, three from Statistics, one from an outside department. The exams require a unanimous decision for a "pass". The oral presentations are made to the entire department (70+ people). Method(s): Faculty Committee Evaluation of Dissertation, Thesis or Treatise, and Class Performance or Presentation.

Results:
In the 2010 / 2011 academic year, nineteen of our graduate students presented essay exams to public audiences. All successfully presented their material and passed their PhD essay exams.

In addition, fourteen students presented dissertation defenses in the same time period. All successfully presented their material and passed their PhD dissertation defense.

The above numbers are for both PhD programs, biostatistics and statistics. Sixteen of the essay exam students were from statistics, three were from biostatistics. Twelve of the PhD dissertation students were statistics, two were biostatistics.

Thus, 100% of statistics PhD students met the department requirements in this area.

Improvements Made or Action Plan Based on Analysis of Results:
We are confident that this requirement of making each PhD student give two public presentations improves their communication skills. These requirements are now department policy and students will continue to make these presentations in the future.

These presentations are internal to our department. We will modify this requirement in the future by encouraging students to make presentations to audiences that are primarily outside our department.

Maintain the number of US PhD students   [Program Outcome-55775]

Start Date: 08-25-10
End Date: 08-06-11

Define Outcome:
Maintain the proportion of our graduate students who are US citizens to be at least 2/3 and at least one of those a minority student. We measure the percentage of US graduate students and US minority graduate students enrolled in fall.

Assessment and Evaluation Process:
We will determine if at least 2/3 of the graduates students are US citizens and at least one is a minority student as evidenced by enrollment statistics.

Results:
Our goal continues to be that 2/3 of admitted graduate students are US citizens. For US citizens in minority groups, we desire that at least one minority student is admitted each year.

In the 2010 / 2011 academic year, our department admitted fourteen new graduate students. Eleven (79%) of these students were US citizens and five (45%) of these eleven US students belong to minority groups. This meets our goals.

Note that we admit students into our graduate program without making a distinction for which degree program they will select (MS vs PhD, statistics vs biostatistics). Thus, this outcome is common to all four of the graduate degree programs. They are tracked and evaluated as a group, rather than individually. All PhD students must possess an MS degree in statistics before graduating.

We maintain this balance through our current admission policies and efforts. In particular, we separate international applicants from domestic applicants and consider and weight them separately. We intentionally admit more domestic students to attain the above stated goals. Additionally, we separate and give special consideration to applications from domestic minority students.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the current mix of domestic, international and minority graduate students. We intend to maintain this balance in the future by continuing our current admission policies and efforts.

Doctorate in Biostatistics   [Mission Statement-55789]
Mission Statement:
The mission of this program is to prepare graduates for private, academic and public sector research and health care settings who can apply statistical principles, processes, applications, and analytic methods to design, implement, and analyze health related studies including both experimental (clinical trials) and observational (epidemiological) studies.

Ability to communicate statistical analysis   [Student Learning Outcome-55790]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Students completing the PhD program should have the ability to discuss statistical results via written and oral methods to technical and non-technical audiences. The audience for oral communication may range from a single individual to large groups.

Assessment and Evaluation Process:
Effectively communicating statistical results is defined by a student achieving a unanimous "pass" performance on the Ph.D. Essay exam which consists of a written essay containing technical statistical results and an oral presentation of that material. Effective communication of statistical results is further defined and examined via the Ph.D. Defense Exam which consists of a written Ph.D. thesis containing statistical results and an oral presentation of that material. Assessment and Evaluation of both the Ph.D. Essay Exam (which is held at least 6 months prior to the Ph.D. Defense Exam) and the Ph.D. Defense Exam is evaluated by a 4-person committee, three from Statistics, one from an outside department. The exams require a unanimous decision for a "pass". The oral presentations are made to the entire department (70+ people). Method(s): Faculty Committee Evaluation of Dissertation, Thesis or Treatise, and Class Performance or Presentation.

Results:
In the 2010 / 2011 academic year, nineteen of our graduate students presented essay exams to public audiences. All successfully presented their material and passed their PhD essay exams.

In addition, fourteen students presented dissertation defenses in the same time period. All successfully presented their material and passed their PhD dissertation defense.

The above numbers are for both PhD programs, biostatistics and statistics. Sixteen of the essay exam students were from statistics, three were from biostatistics. Twelve of the PhD dissertation students were statistics, two were biostatistics.

Thus, 100% of biostatistics PhD students met the department requirements in this area.

Improvements Made or Action Plan Based on Analysis of Results:
We are confident that this requirement of making each PhD student give two public presentations improves their communication skills. These requirements are now department policy and students will continue to make these presentations in the future.

These presentations are internal to our department. We will modify this requirement in the future by encouraging students to make presentations to audiences that are primarily outside our department.

Statistical methods   [Student Learning Outcome-55791]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Critical Thinking Skills, Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of the course of instruction, PhD students in statistics and biostatistics will be able to generate modern graduate level methods and theory, including using

software and writing code in various computer languages, to resolve issues and solve problems within the discipline. In addition, students should be able to develop new statistical and computational methods.

Assessment and Evaluation Process:
Students are expected to expound on modern methods and theory within the PhD thesis. These works will be evaluated by individual faculty, committee, or both to determine the competency and scholarly innovation achieved by PhD students. Students must also pass the department's PhD written qualifying exam. The goal is that 80% of the PhD students will be successful in passing the PhD written qualifying examination. Method(s): Faculty Committee Evaluation of Dissertation, Thesis or Treatise, and Faculty Designed Comprehensive or Capstone Examination and Assignment.

Results:
Eleven students took the written qualifying exam during the academic year 2010 / 2011. Of these, eight of them passed. This is 73% success rate. While below are goal rate of 80%, it is only one student away from attaining our goal, i.e., had nine, rather than eight, students passed we would have an 82% pass rate. Additionally, all fourteen students who presented a dissertation defense in this period passed the defense exam (100% pass rate).

The above numbers are for both PhD programs, biostatistics and statistics. Two of the PhD dissertation defenses were from biostatistics students, the remainder were statistics students.

The written exam is identical for students in either the statistics or the biostatistics program. Additionally, the written exam is taken before the doctoral students choose whether they will pursue a PhD in statistics or biostatistics. So, the written exam results cannot be broken down into biostatistics vs statistics students.

Improvements Made or Action Plan Based on Analysis of Results:
The department is pleased with our doctoral students' consistent high rate of passing the written qualifying exam and dissertation defense exam. We will continue to expect these high standards of competence from our students. We feel that this high rate of achievement among our students is now part of the department's academic culture and will no longer monitor these metrics.

In the future, we intend to monitor our students' abilities with regards to these outcome categories by creating and tracking a new goal: publishing research in professional, externally reviewed scholarly journals and proceedings. This will begin with the current academic year (2011/2012).

Maintain the number of US PhD students   [Program Outcome-55792]

Start Date: 08-25-10
End Date: 08-06-11

Define Outcome:
Maintain the proportion of our graduate students who are US citizens to be at least 2/3 and at least one of those a minority student. We measure the percentage of US graduate students and US minority graduate students enrolled in fall.

Assessment and Evaluation Process:
We will determine if at least 2/3 of the graduates students are US citizens and at least one is a minority student as evidenced by enrollment statistics.

Results:
Our goal continues to be that 2/3 of admitted graduate students are US citizens. For US citizens in minority groups, we desire that at least one minority student is admitted each year.

In the 2010 / 2011 academic year, our department admitted fourteen new graduate students. Eleven (79%) of these students were US citizens and five (45%) of these eleven US students belong to minority groups. This meets our goals.

Note that we admit students into our graduate program without making a distinction for which degree program they will select (MS vs PhD, statistics vs biostatistics). Thus, this outcome is common to all four of the graduate degree programs. They are tracked and evaluated as a group, rather than individually. All PhD students must possess an MS degree in statistics before graduating.

We maintain this balance through our current admission policies and efforts. In particular, we separate international applicants from domestic applicants and consider and weight them separately. We intentionally admit more domestic students to attain the above stated goals. Additionally, we separate and give special consideration to applications from domestic minority students.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the current mix of domestic, international and minority graduate students. We intend to maintain this balance in the future by continuing our current admission policies and efforts.

Masters in Biostatistics   [Mission Statement-55793]
Mission Statement:
The mission of the MS in biostatistics degree is to prepare students to apply statistical principles, processes, applications, and analytical methods to design, implement, and analyze health related studies including both experimental (clinical trials) and observational (epidemiological) studies. The goal is to produce highly competent graduates ready for positions in government, industry or further academic study.

Statistical methods and software   [Student Learning Outcome-55794]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Content/Discipline Knowledge & Skills

Define Outcome:
Upon completion of the course of instruction, the student will be able to employ modern statistical techniques and software effectively to solve problems and analyze data.

Assessment and Evaluation Process:
Projects and course embedded assignments will be used to test students' knowledge of modern statistical techniques and their ability to use statistical software to work with data and solve problems. This is done through the required courses STA 5106 and STA 5107 (Computational Statistics I and II). Students must pass these courses to earn an MS in biostatistics. Our goal is that 90% of the students earn grade of 76% or better in these courses. Method(s): Course Embedded Assignment (Often in tandem with exam question bank).

Results:
In the 2010 / 2011 academic year, 100% of our graduate students in STA 5106 and STA 5107 received scores higher than 76%.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the level of achievement of our graduate students with respect to this student learning outcome. We expect our students to continue to display this high performance level in the future.

Since this learning outcome was first proposed, our department has created a four-course professional graduate certificate in statistical computer analysis. In the future, we will use completion rates of our graduate students in this certificate program as our measure of a student's ability to use software with modern statistical techniques analyze data and solve problems.

Ability to communicate statistical analyses   [Student Learning Outcome-55795]

Start Date: 08-25-10
End Date: 08-06-11

Outcome Type: Communication Skills

Define Outcome:
Upon completion of the course of instruction, the student will be able to express statistical results and inferences in writing and orally to both technical and non-technical audiences.

Assessment and Evaluation Process:
Communication skills are analyzed through written and oral work required of all students in the biostatistics MS program. Each student must write two projects in each of STA 5106 and STA 5107 (Computational Statistics I and II) and give an oral presentation on a relevant statistical topic in STA 5107. Students muss pass these courses to obtain an MS in biostatistics. Success will be measured by 90% of students passing these courses with a score of 76% or better. Method(s): Project Evaluation and Class Performance or Presentation.

Results:
In the 2010 / 2011 academic year, all our biostatistics students passed these courses with a score of 76% or better.

Improvements Made or Action Plan Based on Analysis of Results:
We are pleased that our students meet our basic requirement for this learning outcome. We intend to make two changes to our measure of success for it. First, in the future we desire that 90% of our graduate students will successfully complete this requirement with a score of 85% or better, the previous score being 76% or better. Second, we will require that the students analyze and present their projects using real world data, rather than textbook sets. In particular, we will begin using data brought to our department's statistical consulting center. This will ensure that the analyses and presentations made by these students are timely and relevant.

Maintain the number of US MS students   [Program Outcome-55796]

Start Date: 08-25-10
End Date: 08-06-11

Define Outcome:
Maintain the proportion of our graduate students who are US citizens to be at least 2/3 and at least one of those a minority student. We measure the percentage of US graduate students and US minority graduate students enrolled in fall.

Assessment and Evaluation Process:
We will determine if at least 2/3 of the graduates students are US citizens and at least one is a minority student as evidenced by enrollment statistics.

Results:
Our goal continues to be that 2/3 of admitted graduate students are US citizens. For US citizens in minority groups, we desire that at least one minority student is admitted each year.

In the 2010 / 2011 academic year, our department admitted fourteen new graduate students. Eleven (79%) of these students were US citizens and five (45%) of these eleven US students belong to minority groups. This meets our goals.

Note that we admit students into our graduate program without making a distinction for which degree program they will select (MS vs PhD, statistics vs biostatistics). Thus, this outcome is common to all four of the graduate degree programs. They are tracked and evaluated as a group, rather than individually. All PhD students must possess an MS degree in statistics before graduating.

We maintain this balance through our current admission policies and efforts. In particular, we separate international applicants from domestic applicants and consider and weight them separately. We intentionally admit more domestic students to attain the above stated goals. Additionally, we separate and give special consideration to applications from domestic minority students.

Improvements Made or Action Plan Based on Analysis of Results:
Our department is pleased with the current mix of domestic, international and minority graduate students. We intend to maintain this balance in the future by continuing our current admission policies and efforts.