SABBATICAL LEAVE REPORT

Lisa Winch **September 2016**

Sabbatical Date: Winter 2016

Original Statement of Purpose

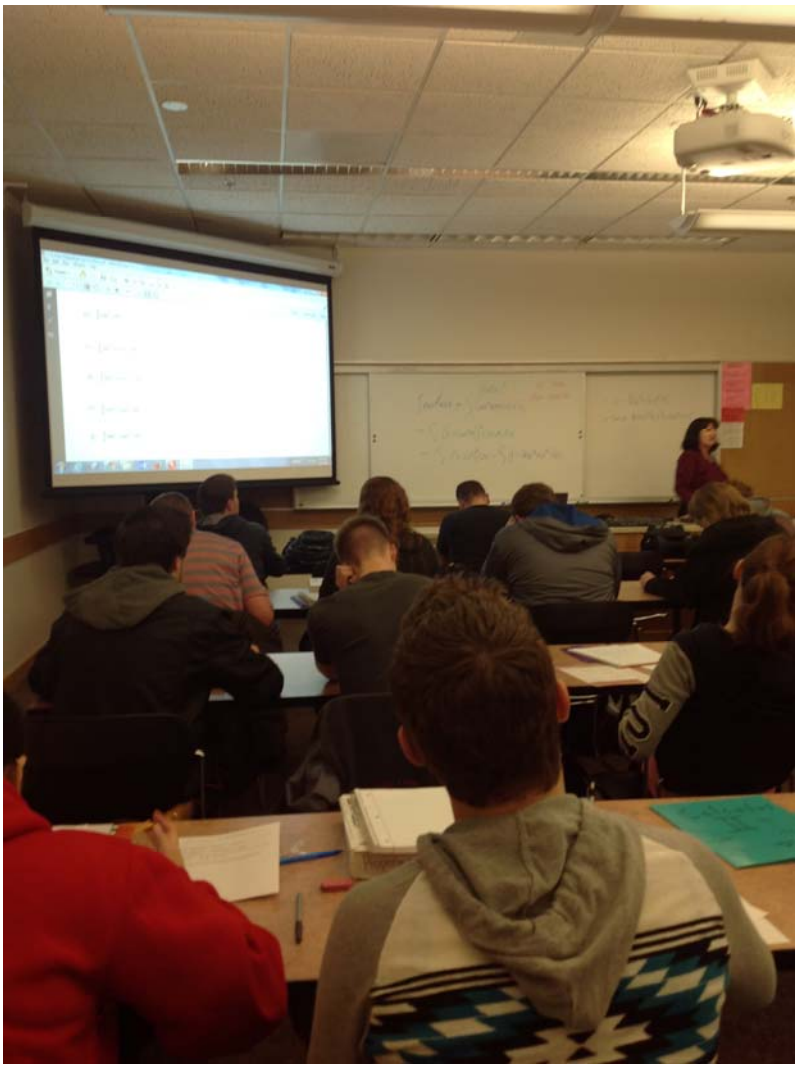
The purpose of my sabbatical was to investigate and research teaching strategies used in blended and flipped classroom environments, determine types of technology that my colleagues are using for their calculus courses, collect sets of real-life application problems for teaching calculus in context, and study the Common Core learning and assessment standards adopted for K-12 in forty-five US states.

Activities participated in to achieve objectives:

1. *I will spend a minimum of two weeks at Salt Lake Community College in Utah. I have contacted Shawna Haider at SLCC and received a sincere welcome to visit the campus and attend classes. Shawna completed a full year sabbatical to design and build a Calculus 2 course that can be used for both a flipped classroom format as well as an online format. Her focus included developing real-life problems that require the skills of Calculus 1 and Calculus 2. Below is more information about Shawna's extensive background in technology, presenting learning through video and researching real-life problems for Calculus and other areas of Mathematics.* http://www.shawnahaider.com

This was by far the most rewarding component of my sabbatical leave. Shawna Haider has created full on-line Calculus 1 and Calculus 2 courses using problem-motivated learning. The e-learning department at SLCC used students' interests and Utah specific situations to create video clips of local real-life situations. Shawna was able to create a calculus problem for students to complete relating the topics in the video shorts created by the e-learning dept. to the scenario in context. Shawna says, "Student interest and motivation has increased as students' state how these real life applications have helped them connect the concepts they are learning to practical application". During my visit, Shawna shared and showed me how to create and record re-usable video lessons/lectures for students using Power Point and **Camtasia Studio**, a screen recorder and video editor software. Shawna also uses PDF Annotator, a software program that lets the user open any PDF file and add annotations, using keyboard, mouse or Tablet PC stylus. Shawna uses it for writing on documents such as assigned problems, practice tests or exams but mostly she uses PDF Annotator as a virtual white

board for demonstrations. In her flipped classes, students are expected to watch content or lecture videos and work on practice homework problems before attending class each day. In class student ask questions about their homework and also work on activities in pairs or small groups to demonstrate their understanding of the material. Shawna briefly introduces the new material with what students can expect to see in the next content video.



← Shawna Haider

Below are my first three videos created using Camtasia software with Shawna's help.

First video using Power Point, Math Type, and Camtasia Studio.

Click on Limits2.mp4 and open the file to play the video.

Limits2.mp4

Second video using one of Shawna's real-life problems:
http://www.screencast.com/t/kUp9fCeiv

Third video using another of Shawna's real-life problems:
http://www.screencast.com/t/HHjChTJvR

Shawna's opening page to her course in **Canvas** (Learning Management System) and Week 2 expanded below. I find her pages to be well organized and easy to follow.

SPRING 2016

- Home
- Announcements
- Discussions
- Syllabus
- Modules
- Assignments
- Media Gallery
- My Media

MATH-1220-006-Sp16

winchli
lwinch@kvcc.edu

Course Information | Algebra & Trig Review | Review of Calculus I

Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 | Week 16 | Week 17

Week 2

Class Activities: (**print** these out and bring to class Monday)

Activity - Integrating Trig Functions
Activity - Trig Sub Prep

Content Videos and MOM:

Before class Tuesday:

- Watch Integrating Products of Trigonometric Functions Part 2 (Corresponds with Section 7.2)

Before class Wednesday:

- If you feel like you are weak on getting trig values using the unit circle here is a review unit circle review assignment due.
- Complete MOM 3 - Trig Review

Before class Thursday:

- Watch the video Trigonometric Substitution (Corresponds with Section 7.3)
- This video talks about examples that follow. That is what we will do in class.

Weekly Reflection:

Week 2 Reflection - Shaq

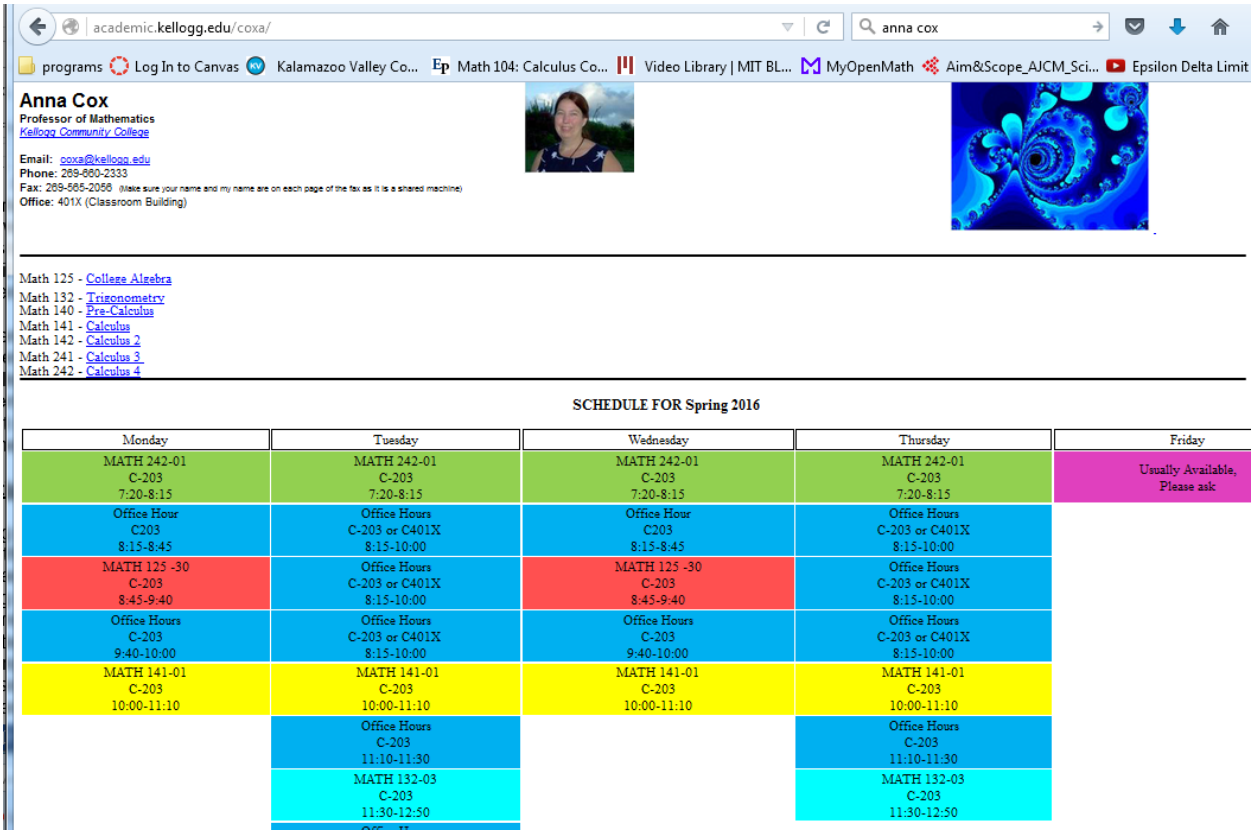
2. *I will travel to Kellogg Community College for at least 10 school days and observe math classes and interact with mathematics faculty. My primary connection to KCC is through Anna Cox who has been using the flipped classroom model for many years. Anna recently acquired a free classroom set of IPADS to be used with her Calculus students. Anna uses Camtasia and Starboard for creating recorded lessons/lectures and has agreed to help me as I begin to design my own video lessons.*

As stated above, Anna Cox has been using the flipped teaching approach way before it became popular. For many years she has had an active class where students were doing the problems at the boards and many thought provoking questions were asked of the students as they work. Anna's videos are linked on a web page provided by the college and housed at **screencast.com** where she pays a yearly fee. Anna's students also use CourseCompass (MyMathLab) an interactive e-learning environment with online student course work that correlates to their textbook. Two years ago, Anna was loaned a classroom set of iPads and piloted an iPad App created by TechSmith called Ask3. "This is a tool that teachers can use to create short instructional videos that are shared directly to their students' iPads. Students can use Ask3 to ask questions about the video, mark the video with drawing tools, and create their own audio comments about the video." Anna loved using this product with her students and I was excited to learn how to use the App during my sabbatical. Unfortunately Ask3 was discontinued, the link below informs users about the **end of the Ask3 experiment**.

http://blogs.techsmith.com/for-educators/updates-on-ask3-screenchomp/

I found Anna's home page to be easy to read. Students can see her contact information, her daily schedule and the class that they need to select.

Anna's Home page: http://academic.kellogg.edu/coxa/



Below is one of Anna's courses on the left with the Chapter 6 link opened on the right.

MATH 142 Calculus 2

Kellogg Community College

Instructor: Anna Cox

COURSE COMPASS

If you enrolled in MATH 142 for SUMMER 201

School zip code is 49017.

Syllabus

MASSIVE TRIG REVIEW - 1 hour proving identiti

UNIT CIRCLE GAME

Chapter 6

Chapter 7

Chapter 8

Chapter 10

Chapter 11

KEYS
7
8
10 1-6
10 7-10
11 1-4
11 5-7

Return to Anna's home page

Return to Kellogg Community College

MATH 141 and MATH 142 Chapter 6 videos

Section 6.1 Washer Method

Section 6.2 Shell Method

Section 6.3 Arc Length

Section 6.4 Areas of Surfaces of Revolution HW 1-19 odds, 30
worksheet for Areas of Surfaces of Revolution

Section 6.5 Work and Fluid Forces
worksheet for Work and Fluid Forces

Section 6.6 Moments and Center of Mass HW 1-13 odds, 23, 25, 27, 29
worksheet for Moments and Center of Mass

Return to Anna's MATH 141 page

Return to Anna's MATH 142 page

Return to Anna's home page

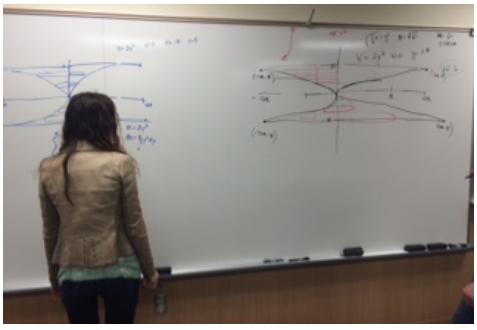
Return to *Kellogg Community College*

Questions asked by students

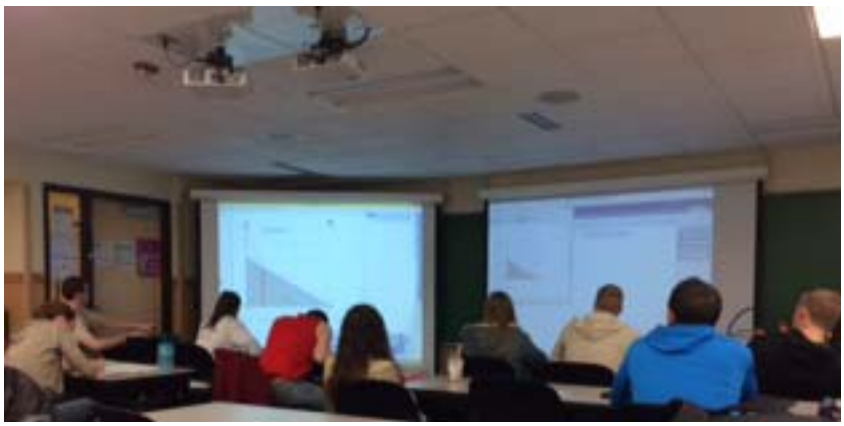
6.1-3

6-1-9 circle diameters volume

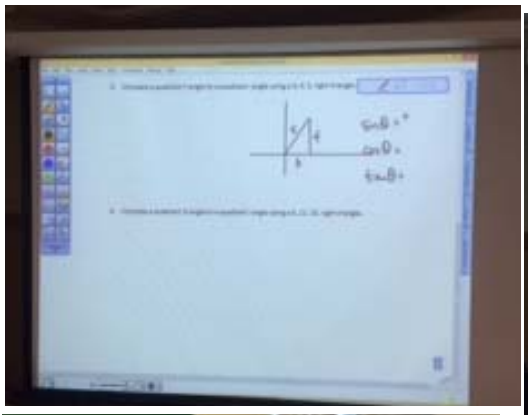
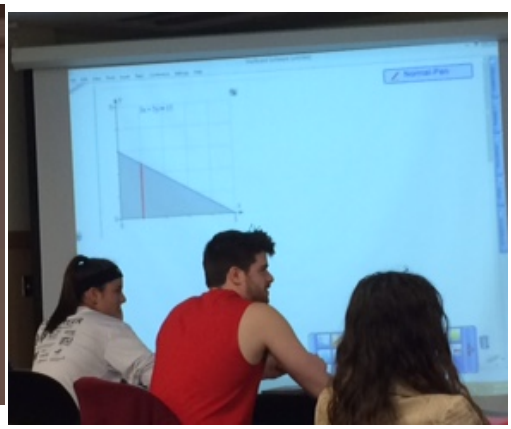
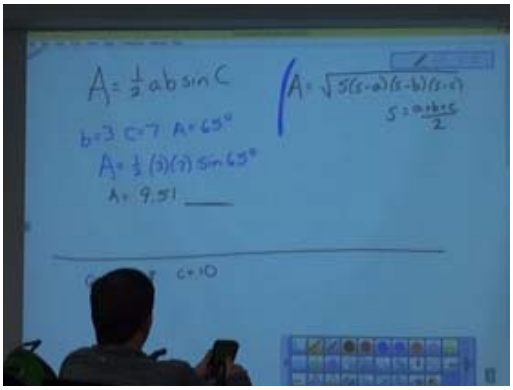
6-1-15



Back of classroom



In the front of the classroom is a computer, document camera and Starboard (Interactive Whiteboard – like a large computer tablet) that faculty use to display and write information. There are **two video projectors in the ceiling** and two screens. There are boards around the classroom for students to work on problems together.



3. *I will visit a variety of classrooms in the Boulder Valley School District in Boulder Colorado. Jackie Weber, Director of Mathematics and Computer Science, is in charge of organizing the professional development and training for the teachers in her district. She will be taking me around to visit teachers and students that are currently using the Common Core Standards in their mathematics classes.*

With Jackie Weber, I visited three classrooms at Platt Middle School in Boulder Colorado. The classes included Math 2S, Algebra 1 Adv and Geometry Adv, where we watched and listened to teachers and students work on their lessons and activities.
I was also able to attend their department meeting with the math specialist team and Assistant Superintendent Dr. Ron Cabrera. They shared some of their teacher professional development goals and I asked questions about any issues with the Common Core Standards. Colorado, like many states, have created a combination of common core standards and their own state standards. For example, "The 2009 Common Core State Standards (CCSS) have brought about a much needed move towards consistency in mathematics throughout the state and nation. In December 2010, the Colorado Academic Standards revisions for Mathematics were adopted by the State Board of Education. These standards aligned the

previous state standards to the Common Core State Standards to form the Colorado Academic Standards (CAS). The CAS include additions or changes to the CCSS needed to meet state legislative requirements around Personal Financial Literacy."
http://www.bvsd.org/curriculum/math/Pages/Curriculum.aspx

Primarily for intervention and supplementing, Colorado uses ALEKS. ALEKS is an adaptive, online math program that uses artificial intelligence and open-response questioning to identify precisely what each student knows and doesn't know. Through truly individualized learning and assessment, ALEKS delivers a personalized learning path on the exact topics each student is most **ready to learn**.
Professor Tanya Ennis, Dr. Jacquelyn Sullivan, Dr. Beverly Louie, and Dr. Daniel Knight. Unlocking the Gate to Calculus Success: Pre-Calculus for Engineers – An Assertive Approach to Readying Underprepared Students at the University of Colorado, Boulder. Notices of the AMS, June 2013

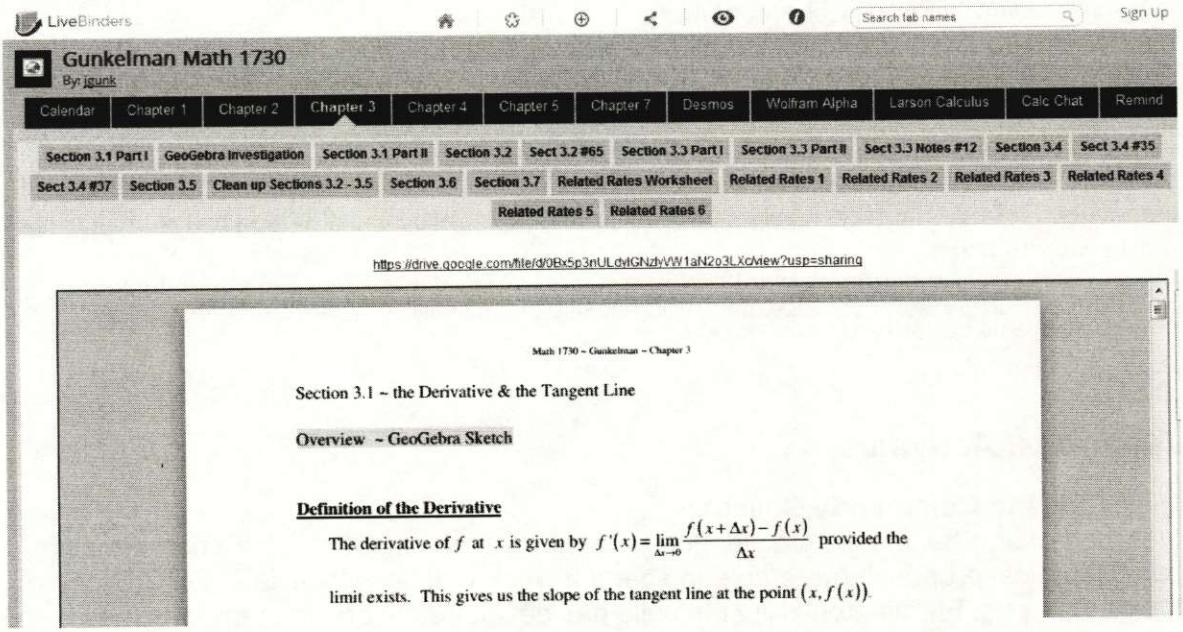
Additional Activities

Visit Oakland Community College:
I learned of another inspiring colleague, Julie Gunkleman at OCC, after I had turned in my Sabbatical proposal. I was able to spend a week visiting with Julie at OCC Orchard Ridge Campus, Farmington Hills, MI. Julie has developed hybrid courses which she converted to the flipped teaching strategy. She uses their course management system, Desire to Learn, as well as the Live Binder site, www.livebinders.com to house the course information, calendars, content videos, and other learning materials. Julie also uses **Camtasia Studio** and PDF Annotator to make her learning videos. The picture of Julie below is from her Geometry for Elementary/Middle School Teachers class. This course meets for one evening each week. During the first half of class, Julie used a few hands on activities where students worked in pairs to discuss the problems, then she used Answer Pad (a free student response system that uses any device) to create an interactive dialog with students. During the second half of class, students moved to a computer classroom where students use Geometer's Sketch Pad (interactive geometry visualization software) to investigate, construct and demonstrate mathematical theorems and concepts.

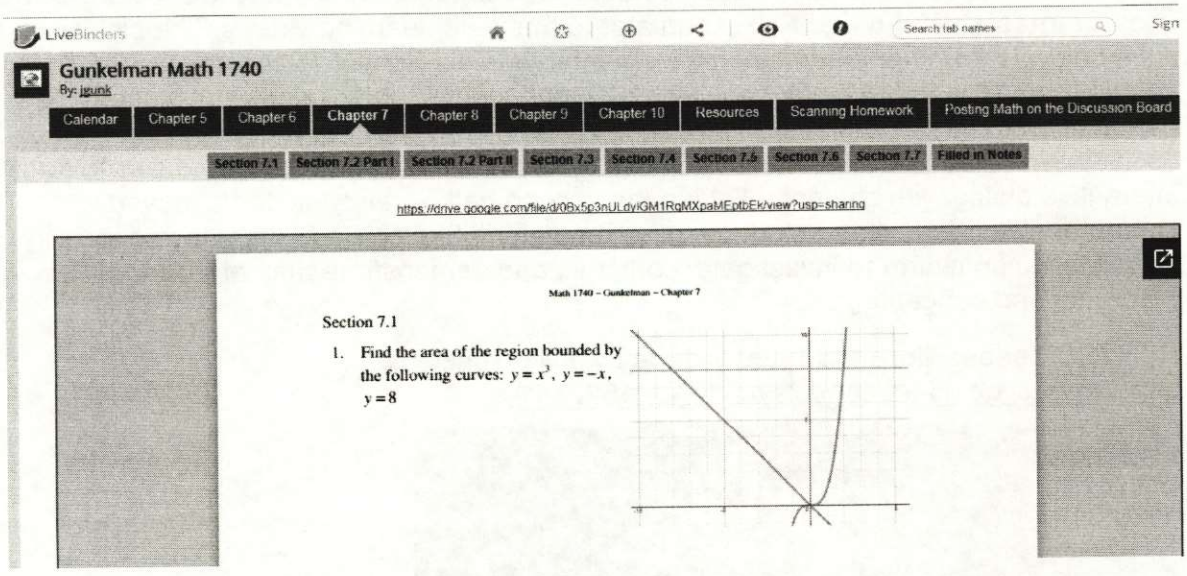
Hybrid Classes: More than just videos by Julie Gunkleman
http://www.livebinders.com/play/play?id=1522141

← Julie Gunkleman

http://www.livebinders.com/play/play?id=1332378 **(kristin)**

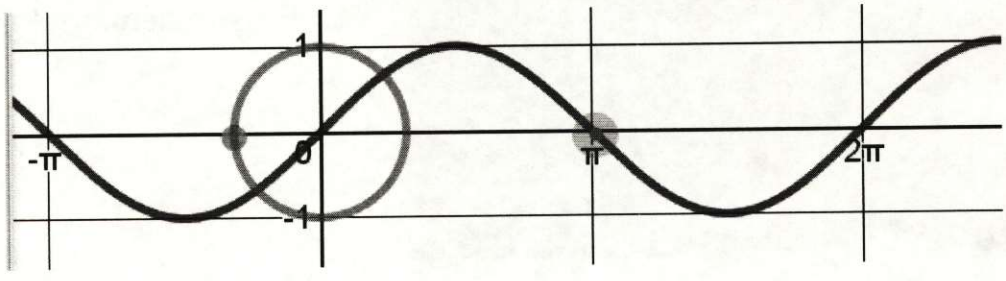


http://www.livebinders.com/play/play?id=1332358 (kristin)

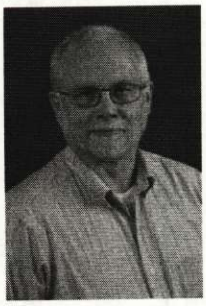


Julie frequently uses a free online graphing calculator called **Desmos**
https://www.desmos.com/

Unit circle example: https://www.desmos.com/calculator/eunckbimff

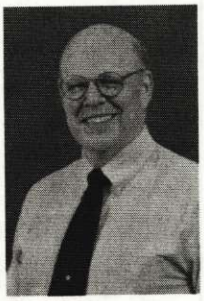


Visit Western Michigan University:



I visited with Steven Ziebarth, the Mathematics Department Chair, at WMU to discuss their Calculus courses and to gain information on why they have two versions of Calculus. Calculus 1 & 2 – "Regular" and Calculus 1 & 2 – Science and Engineering. The only difference is that a section on **vectors** is covered in the science and engineering versions. These courses are interchangeable and may be used for all programs. Steve also shared with me that they piloted the ALEKS software in a few of their Calculus 1 classes.

From Steven: "We are participating in a Gateways to Completion initiative through the college in partnership with the Dana Center (in Texas). The initiative targets courses with low success rates. Her Calc I report was in response to that and contains some information about their use of ALEKS. I am also attaching the feedback we received about the report from the G2C people. Last Friday I received an update on our use of ALEKS this summer that targets STEM students. We have had about 40 students sign on and those that have eventually done the proctored exam all have very positive things to say about it and most have improved their placement by making use of the system. An associate dean from engineering, Paul Engelmann, and I will give a report as such tomorrow at the Provost's council meeting."



I also visited with Paul Engelmann at WMU. Paul is the Assistant Dean for Advising and Retention at the College of Engineering and Applied Sciences. We spent some time discussing common goals and concerns for our students. Paul teaches a course or two each year and believes that critical thinking and problem solving is where students have the most trouble. He is currently working with new students and their parents to encourage the use of ALEKS to develop prerequisite skills and improve placement. Parents understand that spending a little money and time to review, practice and prepare for placement exams can save thousands of dollars and increase students success. Paul agreed to stay in touch and share ideas with KVCC.

Online Learning:

Webinars:

1) **Flipping your Math Classroom: More than just videos and worksheets by Crystal Kirch** https://www.bigmarker.com/GlobalMathDept/Flipping-Your-Math-Classroom-More-Than-Just-Videos-and-Worksheets

2) **Common Vision 2025 by Linda Braddy**
   This webinar highlighted the findings and call to action found in the Mathematical Association of America's report "A Common Vision for Undergraduate Mathematical Sciences Programs in 2025."
   http://www.maa.org/sites/default/files/pdf/CommonVisionFinal.pdf

3) **Calculus Alive! Motivating Students with Applications and Flipping the Class for Active Learning by Shawna Haider**
   https://www.youtube.com/watch?v=iAIsSuCIGzY&feature=youtu.be

The Great Courses: Professional On-line courses

1) Understanding Calculus II: Problems, Solutions, and Tips by Professor Bruce H. Edwards
2) Change and Motion: Calculus Made Clear by Michael Starbird

Conclusion/Summary:

Shawna Haider, Anna Cox and Julie Gunkleman all use Camtasia Studio software for creating their videos. They each use different approaches for making their videos available to students. Shawna uses YouTube and links through Canvas (LMS), Anna uses screencast and links through her college website, and Julie uses livebinders to store her mp4 files. The Camtasia software has been ordered for our Mathematics Department at KVCC and I am looking forward to its arrival and learning how to use the Camtasia software to create concept videos for my students as well as work with Tim Kane and others to share my videos and help others to create videos. Using some of SLCC's real-life video clips and creating some of my own, I intend to challenge students to solve Calculus related problems, (such as the O-ring problem).

I learned that flipping the class is more than just videos and worksheets. Students must participate in the discovery and application of what they are learning. They must build new knowledge from prior knowledge, past experiences and be able to relate to what they are learning. Students must learn mathematics with understanding and they need the opportunity to develop the ability to problem solve and communicate mathematics effectively. Jim Stigler says that learning must be a productive struggle, confusion, pain and agony, for deep learning. He believes that students need to be socialized to interpret struggle differently, to realize that struggle is a sign of learning. Dr. Stigler suggests that on-line learning be more slow and sticky, we need to slow the learning down. He is working with a company called Zaption that stops the video to have students answer questions. While researching Zaption, I learned about EDpuzzle, **EDpuzzle** empowers teachers to make any video your lesson. Crop a video, explain it with your own voice and embed quizzes at any time. I am looking forward to experimenting with these platforms and using them to turn quality premade videos into more personal learning experiences for my students.

Zaption: Don't just watch. *Learn.* Turn online videos into interactive learning experiences that engage students and deepen understanding.
Zaption has joined Workday. The platform was shut down on September 30th, 2016.

Struggle in the Age of MOOCs: Dr. James W. Stigler, UCLA
https://www.youtube.com/watch?v=4xMzWZcPM6c

Three ways to Master Deeper Learning, by Dr. James Stigler

1) Productive struggle 2) Connections to core concepts 3) Deliberate practice vs. rote practice https://www.youtube.com/watch?v=dOjs0bn-RDk

Quote:
Jim Stigler reports that "engagement is not sufficient--students need three elements: productive persistence, explicit connections, and deliberate practice."