

AUGSBURG



C • O • L • L • E • G • E

May 17, 2001

Dear Ms. Talley,

Thank you for your site visit to Augsburg College. We appreciate the opportunity to present our proposal to you in person. We are extremely excited about the opportunity to expand – if not reform – statistical education to include observational causation – the study of causation based on observational studies.

Thank you for your references to George Lakoff: *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought* (1999) and *Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being* (2000). I am interested in reading these this summer.

You asked if I had worked out the schedule for team teaching at Augsburg. I said that I had and volunteered to send you a copy. A copy of my Augsburg Statistical Literacy teaching schedule is attached.

You asked about the project Board of Advisors. I have asked Dr. Tom Moore (Statistics, Grinnell College), Dr. W. Phillips Shively (Political Science, University of Minnesota) and John Cerrito (Chair of Business Administration, Augsburg College) to serve on this board. This gives balance to the three major college-level constituencies: the producers of statistical education, the curriculum managers in the humanities and the curriculum managers in business.

You asked about the dissemination aspect of the project. I noted that our proposal is primarily a “push” approach where we try to educate and encourage producers to use the ideas being presented. But given the goal of extending statistical education, it may be appropriate to balance this “push” approach with a “pull” approach in which we obtain support for change from journalists, employers and curriculum directors (such as Departments of Business). Another “pull” approach would be a trade publication. The publication of *Numeracy* by John Paulos certainly helped “pull” mathematical educators into thinking more clearly and decisively about forming quantitative literacy. A *Statistical Literacy* equivalent is a relevant possibility.

I have attached copies of the Power Point slides to be used in the sessions originally planned. Color copies are located on my web site; a listing of the web addresses is attached. I hope you have time to review these since they do summarize some things that may be relevant to your overall project evaluation. I have also attached a brief project summary.

I have enjoyed the opportunity to develop this project for your consideration. By working together, I believe we can make a difference not just in colleges and universities in California or the US – but world-wide. We have the vision and the plan. With the help of the W. M. Keck Foundation, we can make this vision a reality to benefit undergraduates for years to come.

Sincerely yours,

Milo Schield, Project Director

Copy: John Knight, Augsburg Senior Development Officer

Attached: Project Summary
Augsburg Statistical Literacy Teaching Schedule
PowerPoint Slides for Presentation (Handouts)
Web addresses for color versions of PowerPoint slides

PROJECT GOALS (Qualitative):

General: to expand – if not reform – statistical education at the undergraduate level.

Specific: to expand statistical education to include causality based on observational studies.

SITUATION: An estimated 45% of US college graduates have studied statistics and 15% have studied calculus. Those who study statistics typically study statistical inference using sample statistics to estimate population parameters. The only mention of causes based on observational studies is, "Association is not Causation." Students receive little guidance on how to evaluate or strengthen an argument using observational statistics as evidence for causation. Workers need employees and our society needs citizens that are statistically literate: that can evaluate arguments involving statistics as evidence about causality. This project seeks to address this need.

PROJECT DELIVERABLES

Dr. Donald Rubin (Harvard University):

Generate teaching materials on using statistics to identify causes in observational studies.

Present teaching materials at ½ day workshops at the American Statistical Association.

Dr. Judea Pearl (UCLA):

Conduct at least three two-day conferences in Los Angeles area for statistical educators

Present paper at national meeting of American Statistical Association.

Dr. Milo Schield (Augsburg College)

Generate training video on teaching Statistical Literacy

Conduct three summer conferences on teaching statistical literacy (Augsburg College)

Conduct ½ day workshops on Statistical Literacy at the American Statistical Assoc.

Present paper, "Statistical Literacy & Critical Thinking" at Sonoma State

Present keynote talk on Statistical Literacy at International Conference on Teaching Statistics

Complete an introductory textbook on Statistical Literacy (excluding chance)

DESIRED OUTCOMES:

Students are more likely to recommend this class to classmates.

Faculty can see a positive difference in student performance in analyzing cases involving data.

Students see more benefit in taking a statistics class as part of their major.

Students are better citizens in analyzing public issues and policies.

CONSEQUENCES IF NOT FUNDED: This project cannot be started without funding. The project is discipline-centered rather than simply being institutionally centered. It is certainly bigger than anything Augsburg can handle.

TIMING: This project has a significant number of pieces. If it is not funded this round, there is no guarantee that this project can be reassembled in the future in its' present form.

GEOGRAPHIC FOCUS: \$50,000 goes directly to conferences in Southern California. Although the \$450,000 goes outside California, this proposal is discipline-centered and should affect the teaching of statistics everywhere. California has about 14% of all US college students (2 million college students versus 14.5 million in the US). So if California has 14% of all college graduates and if California students have the same distribution by major as that of the entire US, then 84,000 students would study statistics in California each year. Spending \$450,000 to try to improve the education of 84,000 California undergraduates each year amounts to less than \$5 per California student. This one-time expenditure has the potential to improve education for California undergraduates for years to come.

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PROJECT GOALS (Quantitative):**COST: \$500,000**

\$ 50,000 for Dr. Donald Rubin (Harvard) to develop teaching materials.

\$ 50,000 for Dr. Judea Pearl (UCLA) to lead training conferences in Southern California.

\$ 80,000 for Dr. Milo Schield (Augsburg College) to develop materials for teaching Statistical

Literacy: the use of statistics as evidence in arguments about causality.

\$ 84,000 for course development in helping other teachers teach statistical literacy

\$ 24,000 for Keck Center for Statistical Literacy at Augsburg: two summer conferences

\$ 70,000 for videos, web site and text editing on Statistical Literacy

\$ 20,000 for Dr. Joan Garfield (University of Minnesota) to assess courses and the project.

\$ 80,000 for use in marketing to statistical educators and curriculum directors

\$ 42,000 for project management, coordination of events, generation of videos, etc.

NUMBER OF STATISTICAL EDUCATORS: In 1995, at least 500,000 (45% of) US graduating seniors took introductory applied statistics. These included 235,000 in business (46%), 128,000 in the social sciences (25%), 80,000 in the health sciences (16%) and 72,000 in psychology (14%). At 40 students per class, that would be 12,000 sections taught each year. With each teacher teaching 3 to 4 sections per year, there would be 3,000 to 4,000 active statistics teachers in the US each year.

MARKETING

Changing statistical education involves four different groups:

1. Statistical Educators: teachers currently teaching statistics
2. Curriculum Directors: faculty of disciplines requiring statistics
3. Employers: those who hire knowledge workers
4. Consumers: students and knowledge workers

Statistical educators teach statistics courses. They choose the particular topics within the course descriptions. They may influence the course descriptions, but when the course is a service course, they cannot make major changes in course content without coordinating with the curriculum directors. **Curriculum directors** have the power to make changes in a major. They are concerned with employers of their graduates. Will their graduates have the job skills needed by employers? Will their graduates be perceived as having had a rigorous education? But curriculum directors may not control faculty who will teach statistics. **Employers and end-users** (students) have little direct control of course content. However, they can influence statistical educators and curriculum directors to make changes they consider beneficial. The primary focus of this project is on the first two groups.

1. Statistical Educators. Marketing to this group includes giving talks at national meetings. An advisory board from this group will be formed to discuss the content of statistical literacy and the various ways in which this content could be offered (e.g., standalone final course, standalone pre-stats bridging course, or integrated into the regular statistics course).

2. Curriculum Directors. Marketing to this group includes giving talks at schools of business, business departments and in humanities/social sciences on the need for statistical literacy. Encourage departments to request that statistical educators offer a course in statistical literacy. Encourage curriculum managers to change their major requirements to allow either a course in statistical inference or statistical literacy, or to require a course in statistical literacy for their majors. Organize advisory boards representing departments that already require a statistics course (e.g., Department of Business) or a course in quantitative reasoning (e.g., the humanities).

PROJECT MANAGEMENT: Dr. Schield has had extensive experience in managing entrepreneurial projects. He worked on the Apollo project with North American Aviation in Downey, California. He has a PhD in Space Physics from Rice and a CMA certificate in Managerial Accounting. He has been President of two businesses, has been a Senior Consultant with a national CPA firm, and has been a Senior Operations Research Analyst with a national property-causality insurance company. In his 15 years at Augsburg, was responsible for taking the Management Information Systems major from scratch to being the 7th largest major on campus in less than 7 years. He was elected chair of the Department of Business Administration, Accounting and Management Information Systems. He has excellent people skills and is quite flexible while being very goal oriented. Milo has a clear vision of what statistical literacy should be and of how it can be taught. He is anxious to share his vision with others and to test the ability of statistical literacy to improve student performance in non-statistical courses, in job-related skills and in general decision-making.

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3/11/2001

Schield has total course relief of in 6 (2001-2002), 3 (2002-2003), and 3 (2003-2004).
Schield must be primary teacher in at least 1 (2001-2002), 0 (2002-2003), and 0 (2003-2004).
Schield can be team teacher in 0 (2001-2002), 4 (2002-2003), and 4 (2003-2004).

S = Schield

YEAR	TERM	GST 200	MIS 379 #1	MIS 379 #2	MIS 379 #3
2001-2	Fall WEC	Cancel	[Kaminski]		
	Fall Day	[cancel]	Jaspersen	Naylor	Naylor
	Winter WEC	N/A	[Kaminski]		
	Spring Day	Schield/Jaspersen	Morgan	Schield/Naylor	
	Spring WEC	[cancel]	[Kaminski]		
2002-3	Fall WEC				
	Fall Day	Jaspersen-S/Lapakko	Schield/Stratton	Naylor/Raymond	Naylor
	Winter WEC	N/A	[Kaminski]		
	Spring Day	Lapakko-S/Comm 2	Stratton/Dalglish (S)	Raymond/O'Neal	
	Spring WEC	Schield	Schield/Kaminski		
2003-4	Fall WEC	Stratton	Raymond		
	Fall Day	Dalglish/Green	Kaminski	O'Neal	O'Neal
	Winter WEC	Not			
	Spring Day	Green			
	Spring WEC		Paleczny		

TEACHERS

Schield, Jaspersen, Lapakko, Comm, O'Neal.
Schield, Naylor, Raymond, Stratton, Kaminsky, Kaminski

3/11/2001

PLAUSIBLE CLASS SCHEDULE FOR NEXT THREE YEARS:

1: Who is most interesting in teaching a course while using and debugging Schield's text book? (My guess of 13 people)
 (A) Jaspersen, Naylor & Lapakko. (B) Stratton, O'Neal, Groven & Raymond. (C) Kaminski, Kaminsky, UST-Phil & Dalglish.
 (D) Green, Paleczny
 Use this order in introducing this material to new teachers.

2. Who can bring the different insights to evaluating/improving the existing textbook of the top 11 from above?
 4 total. Critical thinking (3) : Lapakko, Groven and UST. Journalism: Dalglish,
 2 total. Both: Jaspersen and Stratton.
 5 total. Statistics (4): Naylor, Raymond, Kaminsky and Kaminski. Sociology: O'Neal.

Plan: Once Keck grant is on, assemble this group and present the book. Then meet individually to obtain level of interest.
 Omit Winter WEC. Run traditional. Use as a spare. Braces indicate the class is being taught in its' traditional manner.

YEAR	TERM	Fall WEC	Fall Day	Spring Day	Spring WEC
2001-2	GST 200	Cancel	[Cancel]	Schild/Lapakko	Cancel
	MIS 379 #1	[Kaminski]	[Jaspersen]	Schild/Naylor & Jaspers	[Kaminski]
	MIS 379 #2		[Naylor]	Naylor or O'Neal	
	MIS 379 #3		[O'Neal]		
2002-3	GST 200	Cancel	1_Lapakko-S/Stratton	1_Stratton-S/Groven	2_O'Neal
	MIS 379 #1	[Kaminski]	1_Naylor-S/O'Neal	1_O'Neal-S	2_Jaspersen
	MIS 379 #2		1Jaspersen/Raymond	1_Raymond-S/Kaminski	
	MIS 379 #3		1Naylor		
2003-4	GST 200	2_Naylor	2_Lapakko/Dalglish	1_Dalglish/Groven	Kaminsky
	MIS 379 #1	1_Kaminski	1_Groven -S/	1_Stratton-S/??	Kaminski
	MIS 379 #2		2_Raymond-S/Kaminski	1_Kaminski-S/??	
	MIS 379 #3		3_Jaspersen/Stratton		

Must limit total so all teach at least once. Those teaching only once: Stratton, Kaminski, Dalglish. Those teaching thrice: Jaspersen.
 Reserve 12 slots for observers who will teach. Might go with just 8 so they can all teach the course at least twice.