Teaching Philosophy

My goals for the students with whom I work are to see them increase their knowledge, hone their skills, and increase their experience in exploring and applying knowledge. In striving for these goals, I recognize that teachers do not impart knowledge, but rather we aid students in using their abilities to acquire, master, and apply knowledge.

As a teacher, I seek to draw students along by participating in their learning process. For example, in a Modern Geometries course, after challenging my students to construct interesting tessellations, I combined ideas from two courses to produce a pair of fractal tessellations. I also helped a few of the students produce quality reproductions of their ideas using Mathematica, Geometer’s Sketchpad, and Adobe Illustrator (http://www.math.uaa.alaska.edu/~afmaf/classes/math305/notes/tessel_gallery/gallery.html). I believe my enthusiasm for the project motivated the students to use their full creativity and skills to design their own tilings and to consider additional departmental courses in which the related skills are taught.

My preferred teaching methodology is to lead students to discoveries through exploration. In one class, when introducing improper integration, I require students to complete a guided project (http://www.math.uaa.alaska.edu/~afmaf/classes/math201/assign/write_improper.pdf). The success of this project was demonstrated by student questions. Some came to my office uncertain what to conclude after stating that they had produced a sequence of estimates which were approaching some value. Upon being asked where in calculus they frequently use the word approaching, these students thought of limits and wrote the final answer. The majority were ready in class to begin work on examples.

I design my classes to leave students with a desire to learn more. For example, after drawing lower and upper sums to estimate area and learning about Riemann sums, I give my students an assignment emphasizing the conditions of the Fundamental Theorem of Calculus (http://www.math.uaa.alaska.edu/~afmaf/classes/math200/assign/write_rsums.pdf). For this project, students come with the question, “The smaller I make my rectangles, the more I end up with on the left side.” Not only have they discovered the necessity of the continuity condition, but they have also been tantalized with a function with “excessive” variation. Similarly, in linear algebra, my students are stepped through the process of constructing a polynomial approximation of the sine function using inner product spaces, which they compare to the Taylor polynomial approximation. They are left with a new procedure, an apparent improvement, and a desire to further explore numeric mathematics.

My teaching and student assessment methods are designed to help students integrate knowledge. A major component being integrated into my classes is writing across the curriculum. One student began to make the connection between the axiomatic methods used in geometry and the concept of rhetoric while taking Modern Geometries and History of Rhetoric. Her rhetoric professor and I encouraged her to develop the idea in papers she was writing for both classes. The same professor and I are now helping this
student develop an animation to teach mathematics as part of another professional communication course.

Through writing projects, I have also identified students with mathematical talent whose progress was hindered by computational difficulties. With the largely “non-traditional” students with whom I work, computational mistakes are more prevalent. Identifying these students has enabled me to encourage them to continue in mathematics and increase their success by addressing their individual computational difficulties. In addition, after attending a Master of Education thesis presentation about teaching math with art, I have begun discussing with an art education faculty member how to use art in the Modern Geometries course and how to encourage future teachers in the course to do the same.

My goals are to aid students as they pursue knowledge and hone their skills and to motivate them to increase their desire and ability to learn and apply their knowledge. I am currently pursuing these goals by an enthusiastic pursuit of personal knowledge incorporated into my classes, by acting as a guide in the discovery of knowledge and the process of exploration, and by continuing to make interdisciplinary connections and incorporating them into my classes.