

**Strange but true!
2nd year undergraduates chat all night online
about logic course.**

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About me

I research in formal logic and mathematical semantics in Computer Science. I was hired as a lecturer at Heriot-Watt in late 2006.

I taught F22HO **Formal Spec(ification)** in Term 2 (winter term) early 2007; my first time lecturing. I'm teaching Formal Spec again this term.

Teaching has been a very interesting experience.

I'm going to talk about this interesting experience, and put the flexible learning aspects of what I have to say, in the broader context of my starting to lecture.

About the course

F22HO is for second year undergraduates, taught in term 2 of year 2.

It's about using formal logic as a specification language. As Greg Michaelson put it, it's their first exposure to 'really squiggly symbol stuff'.

It has the reputation of being a relatively difficult course.

The students

Second year undergraduates aged 19 to 20. All male in 2007.
Predominantly male in 2008.

The students had one course in logic under their belt.

This made a positive difference: they might not have understood logic first time round, but at the start of Formal Spec it helped a lot that they had seen it all before.

I wouldn't want to try teaching Formal Spec from scratch.

My impression of the students

The students are more creative than us (grown-ups).

If you can get them excited about something, then there's no holding them back. It's nice.

My impression of the students

They are far more computer literate than I am — but in an iPod sense.

They have little understanding of nuts-and-bolts like memory registers, functions, and so on; the kind of thing I knew about when I was swotting in school.

However, they're **completely** comfortable with everything that is online and can be streamed to a web browser or mobile phone.

My impression of the students

It is said that Formal Spec is a difficult course.

No. It's an **interesting** course — but the students have no problem with the kind of abstract thought required.

I think this too is a generation difference. They have seen a formal specification but the basic ideas are implicit in the design of so many modern gadgets that they pick it up fairly naturally — **if** you can get them to study.

The Big Problem

So: creative and gadget-savvy as the students may be, they

- don't study and
- they don't follow through.

Just getting the students to **sit down** and **learn** has been my number 1 issue. The ones that do this, do well.

Not the problem I expected. Were students always like this? I don't think so.

The Big Problem

You know the people who grumble that the youth of today only know how to zap between TV channels and can't buckle down to read, write, and generally **concentrate**? Well — they're right!

Occasionally a student will study out of sheer love for the course. However, this is essentially random. There is no discipline to it; no default assumption that Students Are In University to Make Damn Sure They Study.

I use a number of techniques to get them working.

I need you to . . .

The single most useful comment on teaching **ever** came from a Glaswegian secondary school teacher. I was complaining bitterly about the youth of today.

She said: suppose you want the students to do Exercise 3 for next lecture, which is on Monday. Don't say 'I would like you to do Exercise 3' or 'You should do Exercise 3'.

Say 'I need you to do Exercise 3 by Sunday evening'.

If you say 'I would like' the average student thinks 'well, he would like me to do Exercise 3, but I would like to sit watching Alan Partridge off the internet till 4am — so I'll do that instead'.

I need you to . . .

I got that advice **after** teaching last year's course. I'm applying it this year.

It doesn't command instant obedience but it does seem to communicate what I want — what I need — more reliably.

Flexible learning: videos

I took videos of all my lectures, using my two-year old but exquisite point-and-shoot camera (Ricoh Caplio R4).

320x160 at 15 frames per second. Pretty low quality stuff, but minutes after the end of a lecture the video can be online.

This turned out to be very useful.

Flexible learning: videos

Some students have to travel up to two hours to get to the campus. Some students have to get out of bed. Both groups find it hard to attend all lectures.

The students were emphatic that the videos were a great help.

Files averaged 20 downloads a week and in one week (just before a test) it reached 150 downloads. The YouTube generation; they take to it naturally.

Flexible learning: videos

Two students missed the first half of the course.

One had personal problems, the other had been on a skiing holiday (and, noting my interest in photography, showed me his holiday snapshots online).

They both asked me to tutor them to help them catch up.

I just told them to watch the movies online.

This alone recouped all the time lost to the logistics of filming.

Flexible learning; videos

I have heard it said that audio recording is as effective as video.

I disagree — video is better. You can see what I'm pointing at and it helps to stay awake if you can watch a little Jamie muppet figure jump up and down gesticulating in a little window on screen.

Social ritual

I hand round a tub of Quality Street sweets at the start of each lecture.

It's a nice social ritual, and creates a social connection between me and the students.

Once you've eaten something that somebody has given you, you do feel obliged to at least sit politely and watch them talk for a few minutes.

That's a good start; it gives me something to build on.

There's a downside. One student in my current class gets really nervous and gives me 'why is he doing this?' looks.

Next lecture, I think I'll reassure him that I haven't drugged the sweeties. I'm sure he'll feel better.

Questions

I encourage questions in class. They're reluctant at first, but they usually get into the swing of it. In my last lecture I must have fielded over a dozen questions.

You can check; it's all online.

Students from 2007 tell me that their year is now more active in asking questions also in other lectures. If this is the case, I consider it a job well done.

I changed their culture. Ninety percent of my issues with learning and teaching have been, in essence, cultural.

Student culture: study ethic

This is a film about a little boy who is a weed and a pushover for most of the film. He wins the final big fight with a special (and thoroughly ridiculous) karate kick.

Real life doesn't work like that. Exams favour consistent and continuous effort throughout the year.

The students believe, even when told otherwise, that months of neglect can be made up in an 8 week (or 4 week, or 2 week, or 2 day) cram.

Student culture: study ethic

We must attack this idea **explicitly**, right from the word go. I am currently hammering on about this in every lecture.

This year, I invited a student from 2007 to deliver a long talk to the class about listening to me when I tell them to study, and how he wished he'd had this advice when he was doing the course.

I think this did some measure of good. The fact that he **cared** enough to turn up also sent a message.

Student culture: default permissions

The students divide roughly into two groups:

- those that will work if you give them permission to work, and
- those that will not work if you give them permission to not work.

It's dangerous to say 'it's your responsibility to work'. The second group hears 'you have my permission not to work'. It's an immature mentality.

We can't lie. It **is** their responsibility to work. I **do** say that.

But I also say: you don't have **my** permission **not** to work. The students will accept that, but it needs repeating.

The message board!

I tried to set up a WiKi for Formal Spec in 2007. It flopped: the students just kept overwriting stuff, without converging on a definitive document.

I started a message board in week 3 of 2007 on my own webspace, on the suggestion of the students themselves.

It filled instantly with blog-style entries on topics ranging from F22HO, to the (mis)adventures of a student band, to discussions of other courses.

One student offered a 10% discount voucher for a mail order sex toy site, on the message board.

They were trying to push my limits. I didn't mind: they were hanging out on **my** message board.

Online teaching

I set all exercises through the message board and asked the students to submit work online.

This allows me to **see** them working and keep track of them in ways that would be impossible otherwise.

Yesterday a student assured me she was doing exercises. I just said: “**is it on the message board? No? Then I need you to type it up online by tomorrow lunchtime**”. She may not do this — but it moves the dialogue forwards and makes for an objective and concrete goal.

As I said, the students don't concentrate and they don't follow through. Via the message board I can keep my finger on the pulse.

Online teaching

It is easy to comment on students' work, by inserting comments into their text. I did this in real time, as the answers arrived. **Much** faster than marking and handing back work. I just don't take paper any more.

The students also commented on each others' work.

Speed is important. The students tell me it was important that they could submit a solution or a question, and have an answer within hours from me or from a fellow student.

The moment it takes a day or two to get an answer to a question online, the students don't bother any more.

Online teaching

The result of conducting online all class business outside lectures, was a series of increasingly refined answers to problems. Common mistakes, as well as correct answers, are documented online.

Usefully, because more than one student submitted answers, **several** different correct answers became available.

Students consulted and commented on each others' work.

In 2007 the message board recorded two thousand posts and tens of thousands of individual views. It continued to be used for revision right up until the exam.

Shyness

Some students are too shy to post online.

I created a fictitious student, **Nicebutdim**. An anonymous avatar for 'stupid questions'.

I also created **Stew Dent**, to anonymously answer Nicebutdim's questions.

Nicebutdim was used for technical questions — but also by one bolshy student, to lambast my teaching.

Shyness

I took this utterly seriously. I debated online with Nicebutdim making no secret of what I was doing and why. The other students joined in, taking one side or the other.

After the debate, I made changes to my teaching accordingly. The sense was palpable that the students felt they had a stake in the course and my teaching. This would have been impossible without the message board.

Record

As a (nice?) side-effect, much of my teaching activity is on record. If anybody wants an estimate of how much work went into teaching the class, I can just say “500 posts on the online message board over an eight week period in 2007”.

Significant factors in success: beginner's luck

I think that what happened last year was special. It was my first time teaching.

My excitement and my inexperience at teaching resonated positively with the students' excitement and inexperience at being students.

I do not expect it to be quite the same this time round. I'm a bit calmer, and (I like to think) more efficient.

'Calm and efficient' may be less interesting for the students to watch.

We shall have to wait and see how things pan out in 2008.

Significant factors in success: unofficial

The students have a wonderful spirit of self-expression, once they get going.

This would occasionally flower on the message board, even, on a couple of occasions, in poetry and literature. It was truly a pleasure to see, and my privilege to be there.

I do not believe that an 'official' message board would have the same charm.

Certainly in 2007, since it was the students' own idea, they felt they owned the board and positively frolicked in it.

Significant factors in success: unofficial

My suggestion is: don't give your message board an 'official branding'. Let the students take it over and make it **their** territory — with you as an authority figure perhaps, but not as a supervisor.

Maybe have the whole thing administered off-site by the student reps?

Significant factors in success: personality

My webpage is extensive and contains a great deal of information about me.

I have a blog, with some quite outspoken articles. I keep a brief log of amusing incidents teaching. I have my photographs online. I try to make it into an interesting place to visit.

I also use Statcounter which lets me track visits to my webpage.

Since the beginning of F22HO in 2008, people — presumably students — have logged in from machines in Heriot-Watt and trawled right through my website.

This is good. I believe they'll listen to me in lectures more, as a result.

Significant factors in success: meeting-place

As I said, the students are totally switched on to anything online.

Many students at Heriot-Watt live off-campus. Many work full- or half-time. There are not the same opportunities for socialisation as in a fully campus university where working for a living is the exception rather than the rule.

The asynchronous and location-independent nature of message-board communication gave the students a place to hang out. This is exactly what they did; they hung out. Because they hung out on a **Formal Spec** message board, this raised their awareness of Formal Spec.

I retain a good relationship with the cohort of 2007. They continue to use the message board and administer it themselves.

Significant factors in success: hard work

I showed these slides to my students. One of them said: **Jamie, you don't do yourself justice. You put a lot of work into teaching the course, encouraging us, and answering questions also late at night. This made a big difference.**

I was very touched by that. I don't mention it here out of vanity; if students **perceive** that a teacher wants them to succeed and is willing to invest in that wish, they'll give more of themselves — obviously. (Note: story of the lecturer's back.)

This factor in success need not scale well with class size or teaching load!

Summary of benefits of the message board

Self-generation of record of problems and solutions.

Interaction with students at all hours of the day and night (if I want to).

Speed responding to questions far quicker than any other method would allow.

Allows students to teach each other. Allow them to socialise.

And yes — some students **did** stay up all night discussing logic.

Discipline

So far, I have had no discipline problems.

I hear horror stories about students refusing to work, claiming it was their 'right' to get a good grade because they payed fees, etcetera.

I've always fancied dangling a student out of a second-floor window by their shoelaces. So far, the opportunity has not arisen.

I have found students at Heriot-Watt a good-natured and friendly bunch. I like that a lot.

Two recommendations: recording equipment

Quality of recording is important. I am aware of the limitations of my Ricoh R4 camera. The quality really isn't good enough, but it's the best I can offer.

Departments do have audiovisual equipment. It records to video or DVD; converting to a format suitable for the web is **difficult**. It's 80s technology you can **really** feel it.

Saying to a lecturer who wants to record classes 'go to the AV department' is **not** an answer.

I can only record my lectures because **I** payed for the equipment. Not everybody will have the money, or the technical expertise, to identify and buy recording equipment suitable for rapid online publishing.

Two recommendations: recording equipment

I suggest: buy up some handheld SD card mpeg video recorders.

They record direct to streamable format; time to online publishing is as fast as you can read off the card. Material can be on Google Video or YouTube instantly. See my webpage.

In 3 years' time, **all** mobile phones will do the trick.

Two recommendations: able students

Let's end on a high note.

Once students get excited about something, they commit 100% but they won't follow through if not instantly encouraged.

I **have** seen students inspired by my course. But I have been unable to exploit and channel this enthusiasm. Within a week or two the moment has passed and they're back to watching Alan Partridge off the web.

This is a wasted opportunity. We need to put this enthusiasm to constructive use. Use them as teaching assistants, set them producing online materials, let them do postgraduate courses. **Something.**

Challenge them, cultivate them, make them feel important. I believe this will raise expectations in the class as a whole.

In summary

Teaching is time-consuming and exhausting. It **really** puts a sock in my research programme.

However, it is also one of the most exciting, rewarding, and character-building things I've ever done.

The internet has made itself an integral part of my teaching. Incredible tools are available, for free, and the students know how to use them.

I have not recommended purely online teaching for undergraduates. I have recommended making online an **extension** and a **permanent record** of face-to-face teaching. I recommend some investment in hardware and **zero** investment in software: right now, if the tool isn't free then it probably isn't any good.

In summary

A message board is a useful 'virtual forum' for the students to hang out. Wherever possible, I recommend letting them build their own forum and using free, online tools to do it.

In summary

Universities are under a lot of stress nowadays. We should not endlessly rewrite our courses, or berate ourselves. **We** are not the problem. **Study** is not the problem.

We should stick to our academic guns: we should tell them to **study, study, study**. I use the message board to measure and promote this, in real time.

We should encourage students to teach other students. The message board provided a forum, literally, to make this possible.

We should not be ashamed to challenge the most able students more than we do, the moment they show enthusiasm. We should channel their enthusiasm into improving the general level of study at Heriot-Watt.