In September 2004 I was asked to address the Induction Course for Lecturers New to Teaching Mathematics in UK HE (organised by the Maths, Stats and OR Network). I had attended the event as a delegate in 2003, and was keen to pass on my experiences at this friendly and supportive forum. My comments in this article are based on the talk I gave, and the feedback I received. I hope that they will form a useful list of tips to try and pitfalls to avoid for those (like me) who are new to lecturing.

Background: my experience and what I taught

I joined the School of Mathematics at the University of Leeds as a Statistics Lecturer in September 2003. This was my first appointment after reading for a Ph.D. During my studies, I was fortunate to gain some teaching experience in delivering examples classes, tutorials and computer practicals, but had no real experience of giving lectures. What I lacked in knowledge I made up for with enthusiasm, but it is fair to say I faced a steep learning curve!

During the 2003/04 academic year I taught two single semester modules. The first was an introductory module in probability and statistics, aimed at foundation year business studies students. Most of the 70 strong cohort were from overseas, making clear and concise delivery more important than ever. The module consisted of a traditional mix of about 20 lectures and 10 examples classes. The second module covered topics in environmental statistics, and was aimed at students in their second year of a mathematics degree or a joint honours statistics scheme. The teaching was a mix of 20 lectures, 5 examples classes and 5 computer practicals, delivered to some 30 students. In addition to my lecturing duties, I gave small group tutorials in support of first year modules in probability and statistics.

Lectures

I had much to learn about lecturing, and made several surprising discoveries. For both modules that I taught, I was fortunate to receive the previous lecturers’ notes. Given my relative inexperience, I thought it best to stick to these notes as closely as possible. However, I soon discovered that it is very difficult to deliver someone else’s material in someone else’s style. It is far easier, and much more satisfying, to deliver the material in your own style. I would therefore recommend carefully rewriting any course materials you inherit. Somewhat nervous at the prospect of delivering material to 70 students, I opted to give full printed notes on an overhead projector, rather than writing notes on the board during lectures. However, far from making lectures more straightforward, I found that this made it very difficult to pace material properly. With ready prepared slides, it is all too easy to rush through material, leaving the audience confused. Writing notes on the board gives a natural rhythm to the lecture, that prepared slides do not. However, writing on the board is not as straightforward as it might appear. It is important to develop a strategy for use, particularly in large lecture rooms where boards can be stacked two or three deep. My preconceptions over how best to aid learning were also challenged. I had always believed that adding detail and explanation aided understanding. However, particularly with students whose first language is not English, too much detail can be distracting, and there is a difficult trade-off to be made.

During the year, I picked up a number of useful tips. Students appreciated a set of well-ordered notes. Producing notes in LaTeX automatically gives...
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hierarchical structure, numbered equations etc. Despite the extra time involved, I therefore recommend typing up your board notes as a LaTeX file before delivering them. Even with carefully typed notes, I still found the odd mistake would creep in. On the whole, students are quite forgiving of mistakes, provided that you own up immediately, and correct any errors before the next session. Quite often, it was small details that made the difference between a successful and an unsuccessful lecture. Taking the time to learn a few names helped to build rapport (though it was clearly not possible to learn all of the names in a class of 70). Remembering to thank students who answered questions in lecture also helped to encourage participation. There are a few simple matters of administration that can help a lecture run smoothly. I found it best to make announcements at the start of the lecture, as these can often be overlooked if given at the end. If notes need to be handed out at the start of a lecture, and particularly with a large group, it will help to speed distribution if a pile of notes is given to the back of the room, and another pile to the front. If work needs to be collected in, I found it best to collect it at the end of the lecture. Seventy students all trying to hand in assignments does not make for a very orderly start to a session! It is also helpful to be available to answer questions at the end of the lecture, as students often want to clear up any confusion straight away. Another small administrative point I noted was that if you wish to circulate an attendance sheet, a more honest response is obtained if signatures are requested rather than a simple tick or cross.

Many of these tips were picked up from colleagues during peer observation, and I recommend that both observing lectures and having your own lectures observed is an invaluable way to improve your lecturing style. Students can be a useful source of feedback (though it is worth pointing out that positive student feedback does not always indicate good lecturing). In seeking student feedback, I found it helpful to give students a chance to comment on my teaching roughly half way through a module. If you leave all feedback until the end of the teaching, then it is not possible to make changes for the current cohort of students.

Examples classes and problem sheets

One of the main changes since my own undergraduate days has been the move towards assessed problems sheets and coursework. Unfortunately, this seems to have created a culture amongst students that if a piece of work is not assessed then it is not worth completing. Consequently, attendance at problems classes for work that does not count towards the final mark can be rather disappointing. Particularly amongst the foundation year students, I found issues of plagiarism, as students did not want to lose marks, and were prepared to copy solutions from their friends, rather than using the exercises to help them understand the material. Model solutions proved another contentious issue. Should students be given them without making a serious attempt at the exercises themselves first? It is worth checking local policies on such matters, as they may vary. You are likely to be confronted early on with the difficulties of setting and maintaining deadlines for students. It seems clear that students need to learn to work to deadlines, but how strictly should these be enforced? I find it rather difficult to dock marks for work that is only one or two hours late. Perhaps the most useful advice is to set all deadlines to 5 pm, thus avoiding some of the problems of marginally late work. Whatever policy is adopted, it should be consistent with departmental guidelines etc. Organising classes to large groups of students can be particularly difficult. Postgraduate markers can help to alleviate some of the load, but need to be properly briefed on your marking style and procedure.

On a more positive note, I developed several useful techniques for managing problem sets and examples classes. Students will often want to ask questions outside class and lecture times. I found that an open door policy was quite helpful in dealing with these queries. Set office hours turned out to be less helpful, as students tend to come along at a time convenient to them rather than a time of your choosing! Inevitably, it is sometimes necessary to tell students to come back later. Provided a specific time is given, most are happy to do so. I found that an effective tool for planning class time was to circulate a queries sheet before the session. I would then spend part of the class covering the issues raised on the queries sheet, and the remainder of the time moving around the room answering questions on a one-to-one basis.

Computer practicals

Computer practicals, held in large computer clusters, bring a host of new challenges. I have found that the level of computer literacy varies considerably amongst students. Many who are familiar with Internet and email are less happy using text editors and writing simple programs. Sometimes, trying to teach the intricacies of a computer package can actually distract from teaching mathematical and statistical concepts, and from experience I would argue that computer practicals should be two hours long. Much of the time in a one hour session can be taken up with relatively minor syntactical errors. Compatibility can also be a difficult issue. There is absolutely no substitute for trying the commands for a computer practical at the
computers the students will actually be using!

To help students overcome their difficulties with computing, I have found it helpful to provide a near complete set of commands with strategic gaps to be filled in. I have also found it beneficial to provide these notes in advance of practical sessions, so that students can familiarise themselves with the material. As an alternative, some colleagues give a complete set of commands for some of their exercises, and leave students to work independently on similar examples. Whatever strategy is adopted, students need effective support when using computer software, and I have found support by email to be an efficient way of providing this. Students can then cut and paste into their email commands that are causing them difficulties. To emphasise the need for computing, I have also tried to integrate the use of computers within both my lectures and problem sheets.

**Tutorials**

I have been greatly impressed with the system of small group tutorials at Leeds. However, students do not always make the most of this resource! Attendance is usually directly related to the imminence of homework deadlines, and much time can be wasted chasing non-attendees. Quite often students will not have prepared adequately (ideally, I believe that students should lead the session, asking questions and solving problems, rather than waiting for solutions to be offered up to them). To this end, I have found it helpful to develop a set of problems for students to work on during tutorials that are similar, but not identical, to those handed in for assessment.

Despite the difficulty and reluctance I have encountered, I think that it is worth persevering with an interactive approach in which students solve problems on the board. A simple tool I have used to encourage participation is to roll a die if volunteers aren’t forthcoming. I have not yet had anybody refuse to solve a problem at the board, and using the die helps emphasise that the selection is random, and nobody is being picked on. Some even simpler measures can help to encourage participation. In particular, avoid timetabling tutorials early in the morning or late in the afternoon!

**Exams**

Lastly, I turn to examinations. I have been rather surprised by the sheer number of examinations a modular system generates. With resits and January examinations, a deadline is never far away, and it is worth familiarising yourself with the various submission dates as soon as possible. Students tend to focus on the examinations system rather too much, and can be apprehensive when a new lecturer is giving a module. They have no past papers with which to assess your style of examination question. Giving a mock paper, or some guidance on which past questions are relevant can help to allay fears.

I have found several techniques for making the examinations procedure more straightforward. Marking a question at a time rather than a script at a time will speed the process of script marking enormously, and should help to maintain consistency. A detailed mark scheme (but with some flexibility to allow for variant correct answers) will also help to make marking a simpler process. Constructing an exam paper at the same time as writing the notes for a new module can save considerable amounts of time.

**Conclusions**

Overall, I have had an enjoyable and rewarding first year. I have picked up many useful tips, but there is still much to learn. Ultimately, there is no substitute for experience, but seeking the advice of colleagues and peers can help considerably. I hope that this article will encourage such discussions.