

## TEACHING STATEMENT

NOAH WHITE

**Introduction and goals.** My key aim as a teacher is to give students confidence. This means confidence with the material I am teaching; confidence learning mathematics on their own; confidence exploring their mathematical world; and confidence applying mathematics to other areas of interest.

I find teaching to be a valuable and fulfilling part of being a researcher. Not only is passing on knowledge and watching students achieve rewarding but I find teaching to be integral to my own development as a mathematician. It allows me to synthesise and reassess my knowledge about the mathematical world and build the links between different areas of my understanding that are vital to the success of my research. I enjoy teaching and sharing my love for mathematics. It brings me satisfaction seeing students succeed and to hear that I have positively affected their learning experience.

*“Noah is the best postgraduate tutor I’ve ever had! He has a brilliant way of teaching: He can make the most complicated concepts sound simple without ever being patronising.”*

In particular, I have been nominated three times for a university wide teaching award (twice for best postgraduate tutor and once for best feedback). I look forward to learning and growing as an educator. Below I outline my teaching experience, some of the challenges I have faced along the way and the solutions I have discovered as well as three aspects of teaching I feel are particularly important to my teaching style.

**Experience.** I have experience as a teaching assistant on a wide variety of courses at both the University of Edinburgh and the University of Sydney. I also have experience lecturing and running exercise sessions for an intensive mathematics preparation course at the University of Sydney designed for incoming first year students that do not have the requisite mathematics background required for their chosen degree, it was run over 3 weeks with 24 hours of class time. This was a challenging and fun experience. I believe I am a confident and engaging public speaker but developing my own lecturing style taught me a huge amount about the importance of forethought and flexibility when choosing what to emphasise and which examples to choose.

I have been a teaching assistant on many courses including 6 semesters of introductory linear algebra and 3 semesters of introductory calculus, through to upper level differential geometry and Lie groups courses as well as a graduate algebra and a graduate geometry and topology course. My curriculum vitae contains a full list of the courses I have taught.

More than anything the wide variety of courses I have experience teaching has taught me the huge variation in backgrounds, expectations and preconceptions that students bring with them. One has to be quick to adapt to each situation quickly. Scotland is unique in the sense that it is a small country with a very high quality higher education system and therefore attracts many students, not just from Scotland but from England and other European and North American countries. The differences in schooling means these students bring with them a wide variety of backgrounds in mathematics. This presents a particular challenge in introductory calculus and linear algebra subjects.

**Active learning.** As much as possible I try to encourage students to learn by doing rather than listening. I find it a constant challenge to maintain this emphasis in the classroom. If a student asks for an explanation it is very tempting to slip into “lecturing mode”. Instead I try hard to encourage the student to find their own explanation whilst giving helpful hints along the way. This way a student

might make better progress than completely alone yet still has the advantage of actively engaging in the activity. There is a conscious effort by the mathematics department in Edinburgh to emphasise and facilitate active learning, and over the last three years I have become more and more convinced of its importance as part of a student's learning process.

In my experience students have a reluctance to try small examples. As a researcher my first reaction, if I do not understand a problem, is to try and do the first non trivial example, and then the next example and so on until I become comfortable or get stuck. It is easy as a teacher to take this ingrained instinct for granted. Similarly I find that students can often struggle with finding counter examples. My immediate reaction is to start with the most basic possible object and work my way to more complicated examples until I find one that fits. Students seem to not have this instinct and often struggle finding examples. I think emphasising these types of techniques is a large part of giving students confidence to do mathematics on their own.

**Feedback and learning environment.** Feedback on formative assessment is vital in guiding a student to the successful completion of a course. It signals to them where they have gone wrong, what needs to be improved and what they don't understand. Quality, well thought out feedback also sends a signal that their teacher cares about their success. I find an important part of feedback is to make it clear to the student when they are actually receiving feedback (preferably in written form). To this end I have adopted the practice of writing only a small amount of feedback directly on the students work but including a separate sheet which has an expanded set of feedback. I have received several comments about my high quality feedback since adopting this method.

*"He gave the best feedback I have ever received from the school of Mathematics and Physics."*

*"Noah White was excellent, provided detailed and personalised feedback on assignments, knew the subject well, and was friendly and approachable."*

I also aim to create a relaxed learning atmosphere. I want students to feel comfortable speaking with me and asking questions. Importantly I also want them to feel comfortable asking their peers for help. often I only really truly understand something once I have explained it to someone else. I have received many comments about my approachable and relaxed teaching style.

*"It was very easy to approach Noah, and makes easy explanations."*

*"He was friendly and encouraged the asking of questions which promoted an exceptional atmosphere for learning."*

**Making mistakes.** It can often be just as valuable or even more valuable to let students fail than to correct them immediately. Sometimes while discussing a problem with a student they suggest a method which I can see is going down the wrong path. It is very tempting to point this out or brush off their idea and suggest they try another without any explanation. I think often this is the wrong thing to do. Why an idea is wrong or wont work can be equally and sometimes more instructive than knowing the actual solution.

Within reason I try and let the student come to their own conclusion that the idea is wrong, perhaps with a small amount of guidance. Counterintuitively, in my experience, I think a failure like this can lead to boost in the students confidence. I think this boost comes from the fact they have had an internal "aha moment" and realise or understand something they did not before, even though they did not discover a solution to the problem. This process needs to be managed carefully and feedback needs to be given to indicate the fact that the understand their failure can be a good thing.

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## NOAH WHITE: STUDENT COMMENTS

Noah was enthusiastic and explained things very well. He provided the relevant theory and used examples to further this.

'Noah is the best postgraduate tutor I've ever had!

He has a brilliant way of teaching: He can make the most complicated concepts sound simple without ever being patronising. He always takes the time to work out which parts of the problem each individual finds confusing, and then works to make sure that the issues are resolved. He has absolutely no qualms with staying late after class to help someone who doesn't understand something.

Both tutors (Peter Blue and Noah) are extremely good at explaining the materials. Their feedback<sup>\*\*</sup> are also very helpful<sup>\*\*</sup> and ~~frank~~ ~~honest~~

It was very easy to approach Noah, and make easy explanations.

I found it helpful that he was really relaxed and quite enthusiastic. He was happy to explain questions ~~and~~ in detail.

'He gave the best feedback I have ever received from the school of Mathematics and Physics. Although the assignments for mathematics courses are quite different from the other schools (i.e. No long essay), usually just about proving theorems. However, he really made an effort to mark every assignment. He wrote a full page of feedback for my homework to remind me of some technical details even when I got the concepts right and full marks for that assignment.

The tutor was extremely helpful and gave really good feedback

Noah White was excellent. provided detailed & personalised feedback on assignments, knew the subject well, & was very friendly

Noah was really competent at explaining math examples and theorems, as well as going through questions, and clearly deconstructing them from the sheet

overall really happy to have Noah as a tutor.

Noah's feedback was great!

He is really patient and explains things very well

He was friendly and encouraged the asking of questions which promoted an exceptional atmosphere for learning.

Very articulate and explains things thoroughly.