

FINAL REPORT FOR HEGEDUS PDG PROJECT AT UMASS DARTMOUTH  
Title: Classroom Connectivity: Engaging Students' Minds, Enabling Teachers' Practice

We have progressed well this year in meeting our project deliverables. We have planned out multiple activities using the TI Classroom Connectivity set-up and have implemented them in four classrooms at UMass Dartmouth. The first, part of the START program with a 100-level College Algebra class. The second, in a Technology course for math majors and high school teachers (a course devised by the PI and has continued to run annually with much success with 25 participants in the last administration). We have also used it in Anne Boisvert's MTH100 College Algebra course and Professor Kowalczyk's Impulse Calculus 1 and 2. Our focus has been on function and multiple representations of function, as well as integral calculus.

We have used a full classroom set-up as planned and have recorded students using the network on digital video with particular focus on students' participation as well as teacher use and practice. Students were asked to sign a consent form and this was approved by UMassD's IRB. Each teacher participant has written up a follow-up reflective account based upon their practice and beliefs as a professor using the technology.

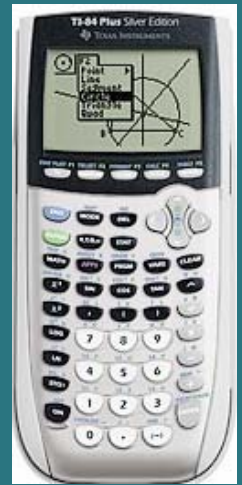
We have met with 5 faculty members and plan to continued to use the set-up in the Spring semester in Calculus classrooms (both Calc I and Calc II), as well as START and classes for pre-service math majors. Our content focus was extended to include advanced function work including Taylor series.

One faculty member is presenting his work at an international conference next year - the 16th International Conference for Teachers of Collegiate Mathematics.

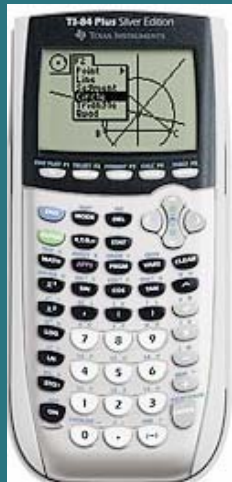
In the Spring semester 2006 we planned and hosted a 0.5 day symposium at UMass Dartmouth (as planned) coordinated with Dr Andrea Klimt and the Center for Teaching Excellence, and opened it up to professors across the UMass system. Over 30 people attended. Corey Brady from Texas Instruments also attended and took part in the workshop.

Dr Hegedus has spent time leading the project, creating new activities for use on the Network, arranging potential interventions with faculty, and conducting preliminary analyses on data from these classes.

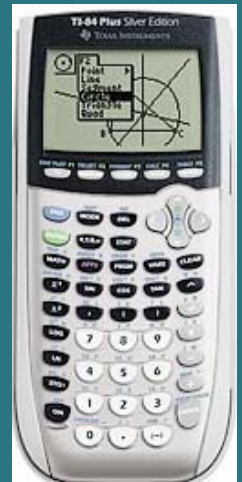
The scope, project schedule and budget remained unchanged and we progressed well as planned.



# TI-Navigator



Robert Kowalczyk  
Mathematics Department

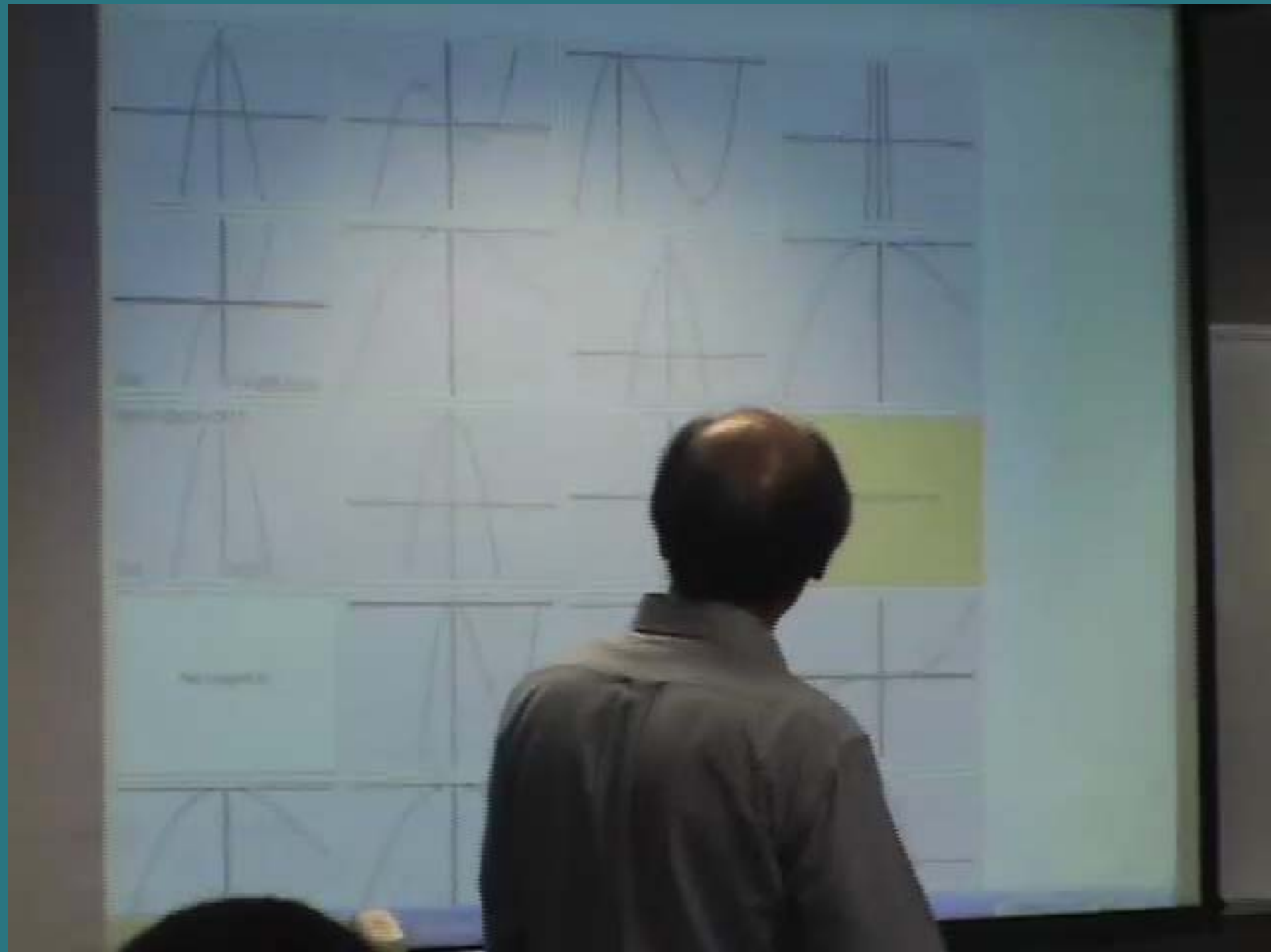


# TI-Navigator Activity

- Two-hour IMPULSE Calculus II class
- First-time user
- Goal — to investigate the potential use of TI-Navigator as a teaching and learning tool

# Warm-up Activity

1. Plot the function  $f(x) = x^3 - 25x^2 - x + 25$  in the best viewing window that you can find?

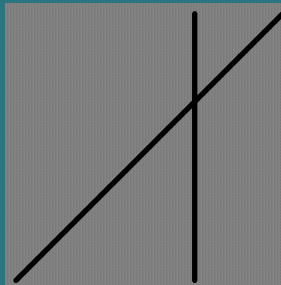


# Student Comments

- I liked the program, it was cool to see how the class as a whole found answers, and I'm sure it would help someone who didn't understand the questions.
- This was a cool program to use and is a good way to find out how other people do with the problem.
- Guaranteed everyone did work.

# Lesson Plan

1. Revolve the region bounded by  $y = x$ ,  $y = 0$  and  $x = 1$  about the  $x$ -axis.
  - Poll: What does the solid of revolution look like?
  - Poll: Find the volume of the solid of revolution. Give answer to 3 decimal places.



# Lesson Plan (cont.)

2. Let  $m =$  your team number (1-12). Find the volume of the solid generated by revolving the region bounded by  $y = mx$ ,  $y = 0$  and  $x = 1$  about the  $x$ -axis.
  - Enter your team number and volume separated by a comma (e.g., 3, 1.234).
  - Plot the list of points.
  - Poll: What type of function do the plotted points represent?



# Lesson Plan (cont.)

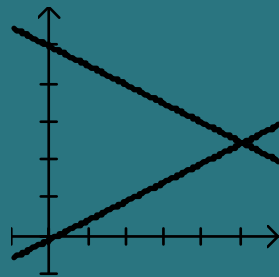
3. Let  $m =$  your team number (1-12). Find the volume of the solid generated by revolving the region bounded by  $y = mx^2$ ,  $y = 0$  and  $x = 1$  about the  $x$ -axis.
4. Find a formula for the solid generated by revolving the region bounded by  $y = mx^n$ ,  $y = 0$  and  $x = 1$  about the  $x$ -axis.

# Student Comments

- The experiment involving TI Navigator was very helpful in studying volumes of revolution. It gave a visual aid that made interpreting the trends in information easy and clear. The interactive element also makes you feel more connected to the class.
- I especially liked how it collectively can take the students data and graph it to spot mathematical trends.

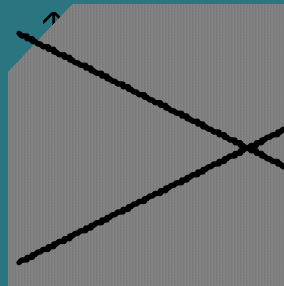
# Lesson Plan (cont.)

5. Let  $m =$  your team number (1-12).
- Poll: What is the  $x$ -value of the point of intersection of the two linear functions  $y = x/m$  and  $y = 5 - x/m$ .



# Lesson Plan (cont.)

- Find the volume of the solid generated by revolving the region bounded by  $y = x/m$ ,  $y = 5 - x/m$  and  $x = 0$  about the  $x$  axis.





# Student Comments

- I thought it was a good program. It made it so that everybody could be involved. By making it so the professor knew which group was giving the answers, it lets the professor know who is actually understanding the material. This program also enables the professor to know what the class needs improvement on and even what they should spend more time focusing on.
- It was an interesting diversion from a normal class. And added a break to relax and work with less stress.
- Great teamwork project.

# Student Comments

- I enjoyed the program. It allowed everyone to workout the problem and respond anonymously helping shy people to answer questions and learn more about what they are doing.
- This was a fun way to work as a team to imply the material learned in class. It was magical.
- It wasn't bad. It allowed everyone to participate in class with less pressure than being called on. While people were participating everyone had an easier time paying attention because they had to focus on getting the answer and inputting it. It was also a little more fun. Something different compared to a usual lecture.

# Student Comments

- I think that the TI Navigator Eval went well. I thought that this might become the future of math classes all over the world. Now students can compute answers and that professors can get feedback on whether or not students get the concepts of the lessons. It is interesting to see what your classmates know compared to yourself.
- I thought this experience was priceless. I learned a lot about a high tech calculator. It was a fun and invaluable experience. I hope to do this many times over. *You are the man*, keep on teaching!!

# Student Comments — Technical

- It was a good experience but definitely need one calculator per person. Ends up being one person does it & the other doesn't do anything.
- My only negative comment is that once you enter an answer, it cannot be replaced without resetting the question; it would be nice to have on record what the first answer was, but be able to redo it, Other than this the program is great!!
- I think that it took too much time to use, especially when we had to enter words into a poll question.

# Student Comments — Negative

- I thought it was a good experience, however I don't see that ever being worked into actual classes. I think it would just cause wasted time. It isn't as practical as just having a teacher go over the material. But other than practicality I think every classroom should have some experience with the TI Navigator.
- It seemed a little impractical for day-to-day use in class. There was too much setup time.
- It was very easy to get off track like putting in answers that make no sense as are just plain wrong.

# Student Comments — Negative

- Thoroughly enjoyable. **Temptation to misbehave is high**, but as a teaching and a method for instant reinforcement it was a success.
- The experience was fun, and very interactive. I like it because it's a useful tool to measure knowledge. **However, it consumes more time from learning a new concept in class.**
- I thought the experience did a good job of showing the ideas using technology. **I don't think it is practical for an everyday classroom experience but it was a good change of pace.**

# Student Comments — Negative

- Old fashion (verbal) class participation would have worked just as well. Probably with less confusion and goofing off.
- It was interesting, but didn't help with knowledge of the material being covered in class.
- Nothing beats teaching on the board.