I believe that students’ success in Mathematics classes depends, to a great extent, on how much effort the students are willing to dedicate in their learning process. A successful teacher is one who inspires and motivates students to work hard while maintaining their interest in the subject. At this day and age, students’ interests are as diverse as their backgrounds, so keeping them engaged and focused throughout the semester is not a trivial task. In the Calculus and Pre-Calculus classes that I taught, at both the University of Kansas and Michigan State University, I found that teaching Mathematics via examples is the approach that enables me to keep the students’ interest in the material. I view examples as either motivational or technical. Motivational examples are useful to illustrate the importance of a new concept. These examples are usually found in textbooks in the form of story problems. The technical examples, on the other hand, are more mathematically challenging and I use them to explain a new technique, or review an old one.

This is not a novel approach by any means. Mathematics textbooks for undergraduate classes have utilized this same method for years. Yet, I find that many of the examples in these textbooks are not inspiring to the majority of students because they either involve too much technical details from other fields, or they are simple applications that fail to grab the students’ attention. Alternatively, I found that using examples students can relate to is more successful. More specifically, in the class I am teaching this semester (Calculus II: Infinite series, functions of several variables, area and volume integrals,...etc.), I have talked about the applications of these Mathematical concepts in computer games and computer animation, where solids are approximated by polygons obtained via parametrization of the surface of the solid and the construction of a wire frame via a coordinate grid.

Through a computer presentation in class using open-source software e.g. Mathematica®, SAGE, or K3dsurf, we saw how we could use a scaling parameter to animate a surface or a plot. Other examples I showed: the use of Fourier series in additive sound synthesis, applications of the Black-Scholes equation in economics, predator-prey models in an ecosystem, the wave equation in one versus two spatial dimensions, and several others. Applications to the dynamics of moving objects in space, which is one of the topics covered in this course, include the development of software Physics engines that are used in scientific modeling and in 3D graphics applications such as in the movie industry or video gaming.

The use of technology in teaching allows the instructor to demonstrate deep mathematical facts that inspire the students and highlight the importance of Mathematics in everyday life. The ubiquity of adequately powerful computing options available to students opens the door for more ambitious goals, such as offering an individualized learning experience where the student applies the mathematical knowledge taught in class to a series of research projects relevant to his or her field of study.

Teaching Mathematics at the college level also involves the development of several essential skills. In addition to the pertinent technical skills, students should work on developing their logical and critical thinking skills. It is my belief that an instructor can help greatly in this respect by maintaining a proper level of rigor in his or her presentation, and by minimizing the amount of ad-hoc results as much as possible, skipping only the proofs that are too involved for the course. I also believe that it is my duty as an instructor to always strive to present the concepts in the simplest, most transparent way possible.

One reason I chose Mathematics as my career is that there is a great deal of joy and accomplishment, although not without some painstaking effort and hard work, that one feels after proving a new result or shedding new light on a tough problem. The joy of discovery and the fun of working jointly with my colleagues are positive emotions that I believe should be part of the students’ learning experience in Mathematics. This can be achieved by encouraging them to be more creative and independent thinkers, arrange for them to work in teams on stimulating projects, provide an encouraging atmosphere in the classroom for them to ask questions, and make sure that they get prompt feedback on their assignments so that they can assess their capabilities and recognize the areas that they need to enhance.

I believe that my teaching can continually improve and my methods should always adapt to the students. Taking into account anonymous student feedback provides a valuable tool towards this end. I look forward to the challenge of making Mathematics a joyful and successful student experience.