



Building a Statistics Department

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1. History

Every once in a while there are Statistics Departments established (and disestablished unfortunately). In the UC system, we recently had departments created at UCSC, UCI, and (in 1998) at UCLA.

This presentation reviews what has happened at UCLA, what strategies we have followed, what we want to happen in the future, and what we have learned from the experience.

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Before 1987

UCLA had a Division of Statistics within the Department of Mathematics (since 1986), a Department of Biostatistics in the School of Public Health, and various statistics groups (and courses) in the social and behavioral sciences.

This made for a complicated and not very well coordinated situation.

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An faculty committee (1985, Bentler, Leamer) has advised the Dean, and had actually proposed to also look at the possibility of establishing a department of statistics. The Division of Statistics in Mathematics had written a letter to the Provost in 1986, also proposing a new department.

The basic motivation was that a Department was needed to coordinate statistics research and teaching, and to get away from the influence of Mathematics. The 1987 committee agreed, and switched its focus from an IDP to a Department.

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From 1987-1998

In 1987 the Dean of Social Sciences formed a committee with the charge of forming an Interdepartmental Graduate program in Social Statistics, and looking at the Statistics on North Campus in general.

I was hired to chair the committee and the resulting program. There was support for 4 years from the Dean.

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In 1992 we managed to get 4 years of NSF support for developing a Statistics program (joint from Social and Math Sciences).

When the money ran out, in 1997, we got a budget from the (departing) Dean of Physical Sciences and we moved to that Division. Then VERIP caused all senior statisticians in Math to retire, and the courses were threatened. This triggered a response by the College to establish a department (in the Division of Social Sciences).

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In this period we did all we could to make the department real, although it was not real yet.

-- Electronic presence since 1994 (with electronic consulting, statistical calculators, electronic journal, preprints, mailing lists)

-- Services to societies.

-- 11th place in national NRC rankings (although we did not exist yet)

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Since 1998

The Department moved back, after a few months, to the Physical Sciences.

Major events:

-- 2001 three-year external/internal review

-- 2003 undergraduate major approved

-- 2004 space consolidation

-- 2005 statistics in GE

Observe we have gone Social-Physical-Social-Physical. We won't be going back.

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Lessons

-- Undergraduate teaching drives most of the university resources. One continually has to maximize the enrollments -- eventually resources will follow.

-- Shared governance is there for you. When the major was approved, we were in the undergraduate council. When Stat 10 became a GE course, we were in the GE Council. Now we are in the Quantitative Reasoning Committee of the FEC.

-- Size matters.

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2. Undergraduate Division

Lower Division Service Teaching

In 1998 there were introductory statistics courses in psychology, political science, sociology, anthropology, geography, economics, and mathematics. The deans tried to make sure all this teaching was moved to the new department. They were only partially successful.

I just want to emphasize that service teaching is *the only reason* the department exists -- so it obviously is very important.

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What we did is to create one “quantitative literacy course”, Statistics 10, which took care of about half of the enrollments, and a number of specialized courses 11,12,13,14 for economics, sociology/anthropology/geography, biology, and physical sciences.

Each course had a committee with faculty from the client departments, and we assumed these courses were required for all majors in the client department. This is not true in all cases.

Here’s a look at some enrollment figures.

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Enrollments

Year	LD	UD	GD	Tot
98–99	1990	603	157	2750
99–00	2308	615	235	3158
00–01	2637	822	330	3789
01–02	2727	869	424	4020
02–03	2645	799	650	4094
03–04	2915	1006	823	4744
04-05	2794	915	911	4620

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Lessons

-- Give each client department its own course, if they require it for their majors. Offer them participation and resources (experienced teachers, computer lab). Tailor the curriculum (somewhat).

-- Provide one basic “quantitative literacy” course for all other departments. Minimize math in that course.

-- Sell statistics courses continually, to all prospective buyers. Each buyer is an ally.

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General Education

The next item on the agenda was to have Statistics 10 listed as satisfying the general education requirements (for the life and physical sciences). This happened first time in 2004-2005. First Stat/Math course in GE. We should extend this to the other “foundations” areas.

Current project: redefine the campus-wide Quantitative Reasoning requirement and make sure Statistics plays a larger role.

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UCLA has the *Fiat Lux* courses (19), which are one hour per week seminar courses for freshmen, with a cap of 15. They were created as a response to 9/11, but also as a response to creating more LD courses to be taught by regular faculty. Statistics teaches about 10 of these seminars each year, more than other departments in the physical sciences.

We also increase enrollments (and number of courses taught) by adding honors seminars to each undergraduate course, and by listing graduate research seminars.

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Major

Why do we have an undergraduate statistics major ? Since 2004-2005.

1. There is interest (AP Statistics).
2. There is a job for Statistics BS.
3. A department without a major is not as solidly anchored in the campus structure.

We aim for 100 majors (25 per year, recruit more).

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Students

Year	PhD	MS	Maj	Min	Tot
98-99	13	4	-	0	17
99-00	12	6	-	2	20
00-01	15	12	-	3	30
01-02	19	14	-	5	38
02-03	27	18	-	13	58
03-04	30	25	-	34	89
04-05	35	36	8	33	112
05-06	44	36	19	22	121

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Upper division

Of course until this year all our UD teaching was service teaching as well. This year our major came on-line and we have to rethink the teaching. We are planning a reorganization similar to that of the graduate curriculum.

One strategy is to set up relations with client departments similar to the ones at the LD level: this year we are starting UD service courses for Sociology and EE which are required for all their majors.

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We also teach the 130 ABCD courses, which are *Introduction to Statistics with X*, where X is SAS, SPSS, Stata, or R. These are service courses, with the SAS version also being taught in the summer.

In the end we will have core sequences for the majors, client courses for departments, campus level service courses such as 130, and specialized courses for both campus and majors (missing data, time series, bioinformatics, resampling). The last type of course is often M-listed (counts for both graduate and undergraduate credit).

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Sections taught

Year	LD	UD	GD	Tot
98-99	25	17	12	54
99-00	29	21	23	73
00-01	35	30	29	94
01-02	34	33	31	98
02-03	35	33	31	99
03-04	41	38	54	133
04-05	53	48	53	154
05-06	48	47	56	151

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Classes listed

Year	LD	UD	GD	Tot
98-99	5	8	25	38
99-00	4	15	34	53
00-01	4	19	39	62
01-02	5	21	46	72
02-03	5	23	49	77
03-04	12	27	54	93
04-05	14	26	50	90
05-06	19	28	39	86

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Graduate Division

Ph.D. Program

The optimal size is hard to determine. It has more than tripled since 1998, and the graduate program has more than quadrupled. This cannot go on, since faculty FTE has only grown by 50% in the period. It seems we are now at maximum size (for the current FTE).

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Masters Program

We decided, from the start, to have a (terminal, professional) MS program, because

1. MS resources from the Graduate Division.
2. There is a strong demand for Statistics MS students.
3. We could grow our program faster (size matters).
4. MS Students are inexpensive and provide TA's.

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Eventually, the plan is to make this program self-supporting and off-hours, but there are currently not enough resources to do so.

Over the years, the PhD and MS programs have grown at about the same rate, and we feel that we can (work with industry) and make the MS program both bigger and economically more interesting.

Two professional MS programs are planned (with UCLA Extension): *Teaching of Statistics* and *Applied Statistics*.

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Curriculum

The graduate program was patchwork, and we reorganized it into three three-quarter sequences.

1. *Theoretical* (Probability, Math Stat, Large Sample)
2. *Applied* (Design, Regression, Data Analysis)
3. *Computational* (Programming, Numerical Analysis)

This provides structure for the first year, defines the exam, and is even popular with other departments.

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Being On Track

An M.S. student has one year for the core sequence and one year for an M.S. thesis. A Ph.D. student has one year for the core courses, and one year to advance to candidacy (fees !). The qualifying exam is still given, but no longer (strictly) required.

Ph.D. students select two of the three core sequences for the exam, but have to take all three. M.S. students do not take the exam, unless they want to “stream up”.

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PhD Students

Year	App	Adm	Acc
99–00	40	18	9
00–01	64	24	6
01–02	61	20	8
02–03	74	19	9
03–04	71	13	8
04–05	62	18	7
05–06	87	27	13

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3. FTE

We started unbalanced, because we were essentially an undergraduate teaching component of Mathematics -- with lots of temporary faculty. As the table below shows, we still have a large component of non-senate (teaching) faculty.

This, however, is an *advantage*. We no longer have visitors, adjuncts, students teaching, but we have a permanent core of very experienced faculty who teach our many service courses.

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Faculty FTE

Year	Reg	Tch	Tot	Pow
98-99	6.00	5.59	11.59	63.13
99-00	6.50	6.00	12.50	69.00
00-01	5.50	7.82	13.32	76.74
01-02	6.50	7.77	14.27	80.39
02-03	8.50	8.78	17.28	95.46
03-04	9.50	7.20	16.70	88.40
04-05	10.00	6.20	16.20	83.40

$$\text{Power} = 4 * \text{regular} + 7 * \text{teaching}$$

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Our teaching staff now consists mainly of continuing lectures and senior lecturers, with (for all practical purposes) security of employment.

It should be emphasized (and we do this at every occasion) that our FTE do not grow proportional to enrollment, size of the graduate program, or amount of extramural funds. Nevertheless this growth enhances our stability and will eventually lead to resources.

Observe we were hit hard by the budget cuts.

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Lesson

-- If the department has teaching faculty (which is both unavoidable and desirable), then all possible effort should be made to make those positions (semi)-permanent, and to involve teaching faculty in all aspects of the department.

-- Regular faculty teaching lower division courses is often bad for both the faculty and the students. No matter what OP and the legislator says.

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4. Research

Centers

We went from a *mathematics* model (one faculty member in an office with pencils and yellow pads) to a *science* model (one or more faculty members with graduate students in labs).

Centers are autonomous, support their graduate students, and are associated with specialized courses.

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-- *Center for Applied Statistics* (Berk, Schoenberg, De Leeuw)

-- *Center for Statistical Computing* (Hansen)

-- *Center for Image and Vision Sciences* (Zhu, Yuille, Wu)

-- *Center for the Teaching of Statistics* (Gould and the Teaching Faculty)

-- *Laboratory of Statistical Genomics* (Sabatti)

-- *Studio of Bio-data Refining and Dimension Reduction* (Li)

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Lessons

-- Pay attention to Campus Initiatives (Bioinformatics, Computing, UCLA in LA).

-- Link with large interdisciplinary projects (Embedded Networks, Institute for the Environment).

-- PI's autonomy and responsibility. Federal model.

-- Use a very wide definition of statistics.

-- Preprints, Digital Library, E-Journals.

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