

Sabbatical Leave Report

A. Applicant

Name: Bic Ha DoVan

Department: Mathematics

Type of Leave: Research / Independent Study

Leave Dates: Fall 2018

B. Purpose of Leave

The purpose of my sabbatical leave was to bring relevance to the course study of students in mathematics classes by developing a resource document with projects and supplemental materials for any faculty to use. I updated my technology skills in order to enhance my teaching of these classes. I used independent study and research to accomplish these goals.

C. Objectives

- 1) I brought relevance to the coursework for math students by producing a resource document consisting of 4 projects and supplemental materials for instructors and students in Math 9 (Finite Math), Math 10 (Liberal Arts Math) and Math 15 (Statistics). All of these courses are transfer level courses intended for students who are not math or engineering majors. *My original proposal did not include Math 9, but the Course Outline of Record for Math 9 includes mortgages and annuities under topics and scope, so the lessons and projects I developed on my sabbatical leave for Math 10, may be used in Math 9.* My objective has been completed.
- 2) I increased my technology skills by learning advanced Excel and the programming language Mathematica. I feel my teaching is enhanced, because I now have a better understanding of a programming language and can incorporate their usage for the benefit of students in my curriculum. I will show my students how to use Excel so they may do their statistics projects for my class. My objective has been completed.

D. Narrative

Students who take math courses usually do so because it is a General Education requirement and do not see its relevance, beauty or utility. Students often lament, “When will I ever use this in real life?”

I can answer their question and show students that math permeates throughout their lives. It doesn’t end when you leave a classroom.

With the implementation of Common Core in our educational system, a holistic approach to teaching has been stressed. Greater emphasis is made on a project-based curriculum and using applications. I have provided a resource for instructors so that they may show their students the math they learn is interesting, informative, applicable, and useful in their lives.

Objective 1.

I researched, used independent study and created a resource document that includes four projects and ancillary materials for instructors and students in Math 9 (Finite Math), Math 10 (Liberal Arts Math) and Math 15 (Statistics) to be used in their classes as lessons or to supplement their lessons.

- The ancillary materials contain tools that incorporate data and research methods for statistical analysis: sampling techniques, summary statistics, confidence intervals, and hypothesis testing. They provide ideas and resources including links or websites for research projects that encompass sustainability, social issues and finance covering mortgages and annuities.
- One component of Math 9 and Math 10 is to learn the practical knowledge of mortgages and annuities as an application of exponential functions. I have written handouts (including solutions) for lessons and two projects for students to apply the tools they learned so that students can discover their usefulness and practicality.
- I did research on Yellowstone National Park and Yosemite National Park to gather ideas so that when I introduce statistics to my students, I can make the subject more interesting, familiar and expose them to the highlights of our National Parks. I researched numerous topics and have used the number of bison at Yellowstone National Park, the prediction times of Old Faithful Geyser and the duration time of eruptions of Old Faithful Geyser.
- I did not visit Yosemite National Park when I had planned due to its closure by the Ferguson Fire (August 2018).
- I attended the 46th Annual California Mathematics Council of Community Colleges (CMC3) in Monterey on December 7 – 8, 2018. As a professional group faced with the curriculum and pedagogy for mathematics at community colleges, we discussed AB705 and I met with my mathematics colleagues at SRJC and mathematics colleagues

throughout the state and the nation about their ideas on teaching statistics and math for liberal arts students.

Objective 2.

Increase my technology skills.

- I furthered my knowledge of Excel by learning Advanced Excel to enhance my teaching and to demonstrate its capabilities to my students. I used many YouTube videos and followed three lab assignments to practice Excel. I incorporated the usage of Excel for my students in the projects I developed in Math 15.
- I learned Mathematica, a programming language so that I could use the program to write handouts, quizzes or exams that produce professional and clear mathematical notation and graphs. And I wanted to increase my understanding of how computer programs are written and their function. I followed and practiced three Mathematica Labs, called Notebooks that Sonoma State University uses in their Mathematica course.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

I return to teaching with fresh ideas from my research and independent study. I was able to devote more time and found interesting and relevant data to inform and teach my students as well as expose them to our diverse world. My teaching is enhanced by using current data and providing examples to all my students, and specifically, my Math 15 students, that they may not normally encounter. I use more technology in the classroom and in writing handouts, quizzes and exams.

But mostly this sabbatical leave enhances my work performance at the college because I return as a person invigorated and rejuvenated from my first sabbatical leave after teaching for more than 20 years.

2. How did this sabbatical leave benefit students in my discipline?

The students benefit because they will be more engaged in their math classes when they are provided with hands-on activities that are relevant and interesting. They are able to view math as a practical tool and to see it for its beauty and usefulness. And my students are getting an instructor who is returning refreshed with new perspective, current information and new ideas.

3. How did this sabbatical leave benefit my department? The expected outcome is the impact you might make on the students and colleagues within your department/cluster.

My department benefits with my written resource document that has handouts and projects that is available to any instructor, especially our adjunct instructors teaching Math 9, Math 10, or Math 15. The students will benefit with material that is relevant, interesting and practical in their lives.

4. *How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?*

SRJC's Strategic Plan includes "preparing students for transfer . . ." and to "support student success and enrich student lives".

My project has provided faculty with a resource document for research projects and lessons in Math 9, Math 10 and Math 15. These courses are transfer-level courses intended for students who are not mathematics or engineering majors. The use of relevant data, hands-on activities, practical applications and interesting topics will prepare students for transfer, support their success and enrich their lives.

F. Abstract for Board Report Summary

Bic Ha DoVan developed a resource document of 4 projects and ancillary materials for instructors and students in Math 9 (Finite Math), Math 10 (Liberal Arts Math) and Math 15 (Statistics). Her project can assist other math faculty and enhance student learning using project-based curriculum. She used independent study, conducted research and attended the 46th annual California Mathematics Council of Community Colleges conference to accomplish this goal. She increased her technology skills by learning Advanced Excel and the programming language Mathematica.

G. Appendices

Sources used during sabbatical leave:

<https://www.nps.gov/yell/learn/nature/bisonfaq.htm>

<https://pro.boxoffice.com/movie/31828/crazy-rich-asians>

<https://www.boxofficemojo.com/movies/?page=weekend&id=marvel2017b.htm>

<http://geysertimes.org/>

<http://www.geyserstudy.org/geyser.aspx?pGeyserNo=OLDFAITHFUL>

<http://sustainabilitymath.org/>

<https://math-for-sustainability.com/>

<http://www.mathispower4u.com/>

<https://weather.com/weather/monthly/l/95404:4:US>

<https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?end=2014&start=1979>

<https://www.bls.gov/cps/cpsaat11.pdf>

<https://www.gapminder.org/>

<https://spacemath.gsfc.nasa.gov/Modules/7Module5.html>

<https://airnow.gov/state/california>

<https://hbr.org/cover-story/2018/11/when-no-one-retires>

Resources for Finance Projects: Math 9, Math 10

<https://customer.statefarm.com/sfcalculators/mortgages/amortization-calculator>

<https://www.trulia.com/>

<https://www.century21.com/>

<https://www.redfin.com/>

<https://www.zillow.com/>

Resources for Statistics Projects: Math 15

<https://data.worldbank.org/indicator/>

<https://airnow.gov/state/california>

<https://weather.com/weather/monthly//USCA1017>

<https://www.boxofficemojo.com/movies/?page=daily&id=marvel2017b.htm>

<https://www.bls.gov/cps/cpsaat11.pdf>

<https://www.gapminder.org/>

Sabbatical Documents from Independent Study:

1. Excel Lab and Worksheets (7)
2. Mathematica Lab and Notebooks (8)

Resource Document for Faculty:

1. Finance Handouts (3)
2. Finance Projects (2)
3. Statistics Ancillary Materials/Handouts (9)
4. Statistics Projects (2)

Additional Narrative on the next page.

Additional Narrative:

I started teaching later in life and technology did not come easily for me. The fear of failing only made me procrastinate learning it even more. That is why one of the objectives in my sabbatical project was to improve my technology skills, forcing me to move outside of my comfort zone. Learning the programming language Mathematica was challenging for me.

I have always had empathy towards students who are struggling in math classes. But I now have first-hand experience when I learned Mathematica. At times, I was ready to pull my hair out when I followed the lesson and could not produce the same results. Every detail in a programming language was crucial to getting the outcome. The computer and the program are never at fault, but rather the user. What I've learned is what I tell my students. In order to be proficient in something, you must practice and apply it. I emphasize the details in mathematics when using online homework. Numerous students have told me that they have gotten the correct answer, and the computer tells them it is incorrect. When I show them the minor detail they neglected, they see their error immediately. I need to follow my own advice.

The projects I wrote for Math 9, Math 10 and Math 15 have the students applying what they learned in class. It also introduces them to practical life lessons, especially in finance. My hope is that students in my classes do not memorize math formulas and concepts but rather appreciate math, learn some technology, ask questions about the world they live in, how to improve it, be better consumers and be life-long learners.

My sabbatical leave was invaluable to me. I was able to spend more time researching topics that I felt were important, relevant and current for students to know and then decide which ones would fit the lesson and keep the others as reference for later use. The benefits of a sabbatical project are long lasting, like a lesson that is learned and used time after time.

I have already incorporated the work I did on my sabbatical leave into my current Math 15 Statistics classes this spring. I have added more group work and interactive classroom activities into my lessons. Student participation in class is emphasized. I noticed that the energy level and engagement in the classroom has grown. The students will be doing two projects in these classes to apply what they have learned.

I want to thank my colleagues Sara Jones, Jen Carlin-Goldberg and Nick Dowdall for their assistance with my sabbatical leave in providing me resources for sustainability, Excel and Mathematica. I am deeply grateful to the District, the Board of Trustees, AFA and the Sabbatical Committee for providing me this opportunity.