

Spring Semester 2015 Sabbatical Proposal for Brendan P. Purdy, PhD

Purpose

The purpose of my sabbatical leave is investigate two aspects related to Math M15: Introductory Statistics. First to see if the content of Moorpark College's four unit statistics course is covering the appropriate material in the best possible way. Second to consider alternatives to the way introductory statistics is traditionally taught at Moorpark College, following the pre-transfer level algebra sequence.

Background

One of my primary areas of expertise in mathematics is in statistical modeling, and in fact my dissertation is on a statistical model that is widely used in the cognitive sciences. I have also taken a large number of statistics, probability, and statistical modeling classes at the undergraduate and graduate level. In particular, I have studied the applications of statistical models to the behavioral sciences.

Further, I continue research of applications of statistical models in the cognitive sciences and related fields. I have had one paper published on statistics since graduating with my doctorate from UC Irvine in an academic journal- *The Journal of Mathematical Psychology*- and I am currently working on a chapter for a book of mathematical psychology with my dissertation advisor, which again is on class of statistical models. I also have presented at mathematics conferences a number of times on statistical models over the past ten years.

While I was working on my Masters in Math at Cal Poly Pomona, I worked in Institutional Research at Pasadena City College part-time and then full-time at Western

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University of Health Sciences in Pomona, and I continue to consult on statistical matters for the Ventura County Office of Education.

I have taught introductory statistical models for social science at UC Irvine and introductory statistics at Saddleback College and Moorpark College, where I have been a full-time math faculty member for over five years. As a math faculty member at Moorpark College:

1. I have taught Math M15 both in its five and four unit iterations;
2. I have taught Math M15 out of both of the two textbooks that our department uses;
3. I have taught Math M15 both with and without the use of a graphing calculator;
4. Being the current Math Faculty in the Math Center (from Fall of 2008 until the end of Fall 2013), I have had witnessed the myriad of perspectives that faculty use when teaching Math M15 statistics, and have trained tutors to recognize the underlying similarities;
5. I was on the faculty committee that changed the Course Outline of Record (COR) to make the Course four units;
6. I have long advocated the inclusion of ANOVA into the COR, which has finally occurred due to C-ID;
7. I have been on the Math M15 Textbook Committees;
8. I plan to teach at least two sections of Math M15 each semester for the foreseeable future.

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Rationale & Topics of Research

Math M15 is an important course for Sabbatical Study for a number of reasons.

(I) First, there are usually at least 25 sections or so of Math M15 each semester at Moorpark College, which means it has the most CRNs of any course except Math M03 (Intermediate Algebra) within the Math Department, and as such one of the largest number of CRNs campus-wide. The reasons so many students take Math M15 is that it is a “first level” transfer level class, many students need it for their majors, and it is not algebra. Thus, this is a course that effects a large number of students, and for many students it is their last math class they have to take. However, for many majors (e.g. sociology or psychology) they will still have to take at least one research methods course in their field of study, which will include concepts taught in statistics. As such, e.g., should the math department use statistical software like SPSS for introductory statistics? *So I will investigate how to link what is taught in the Math M15 classroom to the future academic and professional experiences of our students, with being especially attuned to the use of technology.*

(II) Second, while the content of Math M15 has little explicit use of algebraic concepts, students do need a certain amount of mathematical sophistication to succeed in Math M15, which is why Math M03 is a prerequisite. *So I will investigate the relationship between success in Math M03 (or the equivalent) and Math M15.*

(III) Third, taking a step back from the previous point, a key aspect of the California Student Success Initiative (SSI) is that so few students are able to make it from three, or even two, levels below transfer-level to a transfer-level mathematics course. *So I will investigate the non-traditional ways that statistics is taught, e.g.*

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Statway, that aim to increase the number of students that successfully complete their quantitative coursework.

The only realistic way that I can investigate these three aspects of Math M15 is by being granted sabbatical leave.

Schedule/Plan for Sabbatical Work

N.B. In parenthesis the Roman numeral refers to the topics of research in the previous section.

January 2015 - Research and data gathering

- * (I): Begin to investigate the link between pre-transfer math classes to transfer level statistics and non-mathematical course work beyond.
- * (II) & (III): Gain an overview of how the different way statistics is taught in California and elsewhere, particularly at the community colleges, but also at four-year institutions.

February/March 2015 - Curriculum and pedagogy research for Statistics

- * (II): Interview mathematics faculty at community colleges that teach statistics, with the emphasis on the myriad of ways that statistics is taught as well as the preparedness of their statistics students.
- * (III): Further research into the various statistics curricula for introductory statistics.

April 2015 - Curriculum research for majors that have statistics as a prerequisite

- * (I): Interview non-mathematics faculty at community colleges and transfer institutions to see what they desire from their students that have statistics as a prerequisite.

April/May 2015 - Report on findings

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* (I), (II), (III): Write a report on my findings, with particular emphasis on how my research can be instituted at Moorpark College.

I should also note that I'd plan to attend at least one, if not two, conferences. My hope is that I could attend sessions at the conference(s) with a research focus on statistics and with an academic focus on statistics.

Benefits of Sabbatical Leave

Benefit to Myself: I will be able to take what I have learned on leave, and apply it directly to the classroom, where again I plan to teach at least two courses of Math M15 for the foreseeable future.

Benefit to Faculty: I'll have an increased understanding of the different ways that statistics is taught and the purposes it serves for other disciplines. I'll be able to share this knowledge with the faculty and administration at Moorpark College through Faculty Development presentations, discussions with the math department- particularly the faculty interested in the Math M15 curriculum, other interested departments, and committees such as Basic Skills, Curriculum, and Student Success.

Benefit to Students: By investigating (I) what other disciplines desire of their statistics students, (II) the relationship between intermediate algebra and statistics, and (III) non-traditional ways of teaching statistics, the Math Department will be better able to meet the needs of our students, and having a higher probability that they will get to Math M15, succeed in the course, and then use the knowledge in other courses.

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Benefit to Moorpark College: By benefiting faculty, administration, and students, my research will benefit the College as whole since the fundamental goal of this research is to help statistics student succeed and will be is aligned with the Students Success Initiative.

Benefit to the District: I'll share this information with the Mathematics Departments of Oxnard and Ventura Colleges, and in particular will help with the entire District efforts with the Student Success Initiative.

Feasibility of Implementation

The benefits of this sabbatical leave can be implemented upon my return to teaching and no additional funding is required.