Teaching Statement for Andrew Stacey

My teaching philosophy is founded on the obvious fact that teaching can only occur when learning is happening. Thus teaching is the act of enabling learning. This concept pervades my teaching, from designing a course through to the style of the individual classes.

Before beginning a course I decide in broad terms what it is that I want the students to have learnt by its end. I have found that this tends to divide into two parts. The first part consists of a certain body of mathematical knowledge that I wish the students to learn and be able to use. The second part consists of a development in the students' mathematical maturity. Of course, to set these objectives I first have to know what to expect from the incoming students in terms of knowledge and ability.

The material objective determines the content of my classes whereas the maturity objective influences my style of teaching. I adjust my style in order to lead the students to a deeper understanding of how a mathematician views mathematics.

Thus my classroom style is ruled by pragmatism rather than idealism. Although the aim of a university education is to produce mature people capable of independent learning, this is not achieved in one course. If the material is particularly difficult and the students new to university, I keep my teaching style simple and closer to that found in schools.

For example, at Warwick I was involved with teaching a real analysis course to undergraduates in their first term at university. It was found that students had trouble with the double jump from school mathematics to university mathematics and from school teaching to university teaching. Therefore the course was redesigned as a classroom based course. In this course the students were given booklets each week that led them through the material. My rôle as classroom instructor was to give a short presentation at the start of the week, to help them as they worked through the material, and to encourage them to give presentations to the other students. After completing this course, students were better able to benefit from courses given in a more traditional style.

At the other end of the scale, when teaching a graduate course my style is similar to that of a seminar. I aim to present the students with the essence of the subject. I make sure that I present the essential ideas and techniques but where, say, the details of a particular proof are not difficult and are not particularly illuminating then I am prepared to leave the students to read those from the literature.

I subscribe to the view that one learns mathematics best by doing it. Thus the main part of learning takes place outside the classroom. I take care to select homework problems that guide the students' learning and am always keen to help students during office hours. However, it is also essential for their learning that students engage with the material during class time. Therefore I take care to ensure that the students understand what I want them to understand.

This takes place on several levels, all of which are designed to help me know what the students have understood. At the most informal level, I try to encourage an atmosphere in class where students are not embarrassed to ask questions. When working through examples in class I ask the students to suggest ways to solve them. I have also used the "minute paper" where at the end of a class students take a minute to write down the main point of the topic and any points that remain unclear. I have also found it possible to use office hours to get more feedback. At a more formal level, I have used mid-quarter evaluations to get a detailed view of the students' understanding.

At Stanford I have taken part in a small group which meets once a month to discuss teaching issues in science and engineering. Through this group I have learnt more ideas as to how to engage the students' interest in the material and how to encourage the students to develop their thinking. I am always looking for ways to improve my students' learning and thus also my teaching.