

## Teaching Mathematics with Technology

**Title** “*Internet technology: difficult classes become fun and inspirational*”

Is learning mathematics difficult? Not if the instructor chooses sensible and effective teaching methods to suit student learning styles. Technology such as a class website, blogging assignments and a mid-term survey can be used to enhance the classroom experience. A well-organized website is a powerful tool for instructors to efficiently **extend learning outside of class**, to better **manage course materials**, and to **provide meaningful and timely feedback for students**. Blogging is a fascinating tool, allowing instructors to **foster collaboration among students**, **promote effective online discussions** and **engage students in active learning**. A mid-term survey (such as the Teaching Assessment by Students) promotes **effective and efficient student assessment** and builds **meaningful relationships between teacher and students**. From my experience, combining innovative methods and technology contributes to student learning at Florida State University. These technologies have helped me to actively reach out to my students in pre-calculus and calculus classes. Further, the students become more motivated to achieve their goals. In brief, even difficult mathematics classes can be fun and inspirational; it is in the instructor’s power to cleverly use technology to stimulate student curiosity about mathematics and maximize their performance.

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I am Hoa Nguyen, a Ph.D. candidate in Computational and Applied Mathematics at Florida State University (Graduation Expected: April 26, 2008). I have taught Pre-calculus and Calculus classes and my teaching performance has been evaluated as outstanding. At the ICME-11, I would like to share my experience with other participants in the discussion group (DG 29) about using internet technology to stimulate student curiosity and maximize their performance in learning mathematics. I believe that this discussion will be useful to answer the question “What are the new opportunities that digital technologies offer to mathematics education?”.

Following are some methods involving internet technology which I have successfully used in class.

### 1) **Well-Organized Class Website:**

My students have given me a lot of compliments about my class website because it is available 24/7 for their study needs. I post lecture notes and example slides *before* each class, homework assignments *after* each lecture, review sets *before* each test and the solution to every problem regularly. This consistency has helped my students to form good study habits. Furthermore, I even post all the test questions and their answers so that my students can self-evaluate their performance. For evidence, please visit my class websites on Pre-calculus:

[http://www.scs.fsu.edu/~nguyen/MAC1140\\_24.html](http://www.scs.fsu.edu/~nguyen/MAC1140_24.html),

and Calculus 1: [http://www.scs.fsu.edu/~nguyen/MAC2311\\_17.html](http://www.scs.fsu.edu/~nguyen/MAC2311_17.html).

The class website has been an important aid in teaching because:

- Students prepare themselves by printing out the lecture notes before coming to class.
- As a result, I am able to deliver the lecture in a precise and easy-to-understand manner since students do not need to concentrate on taking notes. Instead, they focus on comprehending my explanations and responding to my questions.

- The students become accustomed to automatically download and do homework after each lecture since it will be due in the next class. They also learn to correct their mistakes on the previous homework by checking the correct solutions posted online.
- Students have enough time and practice before each test because they have to work on review sets posted on the website.

In brief, the organized website is a powerful tool for instructors to efficiently **extend learning outside of class**, to better **manage course materials**, and to **provide meaningful and timely feedback for students**.

## 2) **Blog Assignments**:

Calculus has many applications in different areas such as biology, chemistry, engineering, etc., but it is a tough subject for a lot of students. To keep my students' interest in this class, I have created a blogging site to help students explore the richness of calculus applications (<http://learncalc1.blogspot.com/>).

The resulting discussions have made my students:

- Realize the importance of calculus knowledge for their majors and other classes.
- Increase their performance because they understand the need to master the material. As a result, my students regularly attend class and office hours. I am compelled to hold my office-hours in a small classroom rather than inside my cubicle because seven or more students typically attend.
- Communicate with each other based on the blog assignments and learn how to discuss math subjects in writing. Some blog topics are actually drawn from sections of the textbook not covered in class, which has motivated my students to learn the subjects by themselves and saved me time to teach other sections.

In brief, blogging is a fascinating tool for instructors to **foster collaboration among students**, **promote effective online discussions** and **engage students in active learning**.

3) **TABS (Teaching Assessment by Students)**: TABS is a mid-semester survey provided by the Center of Teaching and Learning (CTL) and taken by students through the Blackboard site.

In my calculus class, after Test 1, I used the feedback from TABS to understand my students' studying needs and to adjust my teaching methods accordingly. I did not use the default survey questions because I wanted to tailor them particularly for my class.

Following is the set of questions that I developed for TABS:

1) Do you enjoy this class so far? Please answer "yes" or "no" and tell me why.

2) Are the subjects taught in this class difficult for you?

--> If "yes", can you suggest some ways that I can help you, or things you can do to help yourself?

--> If "no", do you want me to assign more challenging problems for you to further extend your knowledge on the subjects? Feel free to tell me what else can be done to help you learn more in this class.

3) Do the course materials (lecture notes, example slides, textbook, hand-outs, homework, review sets, review days, discussion on blog, etc.) help you understand the class subjects better?  
--> If "yes", can you tell me which course material do you like best and why?  
--> If "no", what can be improved?

4) What do you think about my teaching techniques? What do you like or not like? And why?

5) Do you think I evaluate your work fairly? Is there any problem about "fairness" which makes you uncomfortable in this class?

6) Have I been able to:

-- show my expectations for your achievements in this class?

-- explain the class subjects clearly?

-- provide enough individual help (in and out of class)?

-- inspire you with the usefulness of Calculus concepts?

-- give helpful feedback on your performance?

Please answer "yes" or "no" for each question, and express your opinions as much as you can.

26 out of 32 students in my Calculus class responded my survey. I actually reserved one lecture to discuss the results so that my students and I could come up with the best strategies to resolve the issues raised in the survey. Using TABS effectively has improved the understanding between me and my students. As a result, my course is continuously interesting for students because they are the central focus of the classroom.

In brief, TABS or any type of mid-term survey allows instructors to **develop effective and efficient student assessment** and build **meaningful relationships between teacher and students**.

I have enjoyed teaching undergraduate students here at FSU. I want to be a teacher who has high expectations for student performance and knows how to assist them to perform their best. I endeavor to make students learn more than math. My students are strongly encouraged to achieve good study skills, perseverance, and an outstanding work ethic. I believe that using innovative methods and technology has helped me achieve these goals. In brief, even difficult mathematics classes can be fun and inspirational; it is in the instructor's power to cleverly use technology to stimulate student curiosity about mathematics and maximize their performance. Please check out my student evaluations at <http://www.scs.fsu.edu/~nguyen/performance.html>. Thank you for your consideration.