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Cylch Dysgu 3 | Teaching Cycle 3

Teaching in a Foreign Country

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Teaching in a foreign country

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Introduction
I was asked by the department to teach a Computer Architecture module for an MSc course in Singapore in 2001. I had little experience in teaching this module but knew the subject matter well.

The Task
This would entail teaching students the use of logic elements in constructing simple computing blocks. Logic elements are the fundamental units of all digital computers. I had previous experience in industry using logic circuits and didn’t have my own learning of the subject to worry about.

The Students
The students themselves were mature, highly motivated people who were taking a part-time MSc course taught locally in Singapore by the University of Wales, Aberystwyth. They worked during the week and were taught by UWA staff in the evenings and weekends. Contact hours were around 33 hours in a course of 9 days. The students would be tired from a day at work, unable to attend various sessions due to work and family commitments. Also the students were graduates in fields not associated with computer science. Some were engineers and others had BAs in English, Business Studies etc. And then there was the language. I had been told it was hard to understand some of the students when they spoke. It seemed a daunting task, taking on my first full module for the University, in a strange land; to students I may not even understand when they questioned me. Also I was module leader with a recent graduate of our Computer Science Department helping out on the lectures and practicals.

Previous Experience
But I had some experience that would stand me in good stead. I had lived in Germany for four years and Spain for a year working on computer projects and had managed small groups of German, Italian and Spanish engineers and technicians. You learn to modify your speech accordingly, speaking slightly slower and removing idiomatic and colloquist speech until you get the measure of your audience. I had also spent many years in sales and marketing having received excellent training in presentations and human interaction at Hewlett Packard.

Planning
On all the five occasions I taught this module I was accompanied by a colleague. Two lecturers are sent in able to share the work as some of the lecture days were eight hours long. The module content was dissected and arranged so that we could lecture for no more than two hours at a time. Into these hours we also added some quick revision breaks and many
practicals. Some of these practicals were paper based only and some required the use of a computer per student.

The whole plan was handed over to the students so that they could see the volume and quality of the work they would be getting through.

**The Module**

Now the use of logic circuits requires the student to understand the basics of logic itself. Essentially it is a case of trying to understand that logic is about things that can be said to true or false, on or off, high and low, etc. These states (true/false etc) can be related by the use of logical ANDs and ORs. For example, “I will go to the beach if the weather is warm and I have the day off”. If in this example either “weather is cold (not warm)” or “I do not have the day off” then “I will not go to the beach”. All electronic logic is built upon elements that perform simple logic functions. They perform AND functions and OR functions. For an AND function to have a true output all inputs must be true. For an OR function to be true only one of the inputs need to be true. In digital computers we represent true with a 1 and false with a 0. The whole of computing relies on the use of 1s and 0s in computing elements to achieve the computing power we now have in the 21st Century. And, of course, some clever electronic and software engineers.

So it was this logic systems and its use as building blocks that I had to teach. Also it is necessary to point out that all arithmetic done in computers is binary using a numbering system of 1s and 0s.

**Reflection**

The first series of lectures in this module were very difficult as I was constantly aware that I was teaching students whose mother tongue is not English. I soon came to the realisation that they really could understand spoken English very well indeed and I could up the pace slightly.

During this visit and subsequent visits teaching same material I was surprised to find out that these students read the text books and asked questions from it. This made me re-read the suggested text once again.

**Background Material**

I was lucky that this course had been given many times before and a set of slides existed, some notes were available and books had been recommended. A simulator was also available. This device allowed us to run a simulation of a simple microprocessor on a PC so that students could see the inner working of a computer and interact with it. The slides had great content and were well thought out but were black and white acetates. These would need improving at a later stage.

**Reflection:**

The content of the presentation was very good but the acetates were black print on a clear surface. Back in Aberystwyth these were completely redesigned using PowerPoint. Student feedback is that the presentation material is now well received.
The Teaching Environment

Teaching took place in a classroom which was pretty cramped. Space is not a luxury easily afforded in Singapore. There was a digital projector together with the ubiquitous overhead projector for the acetates. White boards existed but were obscured whenever you used the pull down projector screen. There was no lectern or even a table at the front. All students had a PC on their desks’ which made interaction a little more challenging as it was hard to see some students and the background noise was high.

Another problem was going to be the heat. Although air-conditioned the rooms were not air-conditioned until just before the session started. On the weekends, due to skeleton staffing, the aircon could be off for 3-4 hours. Average temperature in Singapore is about 30-31°C – every day!

Reflection:
On subsequent visit to Singapore I made requests that we had better teaching rooms. Our requests were, in the main, accepted and teaching was improved. We requested the cooling be increased and made sure there was an ample supply of cold water on hand.

The Teaching

I had thought about the teaching before going. I needed to be informal but push the class along. They would be tired and needed to be kept awake. The subject matter, although not rocket science, introduced a lot of new concepts and technical jargon.

Reflection:
It was a shock to find out how hard these students worked. As the sessions were crammed into 3, 4 and 8 hour slots it was soon became apparent that although I tried to keep to a timetable it was not good policy to assume that every lecture could last 50 minutes. Flexibility was the key. Introducing key elements into the module at 9.00 at night was not a good idea and therefore I rapidly changed the sequence of some but not all of my lectures.

First lecture

After introductions and setting out the objectives of the module, basic housekeeping rules and time-table I started the teaching.

My first session dealt with the use of numbers and the power of zero in arithmetic. I have always believed that injecting humour into presentation engages the listener more. There is, hopefully, a feeling of being entertained and not lectured at.

Observations such as “Remember that zero is the most powerful number, the more you have at the end of your salary the better you feel” were used to reinforce some of the points relating to zero.

I briefly talked about the history of numbers. I wanted the students to realise that there was some history to use of numbers. The Romans never discovered or understood zero. To reinforce this fact I told them a new discovery in Rome, near the Roman Forum. They had discovered what appeared to a rocket about the size of a Saturn V moon rocket. It never took off because the countdown went “x, ix, viii, vii, vi, v, iv, iii, ii, i, ……….” Since there was no zero there was no launch!
I felt quite good about this session. I had opened their eyes to other ways of counting, used some of our common history to press home different number systems. Why is \( 11911 + 2 = 201 \)? Because, in Britain and the British Empire, we had pounds, shillings and pence. The sum is one pound, nineteen shillings and eleven pence plus tuppence is equal to two pounds and a penny. I'll leave it up to older readers to explain it to the youth of today.

But it was simple binary arithmetic that I concentrated. I showed the students that the “carry” we use when adding in decimal is the same procedure in binary. The laws of arithmetic are the same in binary and decimal. It is just that we are used to using decimal in our everyday lives.

Reflection:
The use of humour had worked. The students relaxed and seemed to enjoy this lecture. Also I had proved to myself that I was speaking at approximately the right rate as they understood very well what I was saying. However I found that on the early lectures my ears were not attuned to English with a Singaporean accent and dialect.
**Subsequent Sessions**

Subsequent lectures went well. Motivated students ease the task of lecturing.

Reflection:
The average result for students in Singapore is much higher than the UK. This is a result of many factors. They pay heavily for their education; there is a “new country” work ethic. These students were changing career direction and were more mature than the average UK student.

Even though the sessions went well I talked to students about difficult lectures and modified my approach and material for future visits.

**Student Feedback**

I taught this module, in various guises, five times in Singapore. The students were, as I stated above, very hard working and dedicated to passing the examinations. Most of them had family commitments and their immediate families were making some serious sacrifices to helping the students. The commitment to achievement reminded me of the 1950s when a lot of people obtained qualifications by going to night school.

It soon became apparent that these students could learn subjects by rote. For the first examination I based my questions on past papers where the vast majority of questions were of the “Describe the principles of…” or “How does system x work”. When I received the examination scripts for my first examination I was so surprised that the answers were just copies of my slides or passages from books that I assumed cheating had gone on. Through discussion with one of my colleagues though, I was convinced that they had learnt the stuff by rote.

For my next lecture session in Singapore I asked the students how they liked the examinations. They admitted that they liked the regurgitate answer type questions but realised that they weren’t really learning. So during the course I started asking them questions which made them use what we had learnt in class to solve new problems. *How would you do something and why would you do it that way.* They liked this approach and were also a bit surprised that they could partake in the discussions.

Assignments consisted of writing to code to solve a particular computer architecture fundamental problem. There was more than one answer to the problem. The students seemed fascinated that they had to make the decision to pick the one they thought was best. But they had to say *why* it was.

A novel part of the Singapore exercise is the video conference. Two weeks after returning to the UK we hold a video conference with the cohort. At my first video session we ran it rather badly. No one was prepared and the session was not successful in that we did not answer all the students’ questions. We subsequently changed the session so that firstly questions were emailed to us prior to the video session and secondly one student acted as spokesman for the group. We got much interaction and by the fifth session we were able to complete the Q+A session and give some extra lecture time for certain points.
Measurement

The results of examinations were no worse or no better. They couldn't be much better anyway but students have emailed me from Singapore to say that they enjoyed the learning, especially using what they learnt to apply to solving problems. Analysis of the assignments showed that the students had learned to think more for themselves, solving real world problems and not just performing a classroom exercise.

In Conclusion

Teaching overseas is a challenge. The lecturer must be willing to adapt his/her approach to cater for differences in language and culture. Classrooms in most industrialised nations worldwide should hold no surprises for the lecturer. Whiteboards, projectors and computer support abound. The teaching material may be familiar. The students are the difference.

Over the five visits I made to Singapore, teaching the same module, I changed my presentation techniques and material. I changed some of the content dramatically and found new material to add humour to my teaching.