Teaching Statement

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"The good teacher explains. The superior teacher demonstrates. The great teacher inspires". This celebrated and pointedly appropriate quote by William Arthur Ward is a motto for many practicing and aspiring educators, including myself. To me, teaching is a responsibility that presents diverse challenges but also offers many rewards.

Teaching Record

As a graduate Teaching Assistant in the University of Illinois, I have taught five courses in mathematics and assisted with several other courses. These courses include the standard calculus sequence in a typical undergraduate curriculum, staring with differential calculus through vector calculus and ending with advanced calculus, as well as linear/non-linear programming courses. These courses are primarily designed for science and engineering students. In one semester, I also had the opportunity of teaching a mathematics class for business students. My responsibilities for these courses include preparing/delivering lectures, holding office hours, design/grade assignments as well as exams and assigning final grades. In 1995, I received the Outstanding Teaching Award from the mathematics department at the University of Illinois, and my teaching evaluations had been consistently excellent.

The variety of teaching experiences listed above provides me with the valuable opportunity of working with students of different abilities and with varying degrees of technical backgrounds. Through these experiences, I come to appreciate the fact that the students' goals and interests are generally different from mine. Such differences should be respected and perhaps more importantly, they should be included in many teaching-related decision making processes, ranging from developing the syllabus to writing the final exams.

Teaching Style and Methods

As a true believer of active learning, I believe every student has the ability to learn the subject and develop his own view of the subject if he is determined and motivated. In particular, students in higher education should appreciate the importance and necessity of active learning. After all, the process of re-wiring the neural structure of the brain has to be an individual effort. My job as an instructor is to make that process smoother, more pleasant, and hopefully more enjoyable. As an instructor for a graduate or undergraduate class, I consider the following four responsibilities to be the most significant: 1) keep students motivated, 2)help students overcoming conceptual barriers of learning, 3) provide a broad and global view of the subject and 4) provide fair and accurate assessments of students' performances.

Keep Up the Morale The causes for the sinking motivations among the students (individual or collective) can be diverse. For instance, depending on the student's interest, certain part of the syllabus may appear dull. Unsatisfactory exam results may also discourage students and lessen their enthusiasm. It is my responsibility to identify the causes and to apply my creativity and experience to revert the trend. In the past, I have found that keeping a friendly and relaxing atmosphere in classroom is one of the essential remedies. With this, it is easier to involve the students in interesting discussions that can lessen the boredom caused by the repetitive lecture/notes-taking format in the classroom. Sometimes the syllabus may have to be slightly altered or adjusted to fit students' interests. In particular, when the material starts becoming more technical and specialized, it is always helpful to

remind the students why these details are necessary and how they are related to other more interesting ideas and new technology. Occasionally, a tiny amount of pressure, such as a quiz, can also provide the necessary voltage to recharge and reinvigorate the class.

Overcoming Conceptual Barriers In any learning process, there will always be some conceptual barriers that can impede its progress by creating confusion and uneasiness. Some may be simple and they can be overcome quickly. However, depending on the student's background and cognitive maturity, some may present serious obstacles for the students. As a teacher, I consider the responsibility of helping students correctly overcome these barriers as the most important task. If the issue can't be resolved in time, the student's enthusiasm can be seriously eroded, while an incomplete understanding of the concept may hinder the future progress. Some of these conceptual barriers can be anticipated or identified once the syllabus has been decided, by experience perhaps. Often, each student would encounter his own barriers of learning, which can be observed from questions and homework/quiz results. To help the student, I would try to present the material in different angles, in particular, try to make more tangible connections between the new and old materials. I would also encourage the student to ask many questions because, only through questions, I can know the source of confusion and provide maximal assistance for overcoming the barriers. Also, a suitable dose of well-designed exercises is absolutely necessary since only through hands-on experiences can a deep and complete understanding of the material emerge. I would constantly remind the students that internalizing any new idea and concept is always difficult and they should not be discouraged. Once understood, the new concept or idea would appear just as natural and simple as the old ones.

Broader View of the Subject With the pressure of getting good grades, many students inevitably and understandably become focused on the technical details of the subject while ignoring its broader implications such as the relations between disparate concepts, the unifying themes or principles of the subject. Textbooks with hundreds of pages do not make the situation better. It is another important responsibility of mine to constantly bring to their attention the broader and different views of the subject. This requires meticulous planning of the syllabus as well as careful preparation of the lectures. In order for the students to develop and shape their own views, it is imperative that they have a firm understanding of the subject at both micro and macro scales. In addition, many technical details only become transparent and meaningful when viewed from a broader perspective.

Fair and Accurate Assessment As a believer of active learning, I place great emphasis on homework and projects since, as I believe, only through hands-on experiences, such as seeing the result of a calculation or a program, can a complete understanding of the subject emerge. I assign and grade homework regularly, and it serves as a medium for practicing and improving the basic skill for the students. In addition, it also acts as a continuous gauge for monitoring each student's progress. Projects, on the other hand, allow greater individual inputs from the students. Students are encouraged to bring together their own unique creativity and their understandings of the subject to create novel applications. Periodic evaluations of the students' progress through exams (such as the midterm and hourly exams) are also essential, particularly for the undergrads. Finally, I appreciate a student's effort and for assigning the final grad, it can be a factor. Students come with different backgrounds, aptitudes and dispositions. For some students, the "hard" decision such as the exam scores may not be the best way to assess their progresses. For me, the "soft" decision is the amount of effort the student has consistently demonstrated throughout the entire course, usually observable from the homework and projects. Although not a main factor in determining the final grades for most students, I do occasionally take it into consideration under special circumstances.

Future Planes

As a computer vision researcher with a mathematic background, I believe I am qualified to teach many standard courses offered in the CS department at both undergraduate and graduate levels. These include courses in computer vision, computer graphics, artificial intelligent and machine learning, discrete mathematics and probability, computational theory and complexity. All these fields are still considered as active areas of research with new research results and exciting applications appearing constantly. Therefore, I am also interested in organizing advanced research seminars, which provide the medium through which the students (as well as the faculty) can be informed of latest developments.