Course-Level Analytics: Common Themes and New Directions for Institutional Research

Bob Cox

University of California, Los Angeles

California Association for Institutional Research

November 18, 2016 Los Angeles

Connecting Course-Level Analytics with the Past and with the Future of Institutional Research

- Step back to "The Future of IR" keynote panel at CAIR 2015

•**Bob Daly**
The Future of IR
•**Paula S. Krist**
Institutional Research: Thoughts About the Future
•**Edward Sullivan**
The Future of IR
•**J. Fredericks Volkwein**
The Challenges of Strategic Planning and Enrollment Management
•**Terrence Willet**
Hybrid Vigor: Infusing IT into IR

- We begin with a critical passage found in Bob Daly's presentation:

List of IR duties

I put together a list of 16 different IR-type duties. I could probably put together a list of two or three dozen different responsibilities and duties of IR offices by looking through IR job announcements. But, that longer list may not be complete. We sure are doing a lot--maybe too much.

In many ways, all the duties and tasks of IR have not changed for years. Fred Volkwein, our keynote speaker, told me that the topics at this conference and other IR conferences are just about the same as the topics of thirty years ago, only the sophistication of the tools we use are different.

With such a long list of IR duties, it's no wonder that we have hard time explaining what we do for a living. Maybe we need a focus or a specialty that will define IR.

What should we do

To look for that specialty, let's ask the question: "What should we be doing?" Is there a task that can help shape and define the future of IR. Let me summarize what I think we should be doing in two words: Decision Support.

What is IR All About?

And the Plain Sense of Turning to Course-Level Analytics

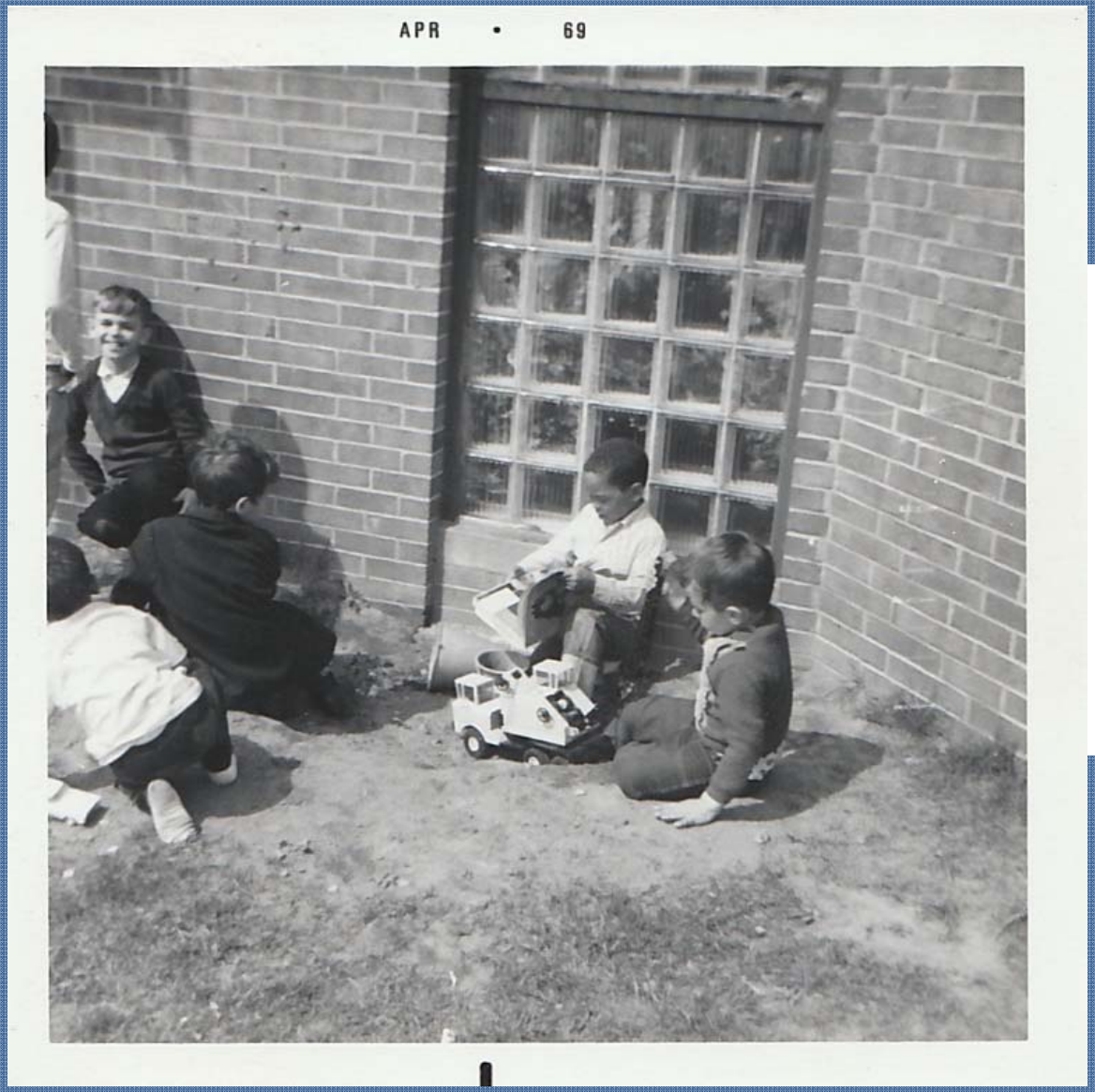
- **YES – Bob Daly's** assertion is compelling and correct: **Decision Support** is the best two-word summary of what IR needs to be about when it comes to fulfilling responsibilities to the institutions in which it is embedded – Institutional Research must provide reliable, timely, and effective decision support. **This is the institutional aspect of IR.**

- Daly's presentation went on to note that a decision support orientation commits IR to a dynamic, future-focused mode of operation, as opposed to being bogged down in reporting statistics about what has already been decided and done (no matter how necessary this may be for purposes of providing accountability or promoting the institutional profile). I am in agreement here too.

- **But what kinds of decisions or sets of decision-makers IR should endeavor to support?**

- Should IR participate primarily in a vertical or 'hierarchical' decision support regime that runs up reporting lines and leads to the top? What are the prospects for developing a more comprehensive or distributed working profile enabling IR to identify and seize upon outstanding opportunities to make a difference for decision makers at all organizational levels?

- In approaching such questions, I find it helpful to recall the emphasis on **collaboration across the organization** outlined in **Ed Sullivan's** contribution to that same panel at CAIR 2015 - and to note the 'aspirational' approach and the accomplishments in magnifying the impact of IR demonstrated in an impressive CAIR 2016 TED TALK by **Ryan Cherland** and his office and his collaborators at UC Irvine.



My Early Sandbox

Michigan State
April 1969

The Research Aspect of Institutional Research

And the Plain Sense of Turning to Course-Level Analytics

- But if a future-oriented commitment to distributed, collaborative, innovative, and productive decision support is what IR must always be about, it does not follow that in selecting questions to explore and analytical approaches to test institutional researchers must be guided exclusively by expressed needs defined by other parts of the organization.

- In order to be collaborative and innovative and productive in decision support, IR needs to have something of its own, something original to contribute, based on a perspective distinct from that of other operational units of the organization. **This is the research aspect of IR.** It is an intrinsic and inseparable part of the compete package.

- Now, among the research topics considered most worthy of investigation from an IR perspective, research on student outcomes or student success always ranks high. Over the past several years, however…

- … with the advent of more powerful data processing engines, investigations into the causes and conditions of student success have pushed into increasingly complex and granular areas, including detailed study of the kinds of **course-level events** that can be plausibly connected to predictive or prescriptive conclusions. As all of us are now well aware, analytical systems operating at this level are proliferating.

An Operational Level Always Present Behind the Scenes
And the Plain Sense of Turning to Course-Level Analytics

- The rise of **predictive analytics** is certainly one important reason why research interest in the IR field is has in recent years turned more toward **course-level analytics**. But there are others.
- This presentation will describe several ways in which this has come to pass in my own work, but it will also show that course-level analysis has been **a core element of the IR enterprise** from the very beginning – that is, from the point at which IR functions and activities began to be recognized as such and organizationally differentiated from those of the Offices of the Registrar in which they were originally performed.
- My argument is that course-level analysis and course-level analytic routines have always been in operation at an underlying level -- or, as it were, 'behind the scenes' in institutional research.
- Forms of analysis in which courses and classes serve as fundamental elements or entities – as opposed to, say, students, or faculty, or academic departments, etc. -- offer many productive jumping-off points for analysis directly connected to distributed institutional decision support as well as opportunities to conduct useful, innovative, and original institutional research.
- We will begin with an excerpt from a presentation I made last fall along with parallel presentations by **Amber Machamer** and **Ryan Cherland** at the University of California Budget and Planning Retreat at Lake Arrowhead.


© Mike Sekulic

A Horse is a Horse: Dimensions of Course-Level Analytics

Bob Cox, UCLA
Amber Machamer, UCB
Ryan Cherland, UCI

UC Budget and Planning Retreat
October 7, 2015 Lake Arrowhead

Course-Level Analytics as a Common Theme for Institutional Research Activity

- Institutional research foundations in basic operations of the Office of the Registrar
  - **Big Data circa 1965 – moving to the mainframe, IR on the Org Chart, birth of a profession**
  - **Big Data circa 1995 – moving to the desktop and the server, distributed processing power**
  - **Big Data circa 2015 – enormous processing power, metrics and analytics on the march**
- Re-emergence of the **course** (and the **classes offered**) as the unit of analysis
- Courses and course-level events provide the material and a serve as the underlying medium for analytical studies of many different kinds
  - Student pathways, academic progress and achievement, graduation rates and time-to-degree
  - Instructional workload analysis, teaching workforce composition and activity
  - Profiles of academic departments as managers of instructional programs
  - **Cost of Instruction** – staffing primary and secondary sections, classroom utilization
  - Well-established analytical forms vs. emerging dimensions of course-level analytics
- For contemporary relevance, look no further than the "Programmatic Elements" of this year's UC Budget Framework Implementation

"Programmatic Elements" in the 2015 UC Budget Framework Implementation

- Specific **courses** or types of courses are the stepping stones in model pathways to 3-year and 4-year degree completion for undergraduate majors
- Specific **courses** and groups of courses are the elements that must be evaluated in "Challenge 45" reviews of undergraduate major programs
- Applying the Common Identification Number System (C-ID) to **courses** may help to streamline articulation and strengthen CCC transfer pathways
- Using technology to expand online offerings calls for focusing on high demand or gateway **courses**, bottleneck **courses**, and high failure rate **courses**
- Summer Sessions are set up to operate on **course by course** basis – a critical condition for modeling supply and demand under alternative pricing schemes
- Predictive (cum Prescriptive) Analytics schemes are built-up around student performance in certain kinds of **courses**
- Activity Based Costing (ABC) calls for models rooted in descriptions of basic operations at the level of specific **courses** or types of courses

Some Perspectives and Components Encountered in Course-Level Analytics

- Courses Constitute the Curriculum – they are the 'elementary particles' in patterns established to govern the instructional function at the heart of the higher education enterprise
- Many and Varied Attributes of Courses
  - As Components of General Education and Other Basic Degree Program Requirements
  - As Components of Major Programs, Minor Programs, Honors Programs, etc.
  - As Nodes in Networks: Connections and Intersections among Courses
    - Prerequisites, Sequences, Equivalency Subsets, Articulation, Depth and Breadth of Major Programs
    - Cross-listings, Interdepartmental Collaboration and Cooperation in Course Offerings
  - Teaching Formats: Lectures, Seminars, Independent Studies, Online Elements, etc.
- Courses are Realized in Classes Offered -- Primary Class Sections and Secondary Sections
- Many Attributes of Classes are Relevant for Analysis
  - Refreshment Pattern of Offerings in Regular Terms and Summer Sessions
  - Staffing Patterns – Lead Instructors, Teaching Assistants, Readers, etc.
  - Enrollment Patterns – Class Size, Attributes of Students Enrolled, Grading Patterns
  - Scheduling Patterns – Days and Times of Meeting, Locations, Classroom Utilization

Finding the Course at the Source of Many Lines of Institutional Research Theory and Practice

- In course-focused precursors of later Institutional Research Reports produced by Sidney Suslow in the Office of the Registrar at UC Berkeley in 1956 and 1958

- In the "Massy/Zemsky" paradigm describing an "Academic Ratchet" linking advancement in academic specialization (more courses in the curriculum) to smaller average class sizes as a key driver of runaway cost increases in higher education

- In a "Curriculum Delivery Analysis" project inspired by that paradigm (and Suslow's example!) at Berkeley in the 1990s. The main item of interest: Between 1964 and 1994 the count of courses in the catalog relative to the count of permanent faculty on staff **increased from 3.2 to 5.5 per capita**

- This analysis also found differences by discipline in course "presentation rates" and "refreshment rates" -- metrics that help to outline depth and breadth dimensions of different major programs that can make for big differences pathways to the degree

UNIVERSITY OF CALIFORNIA BERKELEY: OFFICE OF THE REGISTRAR

COMPARISON

OF

COURSES OFFERED AND CONDUCTED

AND OF

CLASSES CONDUCTED

BY THE TEACHING DEPARTMENTS OF THE BERKELEY CAMPUS

A Comparison of the Academic Years 1954-55, 1955-56, 1956-57

Departments Arranged by Subject-Matter Groups	Class Level	1954-1955			1955-1956			1956-1957			Average			Percent of Offered Courses That are Conducted	Ratio of Classes to Courses (per course)
		Courses Offered	Courses Conducted	Classes Conducted	Courses Offered	Courses Conducted	Classes Conducted	Courses Offered	Courses Conducted	Classes Conducted	Courses Offered	Courses Conducted	Classes Conducted		
PHYSICAL SCIENCES															
Astronomy	LD	6	6	8	6	6	8	6	6	8	6	6	8	100	1.3
	UD	8	8	8	8	6	6	8	4	4	8	6	6	75	1.0
	G	21	17	17	19	11	11	17	14	14	19	14	14	74	1.0
	TOTAL	35	31	33	33	23	25	31	24	26	33	26	28	79	1.1
Chemical Engineering	LD														
	UD	15	13	14	15	13	13	19	18	18	16	15	15	94	1.0
	G	9	8	8	11	10	10	11	10	10	10	9	9	90	1.0
	TOTAL	24	21	22	26	23	23	30	28	28	27	24	24	89*	1.0
Chemistry	LD	11	11	11	11	11	11	11	11	11	11	11	11	100	1.0
	UD	38	37	38	38	36	38	39	36	40	38	36	39	95	1.1
	G	12	11	11	11	9	9	12	11	11	12	10	10	83	1.0
	TOTAL	61	59	60	60	56	58	62	58	62	61	58	60	95	1.0
Geology	LD	4	4	4	5	4	4	5	5	5	5	4	4	80	1.0
	UD	19	19	19	20	19	19	20	20	20	20	19	19	95	1.0
	G	24	24	24	24	21	21	25	22	22	24	22	22	92	1.0
	TOTAL	47	47	47	49	44	44	50	47	47	49	46	46	94	1.0
Mineralogy	LD	2	2	2	2	2	2	2	2	2	2	2	2	100	1.0
	UD	3	3	3	1	1	1	1	1	1	2	2	2	100	1.0
	G				2			2	2	2	1	1	1	100	1.0
	TOTAL	5	5	5	5	3	3	5	5	5	5	4	4	100	1.0
Mathematics	LD	35	35	153	37	37	176	33	33	188	35	35	172	100	4.9
	UD	37	36	53	34	34	61	41	39	79	37	36	64	97	1.8
	G	30	27	46	44	39	39	39	39	41	38	35	42	92	1.2
	TOTAL	102	98	252	115	110	276	113	111	308	110	106	279	96	2.6
Physics†	LD	16	16	22	12	12	20	16	16	23	15	15	22	100	1.5
	UD	30	30	37	29	29	38	30	30	45	30	30	40	100	1.3
	G	29	25	25	44	42	42	40	39	39	38	35	35	92	1.0
	TOTAL	75	71	84	85	83	100	86	85	107	82	80	97	98	1.2
Statistics	LD	3	3	9	3	3	9	6	6	8	4	4	9	100	2.3
	UD	19	17	19	18	18	19	20	19	21	19	18	20	95	1.1
	G	33	31	31	33	32	32	33	32	32	33	32	32	97	1.0
	TOTAL	55	51	59	54	53	60	59	57	61	56	54	60	96	1.1
TOTAL PHYSICAL SCIENCES		404	383	562	427	395	589	436	416	644	422	398	598	94	1.5

*See footnote on Page 2.

†Physics 3A, 3B, and 24-41 courses were not included.

December, 1956

OPERATIONAL STATISTICS, DEPARTMENT OF PHYSICS

ENROLLMENT: Number of Student Credit Hours and % Increase, 1953-54, 1954-55, 1955-56, 1956-57, Fall Term.

	Lower Div.	Upper Div.	Undergrad.	Grad.	Total
1953-54	4421	1300	~~5721~~	1248	~~6969~~
% Inc.	---				
1954-55	5929	1702	7631	1165	8796
% Inc.	34	31	33	2	28
1955-56	6449	2009	8458	1267	9725
% Inc.	9	18	11	9	11
1956-57	6219	2330	8549	1494	10,043
% Inc.	-4	16	1	18	3

FULL-TIME-EQUIVALENT FACULTY AND STUDENTS: 1955-56, Fall Term

Regular Fac.(Lect.,Inst.,Profs.) 26.99 Total Fac. (Reg.+TA,Assoc.) 56.49

Students: Lower Div. 429.9 Upper 133.9 Grad. 281.7 Total 845.5

STUDENT-FACULTY RATIO: Fall Term, 1955-56

LD/Tot	UD/Reg	Grad/Reg.	TE/Comb	TE/Reg.	TE/Tot
7.6	5.0	10.5	23.1	31.3	15.0

(Reg. = regular faculty; Total = total faculty; Comb = sum of ratios, lower division students to total faculty, upper division and graduate students to regular faculty; TE = total enrollment.)

TEACHING LOAD: Average Contact Hours and Units in Fixed Unit Courses and Student Credit Hours in Variable Unit Courses per FTE Regular Faculty, Fall 1955.

Contact Hours Lect.	Contact Hours Total	Units	Student Credit Hours
4.0	5.2	8.8*	16.2

SMALL SIZE CLASSES: Number of Classes to Total, Fall 1955, Enrolling - -

10 Students or Under LD	10 Students or Under UD	3 Students or Under Graduate
---	2/18	1/21

NUMBER OF COURSES: 1955-56

Calif.	Chicago	Columbia	Harvard	Illinois	Michigan	Minnesota	Wisc.
77	26	49	39	55	49	61	52

PRECENT OF UPPER DIVISION MAJOR STUDENT'S WORK TAKEN IN MAJOR DEPARTMENT DURING JUNIOR AND SENIOR YEARS: Based on Quarter Sampling of June, 1956, Graduating Seniors. 45.6

* Department figure.

William F. Massy
Robert Zemsky

Faculty Discretionary Time

Departments and the "Academic Ratchet"

The 1990s have emerged as an era for re-asking fundamental questions about the productivity and efficiency of American enterprises — a change in national mood and circumstance that increasingly has come to dominate discussions about American colleges and universities. For the first time since the upheavals of the 1960s and the Vietnam War, American higher education has found itself on the defensive, having to explain that colleges and universities are neither privileged havens of waste nor institutions so out of touch with reality that they are on the verge of losing their relevance.

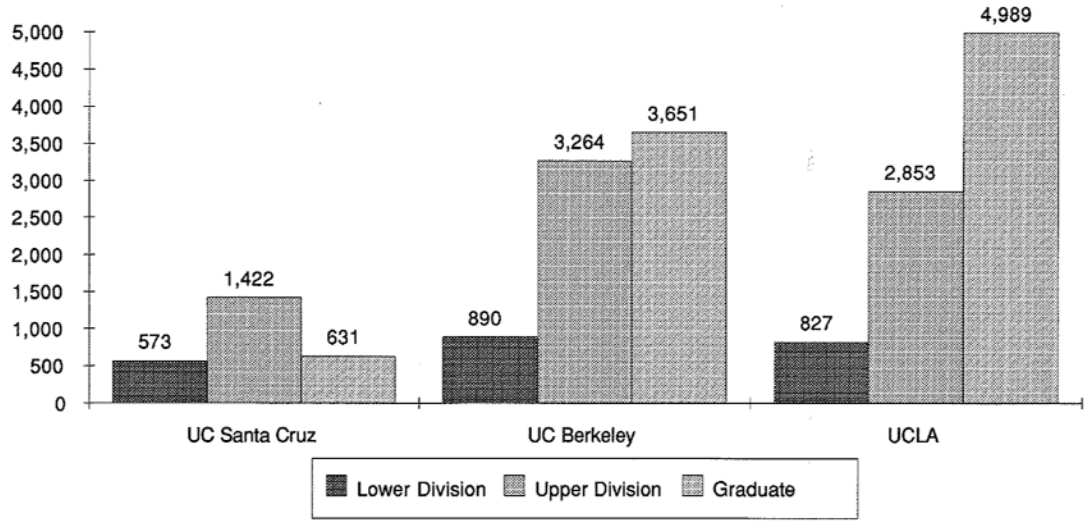
In less than three years, colleges and universities have moved from the ambivalent affluence of the 1980s into an era of resource constraints and nettlesome public scrutiny. Public funding for higher education has declined in absolute terms and, more important for the long-term future of colleges and universities, as a share of public appropriations. Public as well as private institutions have found themselves in the uncomfortable position of having to decrease expenditures per student while simultaneously increasing tuition at a rate that exceeds the cost of living. These actions have made clear what many have long suspected: that students are being asked to pay more for less [1, 6].

The research for this article was supported by The Pew Charitable Trusts. The authors gratefully acknowledge Joy Mundy's invaluable assistance in perfecting and implementing the parameter estimation algorithm.

William F. Massy is professor of education and director, Stanford Institute for Higher Education Research at Stanford University, and Robert Zemsky is professor of education and director, Institute for Research on Higher Education at the University of Pennsylvania.

Journal of Higher Education, Vol. 65, No. 1 (January/February 1994)

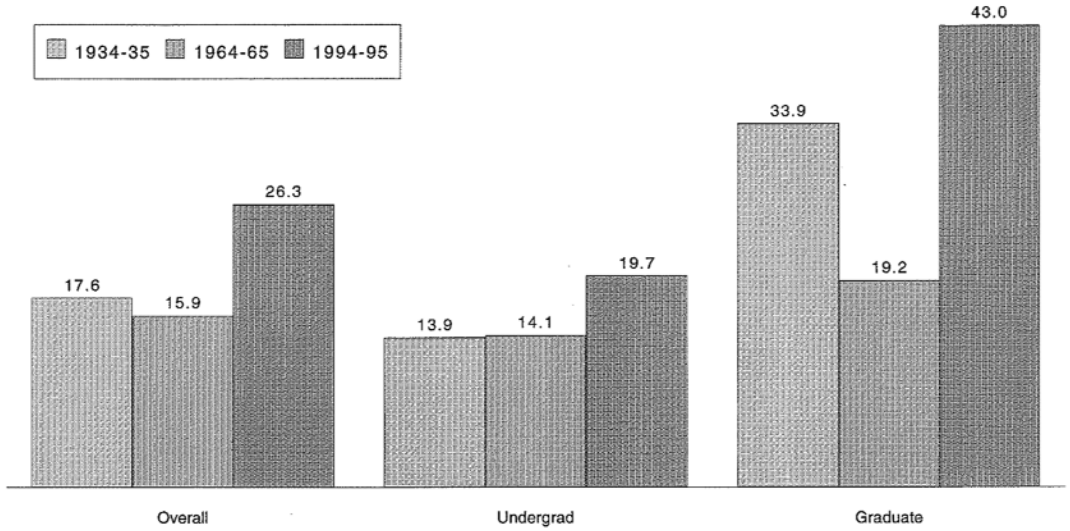
Recent Catalog Course Counts by Course Level at UC Santa Cruz, UC Berkeley, and UCLA

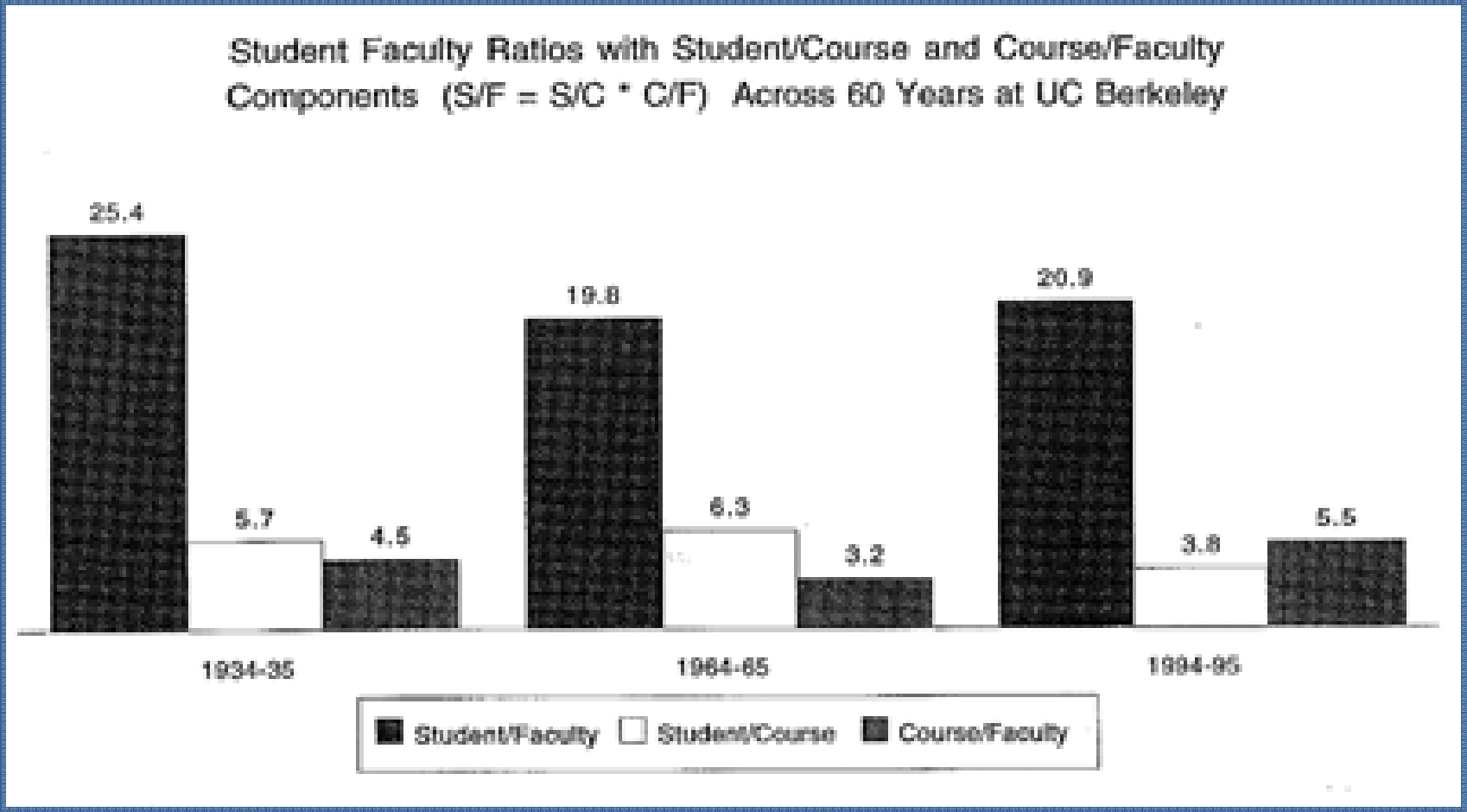


Students, Faculty, and Courses at UC Berkeley Across 60 Years

	1934-35	1964-65	1994-95	Δ 34-35 to 64-65	Δ 64-65 to 94-95
Fall Headcount Students					
Lower Division (Fr/So)	4,276	7,569	8,240	77 %	9 %
Upper Division (Jr/Sr)	5,289	10,109	12,898	91 %	28 %
Undergraduates	9,565	17,678	21,138	85 %	20 %
Graduate Students	2,179	9,963	8,496	357 %	-15 %
Total Students	11,744	27,641	29,634	135 %	7 %
Budgeted FTE Ladder Faculty	463	1,393	1,420	201 %	2 %
Number of Courses in Catalog					
Lower Division	294	417	890	42 %	113 %
Upper Division	1,034	2,074	3,264	101 %	57 %
Undergraduate Courses	1,328	2,491	4,154	88 %	67 %
Graduate Courses	738	1,914	3,651	159 %	91 %
Total Courses	2,066	4,405	7,805	113 %	77 %

Number of Courses per 100 Students Overall and by Course-Student Level Across 60 Years at UC Berkeley




Student Faculty Ratios with Student/Course and Course/Faculty Components (S/F = S/C * C/F) Across 60 Years at UC Berkeley
25.4
5.7
4.5
19.8
6.3
3.2
20.9
3.8
5.5
1934-35
1964-65
1994-95
Student/Faculty
Student/Course
Course/Faculty


UCLA

Finding the Course at the Source of Many Lines of Institutional Research Theory and Practice

Two Useful Applications of Course-Level Analytics at UCLA Today

- For a contemporary example, see results of a 2014 study designed to address the "urban legend" that a substantial fraction of UCLA undergrads are unable enroll in a class of less than 100 in the major department in the senior year
- (Yes, it happens to some seniors, but the legend of its pervasiveness is laid to rest.)

- See also an analysis and report directed to the Faculty Executive Committee of the UCLA College of Letters and Science addressing a concern that the supply of seats in designated "diversity courses" might not be sufficient to support a new Diversity Requirement
- (The concern was laid to rest and the faculty voted to implement the requirement.)

Final-Year Primary Class Enrollment Patterns for All Spring/Summer Baccalaureate Degree Completions at UCLA in 2012 and 2013 with Detail for 51 Departments or Programs Producing 25+ Completions in These Two Years Combined

Department / Program	Number of Grads	Average Number of Primary Classes in Major and Other Departments			Average Class Enrollment in Major and Other Departments			Median Class Enrollment in Major and Other Departments			Percentage of Graduates with Smallest Class in Major Department ...		
	Total	Total	Major	Other	Total	Major	Other	Total	Major	Other	Over 100	Over 50	Under 21
All Completions	**11,661**	**10.4**	**5.3**	**5.1**	**90**	**80**	**101**	**60**	**56**	**66**	***4.6***	***21.1***	***25.8***
Psychology	1,277	10.5	6.0	4.4	130	146	108	108	**139**	66	*7*	*20*	*25*
Political Science	831	9.9	4.5	5.4	96	103	91	80	**112**	56	*16*	*61*	*10*
Economics	774	11.8	5.6	6.3	104	115	94	81	**108**	72	*16*	*54*	*8*
Anthropology	539	10.1	5.5	4.6	108	116	99	78	**83**	62	*3*	*46*	*14*
Computer Science	185	10.3	6.8	3.5	91	85	103	80	**79**	80	*4*	*27*	*10*
Communication Studies	293	9.8	5.3	4.5	94	77	115	77	**77**	74	*2*	*31*	*20*
Sociology	505	9.8	4.4	5.3	89	82	96	69	**74**	58	*4*	*55*	*13*
Geography	208	9.7	6.1	3.6	81	80	84	66	**74**	54	*1*	*23*	*20*
Inst Env & Sustainability	127	11.8	5.8	6.0	84	72	96	69	**70**	67	*2*	*37*	*2*
Chemistry & Biochem	378	9.9	4.5	5.4	97	74	117	69	**66**	77	*1*	*32*	*22*
Chemical Engineering	119	11.2	7.5	3.7	78	63	107	68	**62**	72	*2*	*3*	*34*
Statistics	82	10.9	7.6	3.3	73	58	106	61	**61**	69	-	*1*	*31*
History	648	9.8	5.1	4.7	93	89	97	61	**60**	62	*1*	*6*	*34*
Art History	142	10.0	6.2	3.8	71	69	74	57	**58**	33	-	*19*	*37*
Nursing	116	6.1	5.1	1.0	60	54	95	58	**58**	52	-	*47*	*9*
Ecology & Evol Biology	482	10.9	4.7	6.2	125	106	139	90	**52**	117	*5*	*13*	*19*
Civil & Env Engineering	118	10.5	7.6	2.9	84	67	127	55	**50**	91	*10*	*10*	*16*
Philosophy	229	9.5	6.3	3.2	79	70	97	51	**48**	55	*1*	*2*	*14*
Integ Biology & Physiology	381	10.6	4.6	6.0	111	93	125	73	**47**	117	*1*	*2*	*22*
Electrical Engineering	211	11.1	6.8	4.3	80	62	108	59	**46**	80	*4*	*6*	*28*
Mechanical & Aero Engr	225	10.1	7.9	2.2	72	56	128	47	**44**	85	*13*	*13*	*9*
Asian American Studies	58	10.0	4.2	5.7	62	46	74	46	**44**	49	*2*	*4*	*24*
Bioengineering	86	11.3	7.1	4.3	76	43	130	53	**43**	103	*2*	*2*	*66*
Chicana/o Studies	123	9.7	3.8	5.9	72	60	79	43	**41**	47	*2*	*9*	*38*
Mathematics	437	10.2	4.1	6.1	83	43	109	46	**39**	85	*1*	*2*	*4*
English	572	9.6	5.2	4.5	61	39	87	39	**39**	44	-	*1*	*27*
Linguistics	157	9.6	3.8	5.7	62	32	82	38	**36**	39	-	-	*31*
Spanish & Portuguese	127	10.1	4.8	5.3	71	46	93	39	**35**	53	-	*5*	*37*
Classics	28	9.9	5.8	4.1	61	37	95	41	**34**	68	-	-	*46*
MIMG	202	10.5	4.7	5.8	83	58	104	47	**32**	64	*3*	*8*	*53*
Materials Science & Engr	37	11.1	7.2	3.9	59	42	90	36	**32**	68	-	-	*59*
Neuroscience	236	10.5	3.4	7.1	103	66	121	65	**30**	95	*4*	*4*	*58*
MCD Biology	202	11.3	5.9	5.4	77	48	109	32	**30**	66	*1*	*7*	*57*
Afro-American Studies	50	9.9	3.4	6.5	79	39	100	44	**30**	60	-	*9*	*49*
Asian L&C	103	10.2	6.4	3.8	52	34	82	33	**28**	43	-	*1*	*22*
Arch & Urban Design	41	9.0	5.6	3.3	48	25	88	28	**28**	60	-	-	*11*
International Institute	351	10.0	1.9	8.1	74	40	82	55	**25**	58	-	-	*50*
French & Francophone	45	10.4	4.9	5.5	50	23	74	26	**24**	35	-	-	*30*
Musicology	25	11.0	5.7	5.3	35	22	48	22	**23**	22	-	-	*58*
Design | Media Arts	64	9.4	5.5	3.9	51	23	91	22	**20**	55	-	-	*77*
WAC / Dance	82	12.2	7.4	4.8	57	30	99	22	**19**	63	*1*	*1*	*84*
Physics & Astronomy	104	10.7	6.7	4.0	53	26	101	28	**19**	55	-	-	*46*
Gender Studies	124	9.8	4.3	5.5	51	24	72	30	**19**	39	-	-	*49*
Near Eastern L&C	32	10.7	5.4	5.2	56	26	88	25	**17**	59	-	-	*63*
Study of Religion	27	9.8	4.0	5.8	47	19	66	22	**16**	34	-	-	*59*
Comparative Literature	27	10.2	2.6	7.6	43	15	52	23	**15**	30	-	-	*55*
Art	79	10.1	6.2	3.8	40	15	81	16	**15**	41	-	-	*70*
Theater	96	14.0	9.5	4.5	50	18	115	17	**14**	67	*1*	*2*	*92*
Ethnomusicology	35	14.5	9.2	5.3	40	21	73	18	**13**	27	-	-	*94*
Film, TV, Digital Media	63	11.1	9.2	1.9	38	30	78	18	**12**	34	*2*	*2*	*94*
Music	52	14.8	9.7	5.1	42	21	83	17	**8**	41	-	-	*98*

UCLA

MEMORANDUM

Office of Academic Planning & Budget
2107 Murphy Hall
140501

March 9, 2015

Christina Palmer
Chair, College Faculty Executive Committee
760 Westwood Plaza, 47-422 Semel Institute
175919

Dear Christina:

Over the past two weeks I have had the opportunity to examine historical enrollment capacity and consider questions of future supply and demand for the current set of proposed courses that would satisfy the Diversity Requirement in the College. This exercise builds upon what we have learned from special studies of enrollment capacity for courses that satisfy the General Education and Writing II requirements, as well as general studies of enrollment capacity for all undergraduate courses during the past four years of significant growth in the undergraduate population at UCLA.

For purposes of analysis at this time, proposed courses under active consideration fall into three subsets:

- 50 approved courses
- 45 courses awaiting final approval
- 36 courses at an earlier state of the approval process

In the last two complete academic years (2012-13 and 2013-14) total enrollment capacity (the number of seats offered) has averaged about 6,000 per year for courses in the first group of approved courses and about 4,000 per year for courses in each one of the other two groups. Seats offered have been 87% filled on average, similar to the rate for all other undergraduate courses. If all proposed courses in all three groups are eventually approved, assuming no net change in the aggregate number of seats offered in these courses, total diversity requirement course capacity can be estimated at about 14,000 seats per year going forward.

Briefly stated, it seems clear to me on the basis of this analysis that in the subset of 50 approved courses alone there is more than enough capacity to get the first cohort of College freshman subject to the requirement off to a strong start in Fall 2015. It also appears to be the case that if all or most of the courses in the other two groups are eventually added to the roster there is a high probability that there will indeed be sufficient, sustained capacity in the future (at equilibrium) to ensure that demand for enrollment to meet the requirement can be absorbed by the system without generating excessive strain either for the course system itself (bottlenecks, backlogs, etc.) or for the students who must meet the requirement (extended time to degree, etc.).

On the demand side, we expect the number of new undergraduates entering the College to average 4,850 per year at the freshman level from Fall 2015 forward and 2,850 per year at the transfer level from Fall 2017 forward (the first year in which the requirement applies to transfers) for a grand total of 7,700 new students who must meet the requirement each year from Fall 2017 forward. The number of 'requirement satisfying' enrollments in diversity courses would therefore need to be at least 7,700 per year at equilibrium, assuming that all entering students will be retained at least long enough to need one diversity course, and that all 'satisfying' course enrollments must occur here at UCLA.

For at least the first two years, 2015-16 and 2016-17, the number of 'satisfying' enrollments does not need to be anywhere near this figure, since the entering transfer cohorts will not be subject to the requirement and students in the first two freshman cohorts will be distributing the 'satisfying' enrollments over four years of attendance at UCLA. It is also clear that the total capacity of diversity requirement courses will eventually need to be much greater than the baseline 7,700 figure in order to ensure sufficient space for enrollment by students who have already met or do not need to meet the requirement, but who will continue to enroll in these courses for a variety of other reasons. How much greater total capacity needs to be, and how soon it needs to get to this level, are questions that will benefit from additional study, but if capacity eventually approaches the 14,000 seat total cited above, it appears to me that prospects are very good that the diversity requirement will impose little or no additional strain on students or on the course system as a whole.

I am happy to discuss any questions you may have about the statements above and to support any further discussion or need for analysis that may arise in connection with these issues.

Sincerely,

Robert Cox
Director, Enrollment Planning and Academic Performance Analysis
Academic Planning and Budget

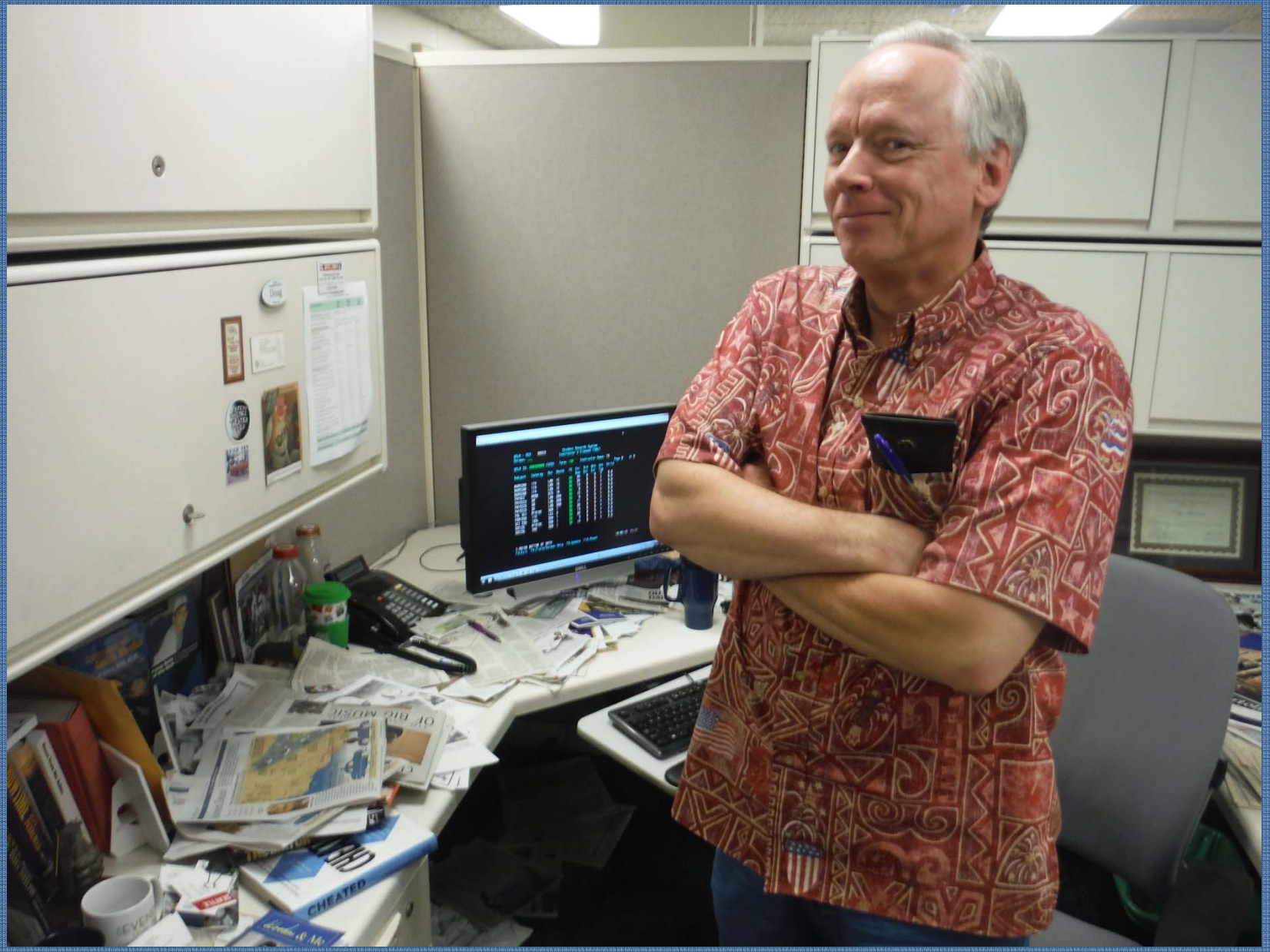
Tracing an Extended Engagement in Course-Level Analytics at UCLA Today

- Significant budget cuts beginning in 2008-09 and rapid growth in non-resident enrollment beginning in 2011-12 have stimulated renewed and sustained efforts to make use of course-level analytics to guide decisions and direct resources to areas of increased need and rising demand for access to undergraduate courses

- Excerpts below from CAIR presentations in 2009, 2011, 2012 and 2013 document stages, twists, and turns in the development of these efforts

- The Scheduling Office is where the rubber meets the road when it comes to transforming catalog courses into class offerings, so before going down that path we begin with a photo of **Doug Thomson**, scheduling coordinator in the Office of the Registrar at UCLA. In 2014-15 Doug managed the assignments of class times and classroom spaces rooms for more than 5,500 primary classes and 8,000 secondary sections

- With a fixed classroom inventory, rapid growth in demand for class placements, and strong cross-pressures from departments and faculty competing for times and spaces, the inherently difficult scheduling operation has been elevated to monumentally difficult status in recent years – posing serious questions about capacity for continuing growth


CHEATED

Shaken & Stirred

Depressed Conditions and New Engagements for Institutional Research

Bob Cox – UCLA

with special guest

Van Novack – Cal State Long Beach

California Association for Institutional Research

November 20, 2009 Sacramento

Full presentation now posted at

http://www.cair.org/conferences/cair2009/pres/Cox_Shaken%20and%20Stirred.pdf


California's
San Andreas Fault
Crescent City
Eureka
Garberville
Point Delgada
Point Arena
Ukiah
Santa Rosa
Point Reyes
San Francisco
Daly City
San Jose
Santa Cruz
Hollister
San Juan Bautista
Monterey
Parkfield
San Luis Obispo
Simmler
Carrizo Plain
Soda Lake Rd
Frazier Park
Palmdale
Santa Barbara
San Bernardino
Desert Hot Springs
Los Angeles
Palm Springs
Brawley
San Diego
San Andreas Fault
Map copyright © 2006 David K. Lynch

Shaken - Summer 2008

- **Financial news - cuts to academic unit budgets**
- **Enrollment news – projected 1,500 FTE over "budget"**
- **News from the Scheduling Office – cancelled classes**
- **News from Orientation – tight space at summer's end**
- **A Shocking Realization – for the first time in its history, UCLA may be at risk of entering a term in which there are not enough seats offered in classes to meet aggregate undergraduate demand**

Stirred - Summer 2008

- Tap into course scheduling system records of **seats offered and seats filled** in every undergraduate course on a repeated basis in advance of an upcoming term
- **A new data source for IR / Learning how to use it**
- Circulate summary reports on the evolving situation for campus leadership and detailed reports to managers responsible for course offerings
- Project aggregate demand / Benchmark proposed seat offerings against comparable past term seats offered and seats filled
- Department managers use detailed reports to formulate funding requests
- Funding distributed - most serious shortages and bottlenecks addressed

Assembling the Components

- Fundamental Measures of Instructional Activity
  - Undergraduate Courses Offered, Term by Term
  - Primary Classes and Secondary Sections
  - Seats Offered, Seats Filled, Seats Open
  - Average Primary and Secondary Enrollments per Student
  - Average Enrollment per Primary and Secondary Section
- Measures Combined and Compared at Different Levels
  - Specific Courses, Subjects, Departments and Programs
  - Schools and Divisions, Campus Totals
  - Special Groups (e.g. Courses for General Education Credit)

Seats Offered and Seats Filled in Undergraduate Primary Classes and Secondary Sections

Fall 2006 to Fall 2009 Third-Week Finals

Primary Classes

Third Week Finals	Seats Offered	Seats Filled	Seats Open	% *Open*	Headcount Enrollment	Per Capita Rates: Seats Offered	Seats Filled	Seats Open	Average Seats per Section: Sections Offered	Seats Offered	Seats Filled	Seats Open
Fall 2006	97,275	85,276	11,441	*11.8*	25,338	3.84	3.37	0.47	1,734	56.1	49.2	6.9
Fall 2007	98,130	86,474	11,656	*11.9*	25,780	3.81	3.35	0.45	1,661	59.1	52.1	7.0
Fall 2008	97,797	88,377	9,420	*9.6*	26,334	3.71	3.36	0.36	1,635	59.8	54.1	5.8
Fall 2009	98,118	89,298	8,820	*9.0*	26,442	3.71	3.38	0.33	1,570	62.5	56.9	5.6
Fall 2009 vs. Fall 2008	**321**	**921**			108				**(65)**		**2.8**	

Secondary Sections

Third Week Finals	Seats Offered	Seats Filled	Seats Open	% *Open*	Headcount Enrollment	Per Capita Rates: Seats Offered	Seats Filled	Seats Open	Average Seats per Section: Sections Offered	Seats Offered	Seats Filled	Seats Open
Fall 2006	54,856	50,642	4,229	*7.7*	25,338	2.16	2.00	0.17	2,267	24.2	22.3	1.9
Fall 2007	57,385	52,492	4,893	*8.5*	25,780	2.23	2.04	0.19	2,338	24.5	22.5	2.1
Fall 2008	58,413	54,593	3,820	*6.5*	26,334	2.22	2.07	0.15	2,353	24.8	23.2	1.6
Fall 2009	59,810	56,249	3,561	*6.0*	26,442	2.26	2.13	0.13	2,311	25.9	24.3	1.5
Fall 2009 vs. Fall 2008	**1,397**	**1,656**			108				**(42)**		**1.1**	

Excluded from the framework of this analysis are courses operating without fixed schedules or definite enrollment capacities -- such as independent study courses, most off-campus courses, Honors Contract courses numbered 89HC and 189HC, Student Research Program tutorials numbered 99, and all courses numbered 195 and above. Nursing and ROTC courses are also excluded.

New Engagements 2008-09

- **Course previews for upcoming terms now a standard issue**
- Enrollment Planning Committee forms in the College to recommend measures to protect access to courses and maintain high rates of academic progress
  - Many accomplishments in a year of work
  - Recommendations led to major overhaul of “enrollment priority” system
- Development of several new reports to support planning decisions
  - Full-year course offerings
  - Multi-year course rotations
  - General Education courses
  - Critical courses for entering freshmen and transfers
  - Term-by-term instructor staffing patterns

The Management of Undergraduate Course Offerings and the Rise of

Future Course

Bob Cox
UCLA Office of Analysis and Information Management

California Association for Institutional Research
November 11, 2011 Rohnert Park

Full presentation now posted at:
http://www.cair.org/conferences/cair2011/pres/Cox_FutureCourse_11.11.pdf

Something New Under the Sun

- The "**Future Course Planner**" at UCLA
- A survey application…
- Embedded in individual student dashboards…
- Gathering data on course preferences…
- Two or three terms in advance…
- Helps departments set section/seat offerings

March 2011 – UAIF

- **UCLA Today**
- Apr 05, 2011 By Cynthia Lee
- **Funds redirected to maintain high quality of undergraduate education**

- **UCLA's largest incoming freshman class** projected to enroll this fall, senior leaders have taken steps to ensure that there will be enough seats for first-year students in **critically needed lower-division courses**, including General Education courses; skill courses such as composition, foreign languages and quantitative reasoning; and preparation classes for impacted majors.
-
- Chancellor Gene Block and Executive Vice Chancellor and Provost Scott Waugh have decided to convert temporary resources, known as bridge funding, to a new pool of funds to meet key student enrollment needs in both core lower- and upper-division courses for all undergraduates to make sure they can graduate in a timely manner.
-
- This new resource, called the **Undergraduate Academic Incentive Funds**, will also be used to provide seed funding for innovative projects that can potentially increase the efficiency of courses and curricula. Last year, roughly $7 million in bridge funding was distributed.
-
- "Maintaining a high-quality undergraduate program is one of our highest priorities and these funds will support that goal," Waugh said. **Undergraduate Academic Incentive Funds (UAIF)** will be allocated annually after deans of the College of Letters and Science submit their requests each year for funding of courses they feel are critical to undergraduate education. Requests for funding for this year's allocation are due by April 11.

Fall 2011 - Planned Growth PLUS!

- Planned for 5,250 new freshmen
- But SIRs show many more are coming
- Actually enrolled 5,825 (= last year +26%)
- Record number of Internationals and…
- Record number of California Residents
- Expanded responsibilities for Orientation
- Identification of **"CRITICAL COURSES"**

Profiles, Projections, and Stress Tests: Pathways to Institutional Effectiveness

Bob Cox
University of California, Los Angeles

California Association for Institutional Research
November 9, 2012 Anaheim

rcox@ponet.ucla.edu

Full presentation now posted at:
http://www.cair.org/conferences/cair2012/pres/54_Cox.pdf

Apr 12, 2012 By UCLA Today staff

UCLA leaders commit funds to maintain high-quality undergraduate education

As state support for the University of California declines, campus leaders are making supplemental funding available to maintain UCLA's high-quality undergraduate education and provide the classroom seats needed to ensure that first-year students make timely progress to graduation.

Deans have submitted comprehensive proposals to utilize funding to be allocated by Chancellor Gene Block and Executive Vice Chancellor and Provost Scott Waugh in the next few weeks. While the exact amount to be allocated has not been determined, campus leaders last April made **$16 million** available for use during the current academic year.

"We want to provide a sufficient number of courses and the right kinds of courses to enable undergraduates to move in a timely manner toward completing their degrees," Waugh said. "Maintaining a high-quality undergraduate education is one of our highest priorities."

The supplemental funding has allowed the campus to accommodate a larger-than-expected freshman class. Deans and department chairs are using the funding to hire the additional instructors and teaching assistants necessary to increase core course offerings in key fields, including General Education courses; skill courses such as composition, foreign languages and quantitative reasoning; and preparation classes for impacted majors.

By paying close attention to course enrollment patterns, deans and department chairs regularly make adjustments to ensure that entering students have the courses they need and to facilitate the progress of continuing students. In recent years, careful attention to enrollment and course planning has helped students achieve the highest-ever four-year graduation rate in UCLA history.

"Approximately 91 percent of our freshman class now earns a bachelor's degree at UCLA. And of those who graduate, three-quarters (75 percent) graduate in four years or less, 21 percent graduate in five years and three percent graduate beyond the fifth year," Dean and Vice Provost of Undergraduate Education Judith Smith said. "Our goal is to increase the number of freshman students who graduate in four years and work more closely with those interested in the option of graduating in three years," she said, noting that timely graduation helps to ensure access for additional incoming freshmen.

As per-student state support for the University of California system has declined by about half over the past decade, the UC Board of Regents has increased tuition to help fill the gap with some of the revenue necessary to maintain academic excellence. But while some college campuses have had to drastically cut back on course offerings, UCLA has used careful planning and supplemental funding to meet important student enrollment needs.

"That doesn't mean that every student gets every course she or he wants at the time they want it," Smith said. "But it does mean that we have worked very hard to determine what classes are needed and to manage course enrollment so that students' needs are met."

Stress Tests in Context at UCLA

- Stress tests mark the opening of a new stage in the academic planning process at UCLA
- Building upon collaborative efforts that have enabled the campus to target instructional resources allocation far more effectively
- But the campus must still rely on the departments to take the initiative in planning for changes in instructional workload delivery
- **Stress tests, to be effective, must be developed in dialog with departments, mediated by the deans**

Student Choice & Course Enrollment Planning

Bob Cox

University of California, Los Angeles

California Association for Institutional Research

November 22, 2013 Napa

A Step Back and A Step Up Today

- UCLA's Future Course Planner (FCP) survey tool
  - Designed to help with course enrollment planning
  - Can also be 'flipped' to address a perennial question:
  - Are students are getting the classes they need and want?
- How FCP supports campus planning and operations
  - Limited uses in rich local contexts (identifying anomalies)
- What types of analyses can be done when 'flipped'
  - Facing complexity: More questions than definitive answers
- But why is this work needed; why is it being done?
- The forward-looking new main line of IR work at UCLA

The New Main Line at UCLA

- **Rapid, Progressive & Permanent UG Enrollment Growth**
- IR Program Focus Shifts from Macro- to Micro-Analysis
- Supporting Departments in Course Enrollment Planning
- Supporting Deans in Coordinating Budget Operations
- Tracing Undergraduate Pathways Course by Course
- Maintaining Access and High Quality in UG Programs
- Supporting Campus Goals for Enrollment Management

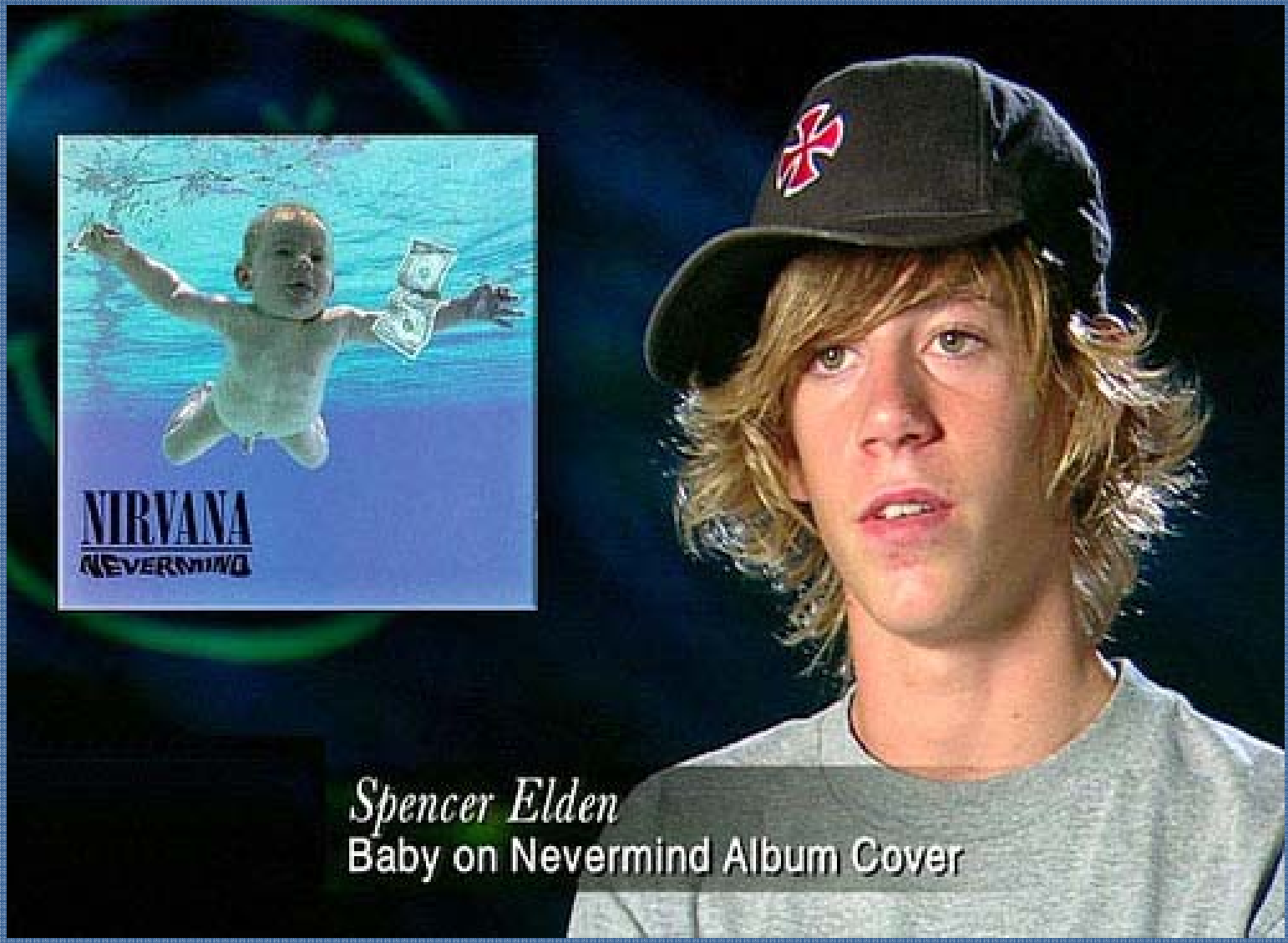
Supporting Student Choice: Access to Programs and Courses

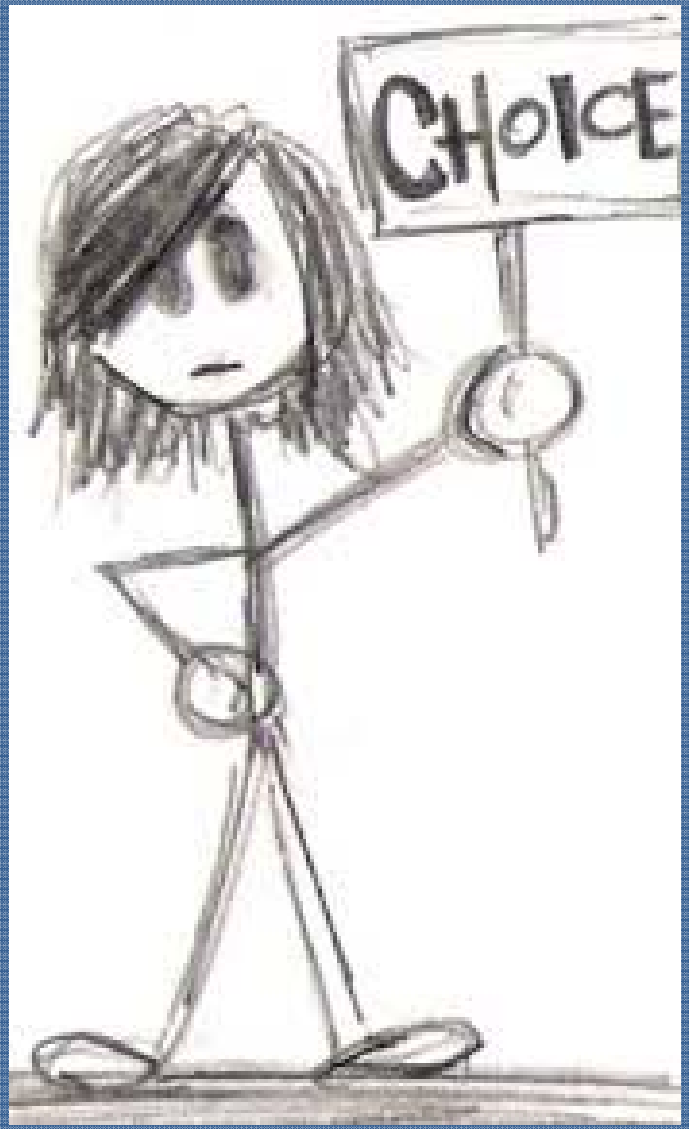
- Offering orderly access to chosen majors & minors
- Enabling students to make orderly progress in same
- Providing courses needed to support student progress
- Providing guidance needed to make best use of options

- Maintaining expected quality in instructional programs
- Maintaining or improving:
- … Graduation Rates
- … Time to Degree
- …. Student Satisfaction with Educational Experience

Supporting Campus Goals for Enrollment Management

- Operating effective and efficient instructional programs
- Managing access to the university and its programs
- Offering the right number of seats in courses
- … in the right courses
- … in the right season
- … at the right time and place
- … and being able to account for the costs of doing so


NIRVANA
NEVERMIND
Spencer Elden
Baby on Nevermind Album Cover


CHOICE

Structuring Student Choice:
A Host of Mechanisms for Guidance and Control

- Admissions Programming – Pathways for Freshmen and Transfers
- New Student Orientation Counseling
- Counseling and Advising throughout the Undergraduate Career
- General Degree Requirements: Math, Writing, General Education
- Course Unit Values and 'Expected Cumulative Progress'
- Courses as Prerequisites for Other Courses
- Major Program Requisite and Prerequisite Courses
- Minor Programs, Honors Programs, Other Special Tracks
- Courses Cross-Listed
- Upper Division Distribution Requirements ('Allied Fields', etc.)
- Residency Regulations Limiting Extension & CCC Exposure
- What is offered: Course Frequency in Regular and Summer Terms
- What is offered: Course Footprints in Time and Space, Coordination

Planning for 2013-14

- **IR** projects growth in course enrollment demand for 2013-14
- … based on course enrollment history by cohort and major mobility
- Provost requests detailed UAIF funding proposals from Deans
- Assistant Deans use IR projections to evaluate responses to the RFP
- IR and Budget Office collaborate to design uniform reporting format
- Planned expenditures are detailed by course level & instructor type
- March 2013: Budget Office receives and evaluates proposals
- May 2013: Provost approves $38m in UAIF funding for 2013-14

UCLA
COLLEGE OF
LETTERS AND SCIENCE

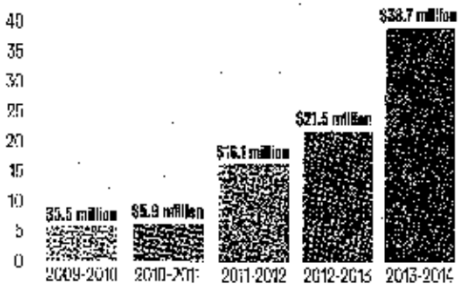
College of Letters and Science

2013-14 Undergraduate Academic Incentive Funding Request

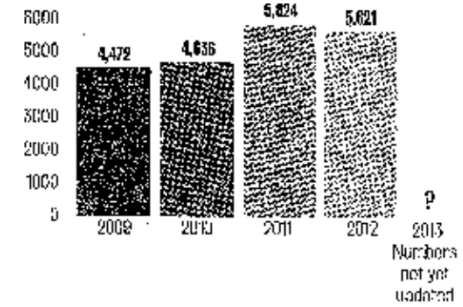
Academic funds for enrollment

To adjust to the increasing number of undergraduate students enrolled at UCLA each year, Chancellor Gene Block has allocated about $38 million in supplementary funding to academic departments over the past five years. The funds are aimed at helping departments provide more seats in classes, offer students more scheduling options and hire additional instructors. From 2009-2011, the allocated funds were known as bridge funding. For the past three years, the funds have been allocated as part of the Undergraduate Academic Incentive Funds.

Amount of funding allocated each year for the past five years



Freshman class enrollment over the past four years



[illegible]

Future Course Planner Functions in Brief

FCP Responses are -

- Summarized by Student Cohort
- Subjected to Response Rate Analysis
- Transformed into Estimates of Demand
- Compared to Course Enrollment Histories
- Circulated to Deans and Departments

Student Participation Rates Average 35% across Cohorts

Analysis of 'Flipped' FCP Initiates a New Phase of Operations

Start by Determining Simple 'Hit Rates' , that is…
Actual Course Enrollments as a % of Courses Named in FCP
But with many qualifications, not yet fully explored

Working with the 'Flipped' FCP: Initial Analytical Findings

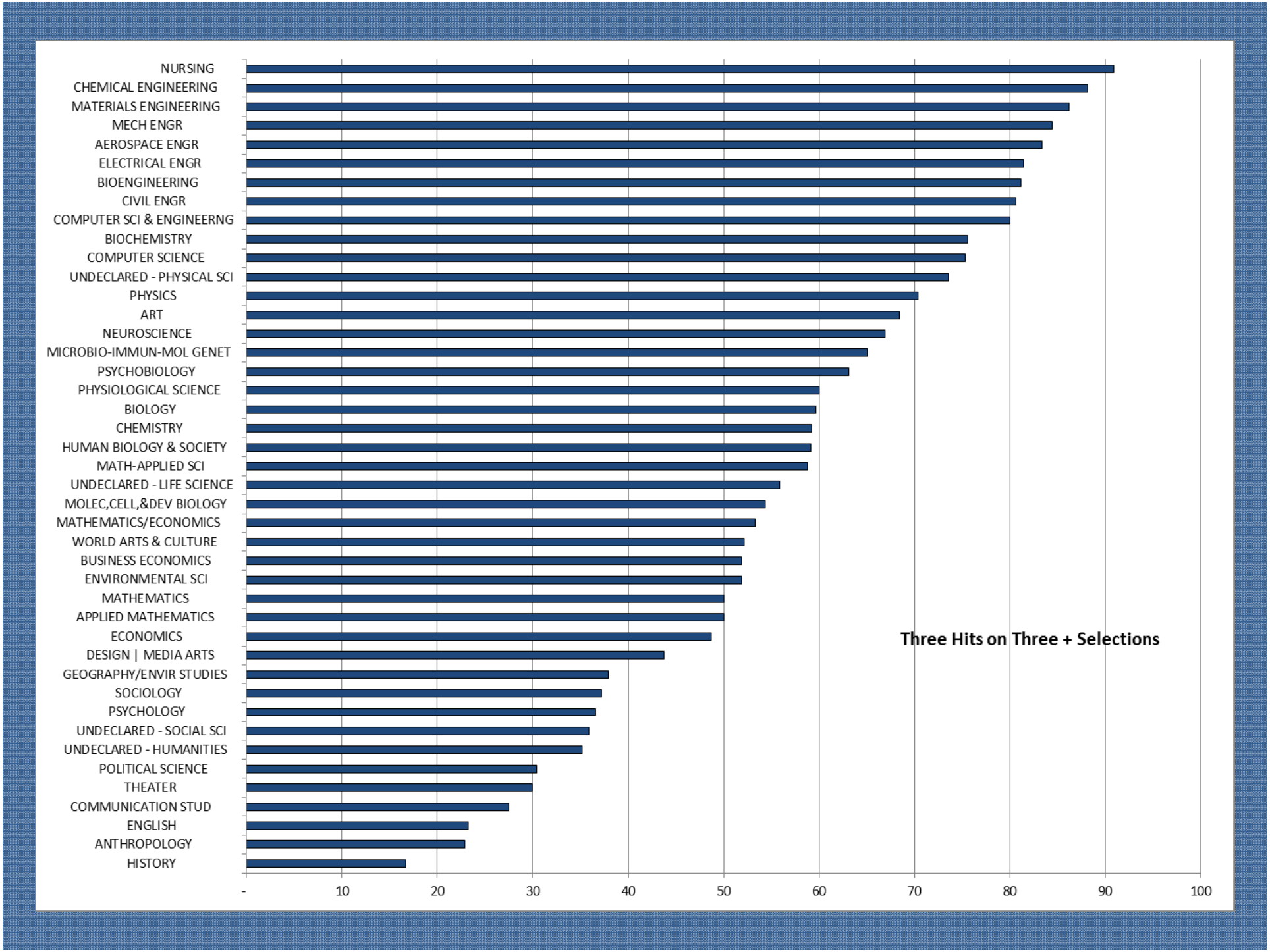
- 2012-13 Course Enrollments for 5,012 FCP Respondents
- Looking for 'hits' Summer through Spring

- 71% naming only one course enrolled in that course
- 52% naming two courses enrolled in both
  - While 34% enrolled in one of two
- 39% naming three courses enrolled in all three
  - While 35% enrolled in two and 19% in one of three

Working with the 'Flipped' FCP: Several Significant Analytical Findings

- 93% of respondents enrolled in at least one FCP course
- 55% managed to enroll in at least three FCP courses
  - Or in all courses named, if fewer than three

- Distributions of simple hit rates by major program
- Majors with strong linear structures show higher hit rates
  - Particularly when it comes to getting three or more FCP courses
  - Engineering, Nursing, most of the STEM majors
  - Why? Majors themselves have 'narrower' course channels
  - And? Students consequently have better idea of what lies ahead


NURSING
CHEMICAL ENGINEERING
MATERIALS ENGINEERING
MECH ENGR
AEROSPACE ENGR
ELECTRICAL ENGR
BIOENGINEERING
CIVIL ENGR
COMPUTER SCI & ENGINEERNG
BIOCHEMISTRY
COMPUTER SCIENCE
UNDECLARED - PHYSICAL SCI
PHYSICS
ART
NEUROSCIENCE
MICROBIO-IMMUN-MOL GENET
PSYCHOBIOLOGY
PHYSIOLOGICAL SCIENCE
BIOLOGY
CHEMISTRY
HUMAN BIOLOGY & SOCIETY
MATH-APPLIED SCI
UNDECLARED - LIFE SCIENCE
MOLEC,CELL,&DEV BIOLOGY
MATHEMATICS/ECONOMICS
WORLD ARTS & CULTURE
BUSINESS ECONOMICS
ENVIRONMENTAL SCI
MATHEMATICS
APPLIED MATHEMATICS
ECONOMICS
DESIGN | MEDIA ARTS
GEOGRAPHY/ENVIR STUDIES
SOCIOLOGY
PSYCHOLOGY
UNDECLARED - SOCIAL SCI
UNDECLARED - HUMANITIES
POLITICAL SCIENCE
THEATER
COMMUNICATION STUD
ENGLISH
ANTHROPOLOGY
HISTORY
Three Hits on Three + Selections
-
10
20
30
40
50
60
70
80
90
100

But Analytical Work is Only Beginning and May Never Reach Full Closure

- Many reasons why students might not score a 'hit'
  - Courses listed in FCP tentative schedule may not actually be offered
  - Other, more attractive courses may be offered that were not posted in FCP
  - Students may only be able to choose one or the other of two FCP courses
  - FCP does not show who is teaching; when this is known, preferences may shift
  - Students entering or changing programs may reorder priorities -- and, of course …
  - Students are free (within limits) to simply change their minds, make new choices
- Many ways in which a 'non-hit' may really be a 'hit'
  - Different courses may be functionally equivalent in many different ways
  - Satisfying, for example, the same General Education requirements
  - Or the same major program or minor program or distribution requirements
  - Students planning to place at one level may step up or down (Math 3 not Math 2)
  - Etc. Etc.

Course-Level Analytics at UCLA Ongoing in November 2016

- Finishing up this presentation with an updated view of undergraduate enrollment growth and corresponding growth in sections and seats offered and filled in undergraduate classes through Fall 2016.
  - Core metrics used to track performance in response to rising enrollment demand remain positive.
  - Percentage changes in seats offered and seats filled exceed the percentage change in undergraduate headcount .
  - The average primary class section is larger, but the percentage of primary classes offering discussion sections has also increased
  - Average course enrollments per student in primary classes ticked up from 3.35 in Fall 2010 to 3.40 in Fall 2016 – a critical sign that demands are being met
  - Average secondary section enrollments per student expanded from 2.14 in Fall 2010 to 2.28 in Fall 2016 – a significant change stemming in part from increased demand for lower division courses and an increase in average primary class size leading to a need for more secondary sections
  - In Fall 2016, UCLA offered secondary section enrollment in conjunction with 67% of all enrollments in undergraduate primary classes, up from 64% in Fall 2010.

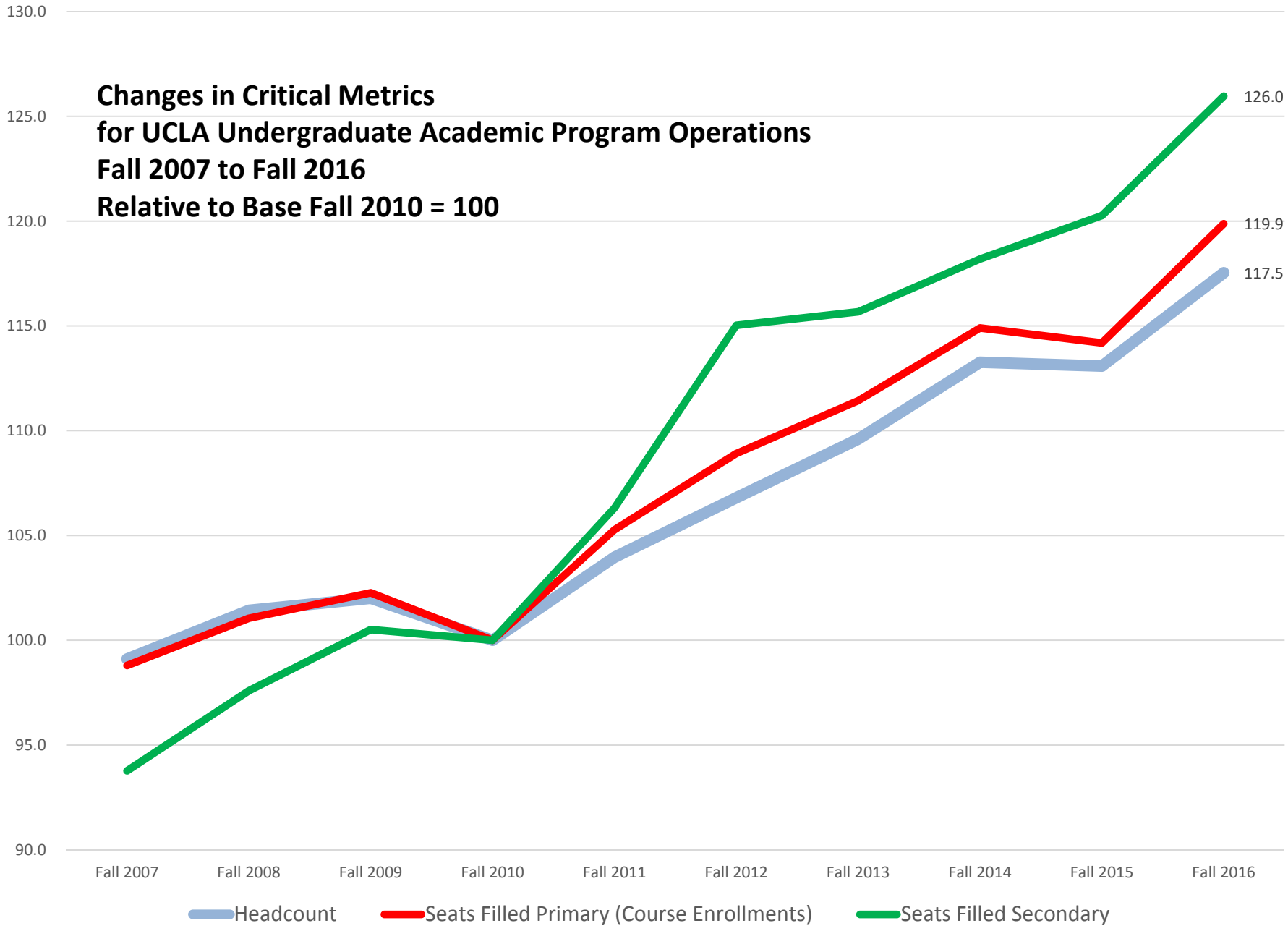
Sections and Seats in Undergraduate PRIMARY CLASS SECTIONS
Fall 2010 to Fall 2016

Fall Quarters	Primary Class Sections				Average Seats per Capita				Average Seats per Section			
3rd Week Finals	Seats Offered	Seats Filled	Seats Open	% *Open*	Headcount Enrollment	Seats Offered	Seats Filled	Seats Open	Sections Offered	Seats Offered	Seats Filled	Seats Open
Fall 2010	97,751	87,643	10,108	*10.3*	26,162	3.74	3.35	0.39	1,547	63.2	56.7	6.5
Fall 2015	114,797	100,077	14,720	*12.8*	29,585	3.88	3.38	0.50	1,728	66.4	57.9	8.5
Fall 2016	**122,673**	**105,063**	17,610	*14.4*	**30,873**	3.97	**3.40**	0.57	**1,795**	68.3	58.5	9.8
Fall 2015 to Fall 2016	**7,876**	**4,986**			**1,288**				**67**			
Fall 2010 to Fall 2016	**24,922**	**17,420**			**4,711**				**248**			
1-Year Percentage Increase	***6.9***	***5.0***			***4.4***				***3.9***			
6-Year Percentage Increase	***25.5***	***19.9***			***18.0***				***16.0***			

Sections and Seats in Undergraduate SECONDARY SECTIONS
Fall 2010 to Fall 2016

Fall Quarters	Secondary Sections				Average Seats per Capita				Average Seats per Section			
3rd Week Finals	Seats Offered	Seats Filled	Seats Open	% *Open*	Headcount Enrollment	Seats Offered	Seats Filled	Seats Open	Sections Offered	Seats Offered	Seats Filled	Seats Open
Fall 2010	59,751	55,981	3,770	*6.3*	26,162	2.28	2.14	0.14	2,276	26.3	24.6	1.7
Fall 2015	74,790	67,325	7,465	*10.0*	29,585	2.53	2.28	0.25	2,835	26.4	23.7	2.6
Fall 2016	**79,085**	**70,514**	8,571	*10.8*	**30,873**	2.56	**2.28**	0.28	**2,995**	26.4	23.5	2.9
Fall 2015 to Fall 2016	**4,295**	**3,189**			**1,288**				**160**			
Fall 2010 to Fall 2016	**19,334**	**14,533**			**4,711**				**719**			
1-Year Percentage Increase	***5.7***	***4.7***			***4.4***				***5.6***			
6-Year Percentage Increase	***32.4***	***26.0***			***18.0***				***31.6***			

Excluded from the framework of this analysis are courses that operate without fixed schedules or definite enrollment capacities, such as independent study courses, SRP tutorials, Honors Contract courses, off-campus courses, and all courses numbered 195 and above. ROTC courses and undergraduate-level courses designed for graduate students are also excluded. Beginning in 2012-13 the framework includes several courses featuring online operations in some primary classes and/or secondary sections.


Changes in Critical Metrics
for UCLA Undergraduate Academic Program Operations
Fall 2007 to Fall 2016
Relative to Base Fall 2010 = 100
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
90.0
126.0
119.9
117.5
Fall 2007
Fall 2008
Fall 2009
Fall 2010
Fall 2011
Fall 2012
Fall 2013
Fall 2014
Fall 2015
Fall 2016
Headcount
Seats Filled Primary (Course Enrollments)
Seats Filled Secondary

Course-Level Analytics: Common Themes and New Directions for Institutional Research

Bob Cox

University of California, Los Angeles

California Association for Institutional Research

November 18, 2016 Los Angeles