

Assessment Report

Department of Statistics

May, 2013

The Statistics Department offers Ph.D., M.S., and BA/BS degrees. The graduate program has been maintaining its national and international reputations and has been attracting very talented students. These statements are supported by the first positions of our graduates and those highly publicized graduate program ranks which ranked our graduate program in the range of the 4th and 12th in US. In the past five years, our graduate program received about five hundred graduate admission applications each year. Among those applicants, many of the best students chose to attend our graduate program. As to the BA/BS program, it has been growing fast. We have now more than one hundred undergraduate majors.

The Ph.D. program

There are three components to this section of our report.

1. The first positions of our calendar year 2012 Ph.D. graduates.
2. The findings from our exit survey of our calendar year 2012 Ph.D. graduates.
3. The department retreat and 2012 summer core course examinations.

First positions. In 2012, fifteen Ph.D. recipients accepted positions at Yale University, UAB, IBM Watson Laboratory, Facebook, Ernst & Young, Novartis, and other major industry companies in US. Among these fifteen Ph.D. recipients, seven of them set their career goals as university professors.

These data support our belief that we are preparing our Ph.D. students accepted to diversified and prominent jobs worldwide.

Exit survey of 2012 graduates. Upon finishing the Ph.D. study and prior to physically leaving the Department, each student is invited to complete a short survey regarding her/his experience as Ph.D. student in the Department. Most Ph.D. recipients participated in the survey. (A copy of the survey is attached to this report.)

In view of their success in finding positions, it is not surprising to find that the Ph.D. students are very happy with their educational experiences in the Department. They expressed their appreciations of learning theories from our core courses and a friendly study environment in the Department. They thought that professors are very kind and are experts in almost every field. Below is a compilation of suggestions the graduates made:

- The department should help students find a research area in early years, not just let them focus on course work and exams.
- The department should offer more selective courses.
- The completion of required courses shouldn't be three and half years.

- The department should offer more computational courses.
- The department should ask the instructors of Stat 849-850 to cover GLMs and mixed effects models.
- The department should create a consulting lab.

The Department has been frustrated by these issues for several years. We have had open discussions in the summer 2012, held the department retreat, formed ad hoc committees to address these issues. The Department has made progresses in all of these issues and will continue in discussing these issues in 2013-2014. One significant change is that the Department has reduced the number of required courses and the total credits of completing a Ph.D. study.

Retreat and core course examinations. The Department of Statistics and the Department of Biostatistics and Medical Informatics jointly hold a summer long core course examinations in the summer of 2012. Particularly, the following core sequences were discussed:

- Stat 709-710, Mathematical Statistics for Ph.D. students.
- Stat 609-610, Mathematical Statistics for M.S. students in the Department and all other graduate students from other department.
- Stat 849-850, Theory and Applications of Linear Regression for all graduate students from all graduate programs on campus.

The strength and the weakness of each sequence were discussed. No decisions were made. There were some thoughts to make changes of some contents taught in each of the three sequences in order to meet the needs of the present statistical practice.

The Department hold a retreat in Fall 2013 and discussed issues in a wide-range. Particularly, the following issues were discussed:

- The contents of Ph.D. qualifying exams.
- What courses are needed for students to learn research experiences and start an early research projects.

Many thoughts were shared by faculty and graduate students. Based on these activities, the Department decided to continue discussions and formed two ad hoc committees to lead the discussions of these issues. These discussions will continue in the academic year 2013-2014.

Beyond the above mentioned three components, Ph.D. students hoped to see more outside people to be invited to speak in our department seminar, instead of just see talks by local people.

The M.S. Program

There are two components to this section of our report.

1. The first positions of our calendar year 2012 M.S. graduates.
2. The findings from our exit survey of our calendar year 2012 M.S. graduates.

First positions. Sixteen graduate students received the M.S. in 2012. Among these sixteen M.S. recipients, two continued in our Ph.D. program; three continued in other Ph.D. programs on campus; one continued in a Ph.D. program at ISU; the rest of them found jobs in US.

Exit survey of 2012 graduates. These M.S. graduates only noticed their completions of M.S. study to the Department graduate coordinator. They didn't write their comments or concerns. Two of them later wrote emails to the chair for graduate admissions saying that the reputation of the Department and the solid training in our program helped them find good jobs.

In the retreat and in the department meetings, there is some concern that our M.S. program is too theoretical.

The BA/BS Program

1. Purpose of assessment and learning objectives assessed

In the past five years, the statistics undergraduate program has seen unprecedented change. In this time the number of declared statistics majors has more than quintupled, from less than 20 in 2008 to over 120 currently. In 2012, the statistics department proposed significant revision to the undergraduate curriculum, updating course information and prerequisites for nearly all of the intermediate and upper level undergraduate courses. Policies for the statistic major, including those for admission to the major and for honors in the major were approved and implemented for all statistics majors starting in Fall of 2013. Given such substantial changes to the undergraduate program, this assessment serves to review the program as a whole. We seek in particular to answer questions about the demographics of statistics majors and also to assess the strengths, weaknesses, and overall student satisfaction with the statistics major.

In regards to specific learning objectives, feedback from statistics majors was sought regarding their opinion on the relative importance within the statistics major of 1) understanding statistical theory, 2) being able to design, collect data from, and write a report summarizing the results of a designed experiment, and 3) gaining exposure an experience with computer programming including statistical software packages.

2. Assessment strategy

The strategies of this assessment were two-fold. First, departmental and university records (ISIS) was used to provide some background on the demographics of those senior statistics majors graduating in the 2012-2013 academic year. Secondly, an online survey of 10 questions, including a mix of multiple choice and free written response questions, was sent to all current statistics undergraduate majors.

3. Key findings and impact

As noted already, the statistic major has seen significant growth over the past few years. Since the 2006 assessment of the statistics major, the number of statistics majors has increased rapidly from less than 20 majors in Spring 2006 to over 120 majors in Spring 2013, with nearly all being students within the

Table 1. Number of statistics majors by college from 2006 to 2013.

College	Number of declared majors per year (Spring Semester)							
	2006	2007	2008	2009	2010	2011	2012	2013
L&S	16	14	18	27	51	52	78	121
All	17	15	19	30	54	58	85	127

College of Letters and Sciences (Table 1). For Spring 2013 commencement there will be a record 21 statistics majors graduating and a total of 25 total graduates for the 2012-2013 academic year. At this time, there is no indication that the growth in the major will slow down, and it is anticipated that by Spring of 2014 there may be 150 declared statistics majors. While there is no conclusive evidence available, one speculation on why the statistics major is growing rapidly is that the field of statistics has gained more notice in mass media, particularly in regard to data mining and data analytics. Another possibility is related to the demographics of the statistics majors. In reviewing the current 25 statistics graduates, we found that nearly half (48%) were international students, that is their home address was not listed in the United States. In particular 40% of all graduating seniors listed a home address in China, with other international students from Malaysia and South Korea (Table 2).

Table 2. Graduating statistics seniors (2012 – 2013) by home country.

Country of home address	Number of students
China	10
Malaysia	1
Republic of Korea	1
United States	13
Total	25

While many graduating statistics majors were international, these students were not necessarily transfer students. Only 6 of the 25 graduating students were admitted as transfers from other universities, and of those, 4 had transferred from another university in the United States and 2 had transferred from a university outside the U.S. These numbers suggest that students who are seeking the statistics major hail from countries in Asia in addition to those from the United States, and these students are being admitted directly as freshman to the University.

The online survey sent to all statistics majors received a total of 29 responses from the 107 majors e-mailed (a 27% response rate). Tables 3-8 summarize the key findings. Details of the responses from students are edited in the Appendix.

Table 3. Academic level of major declaration.

Level when major declared	Number of students (%)
Freshman	5 (17.2%)
Sophomore	15 (51.7 %)
Junior	3 (10.3%)
Senior	6 (20.7%)
Total	29

Table 4. Student opinion on the understanding of the major principles, methods, and theorems of statistical theory was to the statistics major.

Response	Number of students (%)
Not important	1 (3.4%)
Slightly important	3 (10.3%)
Important	4 (13.8%)
Very important	8 (27.6%)
Essential	13 (44.8%)
Total	29

Table 5. Student opinion on the understanding of the ability to design an experiment, analyze the resultant data, and summarize the findings in a written report was to the statistics major.

Response	Number of students (%)
Not important	0 (0%)
Slightly important	2 (6.9 %)
Important	5 (17.2%)
Very important	10 (34.5%)
Essential	12 (41.4%)
Total	29

Table 6. Student opinion on the understanding of the exposure to the ideas and techniques of computer programming (including statistical software such as R) was to the statistics major.

Response	Number of students (%)
Not important	1 (3.4%)
Slightly important	2 (6.9 %)
Important	2 (6.9%)
Very important	11 (37.9%)
Essential	13 (44.8%)
Total	29

Table 7. Student plans upon completing bachelor's degree in statistics.

Response	Will seek employment	Will seek graduate school
Yes	13 (44.8%)	15 (51.7%)
No	13 (44.8%)	12 (41.4%)
Unsure	3 (10.3%)	2 (6.9%)
Total	29	29

Table 8. Student opinion on overall satisfaction with the statistics major.

Response	Number of students (%)
Very unsatisfied	1 (3.4%)
Moderately unsatisfied	2 (6.9 %)
Neutral	4 (13.8%)
Moderately satisfied	15 (51.7%)
Very satisfied	7 (24.1%)
Total	29

L&S ASSESSMENT REPORT SURVEY 2012-2013

This survey may be completed online, by going to:
https://uwmadison.qualtrics.com/SE/?SID=SV_1KPP5NTbU2acZ6t

Introduction

Dear L&S chairs, directors, faculty, and academic program staff:

Annual assessment reports are due to the college by May 15, 2013.

By completing the survey that follows, you will be submitting your annual report on the assessment of student learning. These reports are needed so UW-Madison can comply with Regent and Federal regulations that require the university to systematically perform this work for all academic programs that lead to a credential (degree, major, and certificate). Your responses will be used to create the L&S Annual Report to the Provost on the Assessment of Student Learning. The college report to the Provost must contain a response for every L&S credential. As you know, this is a huge task - your help is essential.

The following links offer some background on Assessment of Student Learning, from the college assessment plan to some simple "how to" guides. (Some of the survey questions below also provide links to relevant resources.)

- L&S Assessment Plan: <https://kb.wisc.edu/lis/page.php?id=25259>
- L&S Department and Program Plans and Reports: <https://kb.wisc.edu/lis/page.php?id=23837>
- L&S Plan and Report content guidelines / templates: <https://kb.wisc.edu/lis/page.php?id=25242>
- Assessment Tips and Terms: <https://kb.wisc.edu/lis/page.php?id=25287>

This is the first time we are trying to gather this information by asking you to complete an online survey. Because reports are due May 15, 2013, the survey will be open during the Spring 2013 term. This survey has been designed to allow you to start, stop, and revise responses as long as you do so on the same computer where you started the survey, using the original link you were sent to begin the survey, and if you click "next" (which saves your information) before closing the survey. (If this gives you trouble, contact Elaine.) As an alternative to responding online, we will also make the survey available as an MS Word document that can be emailed to us.

If your program provides a formal report on assessment to a professional organization, accrediting agency, board of visitors, or other group, you may share that report as part of your response. Please contact Elaine Klein, the L&S Assistant Dean for Academic Planning (emklein@ls.wisc.edu) to discuss these options. (We will need responses for any programs that are not covered by these reports.)

Finally, we hope to share and use this information across the college, to encourage departments and programs to learn from each other, develop collaborations, and improve practices and learning. You may also notice that the information you provide here will be requested by other entities - the L&S Academic Planning Council, Curriculum Committee, and other groups in the college refer to assessment activities when discussing program reviews, requests for changes to courses and curricula, requests for departmental reconfiguration, calls for proposals for new projects, etc. Understanding how, and how well, our students are performing in our programs is essential to the work we do. The responses you provide will help us know if we're headed in the right direction.

Again, thank you for your response.

Gary Sandefur, Dean, College of Letters & Science
Elaine M. Klein, Assistant Dean for Academic Planning

Contact Information

Q2.1. If we have questions about the responses provided, it would be useful to be able to discuss them with you. Whom should we contact?

Brian Yandell, Chair of the Department

Q2.2. Address

1300 University Ave. MSC 1220

Q2.3. e-mail contact

Yandell@stat.wisc.edu

Q2.4. Telephone

262-1157

Program Information Validation

Q3.1. List all of the academic programs this response addresses. Remember to include undergraduate and graduate levels, as well as certificate programs. For your convenience, we provide here links to the lists of approved UW-Madison programs.

- Majors, options and degrees: http://registrar.wisc.edu/documents/85_Majors_Options_Degrees.pdf
- Certificates: http://registrar.wisc.edu/documents/85_Official_Certificates.pdf
 - 949 Statistics
 - Bachelor of Arts* (L&S)
 - Bachelor of Science* (L&S)
 - Master of Science-Statistics (L&S)
 - Option: *Biostatistics*
 - Doctor of Philosophy (L&S)
 - Option: *Biostatistics*

Q3.2. Are the names and levels of the programs, as you understand them, consistent with the official lists?

- ☐ Yes
- ☐ No
- ☐ Academic program not listed
- ☐ Academic program should not be listed

Q3.3. If an academic program name needs to be updated, you may need to request a change to make the working name consistent with the official name. This will require approval by the department/program, the L&S Academic Planning Council, and the University Academic Planning Council. If you think you would like to change an academic program name, please contact your associate dean and the Assistant Dean for Academic Planning, Elaine M. Klein (emklein@ls.wisc.edu).

- Information on changing program names: <https://kb.wisc.edu/ls/page.php?id=20052>

Should we let Elaine know you'll be contacting her about this?

- ☐ Yes
- ☐ No

Q3.4. If an academic program isn't listed, and if it should be formally recognized by the university, the department/program needs to seek approval through the College and University Academic Planning Councils. Please alert your department chair and associate dean that you wish to begin this process. If you have questions, contact the L&S Assistant Dean for Academic Planning, Elaine Klein (emklein@ls.wisc.edu).

- For Information on creating new academic programs: <https://kb.wisc.edu/ls/page.php?id=20049>

Should we let Elaine know you'll be contacting her about this?

- ☐ Yes
- ☐ No

Q3.5. If you have an academic program that should not be listed in these official documents (because the faculty have closed or suspended it), that action must be formally approved and implemented by the university. The department/program needs to seek approval through the L&S and University Academic Planning Councils.

Please alert your department chair and associate dean as soon as possible that you wish to begin this process. If you have questions, contact the L&S Assistant Dean for Academic Planning, Elaine Klein (emklein@ls.wisc.edu).

- For Information on suspending or discontinuing academic programs: <https://kb.wisc.edu/ls/page.php?id=23316>

Should we let Elaine know you'll be contacting her about this?

- ☐ Yes
- ☐ No

Assessment Plan

Q4.1. Please review the assessment plan on file for your program(s).

- L&S Department and Program Assessment Plans: <https://kb.wisc.edu/ls/page.php?id=23837>

Is it current?

- ☐ Yes
- ☐ No

Q4.2. If the plan on file is not current, and if you have a current plan, please send a copy to Elaine Klein (emklein@ls.wisc.edu).

If the plan on file is not current, and you need to update your plan, please provide a statement below explaining your plans to undertake that work. Your updated plan should be sent to the Dean (c/o Elaine Klein) by June 30, 2013. (Please contact Elaine if you need to discuss an alternative deadline.)

You may find the following documents useful as you undertake this work:

- L&S Plan and Report content guidelines / templates: <https://kb.wisc.edu/ls/page.php?id=25242>
- Assessment Tips and Terms: <https://kb.wisc.edu/ls/page.php?id=25287>
- L&S Department and Program Plans and Reports: <https://kb.wisc.edu/ls/page.php?id=23837>
- L&S Assessment Plan: <https://kb.wisc.edu/ls/page.php?id=25259>

Q4.3. Do you have other programs on which you can provide an assessment report? (Please understand that we must provide some report on every academic program and credential we offer.)

- Yes
- Nope, I'm done here.

Recent Assessment Activity

Q5.1.Assessment Purpose. Please describe the purpose of the assessment activity (e.g., to conduct a curricular or program review, to assess learning across a sequence of courses, to solve a problem with student performance, to honor MIU or other obligations, etc.)

In Spring 2013, Brian Yandell, chair of the Department of Statistics appointed two ad hoc committees to review PhD qualifying exams and core courses for graduate students (MS and PhD). The purpose is to assess whether or not the current structures of the qualifying exams and the core courses meet the needs of modern statistical applications.

Q5.2. Learning Outcomes or Goals Assessed. Referring to the list of student learning objectives/goals expressed in the program assessment plan, please identify the learning outcome(s) that were the focus of the assessment activity: what did you study about what you want students to know, value and/or do?

Nothing to report here.

Q5.3. Assessment Strategy. Please describe your most recent assessment project. What did you do to try to better understand student learning across this program, in the context of the learning goal discussed in your response above? Feel free to describe the tools, strategies, methods, and analysis used (e.g., graduating student surveys, standardized tests, grades on embedded questions on exams, alumni surveys, focus groups or interviews, evaluation of student work on papers, portfolios, capstone assignments, etc.)

Nothing to report here.

Q5.4. Key Findings and Impact. Please summarize the key findings (evidence/results) and how the department or program plans to use this information (e.g., no curricular changes, program enhancements, program redesign, etc.). This may include to whom results were reported to effect change (if needed), whether the results suggested other areas of inquiry, plans for continued attention to assessment (including "tweaking" the assessment plan), and/or deadlines for achieving milestones related to the above activities.

Still on going, likely to continue in Fall 2013.

The Future

Q6.1. Please let us know what your next steps for assessing student learning will be.

Thank you!

Please email this document to emklein@ls.wisc.edu.

If you prefer, hard copies may be sent to Elaine Klein, Rm 307D South Hall

We'll be in touch if we have any additional questions.