



Teaching methods

George Bernard Shaw was flippant, cruel and wrong in his pronouncement that *"He who can, does; he who cannot teaches"*. One can bring to mind many outstanding researchers – Jim Pittard and Ian Holmes being just two examples from our own department – who were inspirational teachers. Equally, we also have been blessed with several senior tutors/ lecturers such as Cheryl Power, Sandra Uren and Lyn Howden who concentrated mainly on teaching to the highest standard.

There is no correct way to teach. Some, like the late Syd Rubbo, were born with grand gestures and a tendency towards hyperbole. You don't need to be charismatic, but it helps! What you must have, however, is enthusiasm for your topic and the personality to convey this excitement to the students.

Of course, all of today's students have been raised in the IT era, becoming fully familiar with computers even at primary school. The old days of talk and chalk are moribund, and libraries will soon house

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only genuine historical classics and key prescribed textbooks. Yet, in my view, lectures, tutorials and practical classes will continue to occupy important places in an extended range of teaching modalities.

Lectures today are principally based on IT, but this must not be abused by overload. To facilitate this, all tables, diagrams and key material should be available to all students (before or after the lecture), thereby enabling the students to concentrate full-time on the logical progression of the lecturer's line of reasoning. This regular practice also provides the opportunity for 'lectures' to become fully interactive with student participation.

Practical classes will continue to be an important teaching modality, but tutorials

will assume a different and more challenging role. Rote learning has gone the way of the dodo. Problem solving is the go. The teacher first provides the student(s) with the key principles, mechanisms and technical approaches to enable her/him to work through a given problem from beginning to end.

The weaker students can be helped intermittently towards a particular line of reasoning, and praised for logical thinking, thus introducing them to the gratification they may not have encountered before. The brighter students who breeze through the problem, on the other hand, can be stretched to their limit by adding progressively more challenging forks in the road.

Tell me and I will hear

Show me and I will see

Let me do it and I will understand.

Lao Tse, 2000 years ago



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When I see the mountains of information that come to the avid user of computers at the press of a button or 20, I ask myself who, today, could possibly stand in front of a theatre of students and present a lecture based on that single person's comprehension of the topic?

Yet, in pre-IT times, much the same volume of material was available in the library in the form of books and journals. Lecturers in those times did their best to come to grips with the most recent journals (then often 4-6 months post publication) and present the current hypotheses and their shortcomings, plus some recommended reading.

There was no web and minimal handout material. In my own case, it was photocopies of graphs, tables, figures or formulae. It was up to the student to put

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some flesh on these dry bones, and my task as a lecturer to make them want to do so. To try to convey the excitement, enthusiasm, satisfaction, call it what you will, that comes from gaining for yourself a grasp of how things work – how an organism responds to some stimulus; why it grows in this place and not that; how to go about finding out about such things; how to design the experimental conditions so that the outcome gives a clear answer or leads to a new question.

These responses are not the outcome of a visit to the Internet. I believe there is still

ample need for the outer edges of understanding to be exposed by discussion and for the tools to advance that understanding to be provided by the lecturer.

Today of course the computer is essential, especially for the tedious tasks associated with sequencing bases, so much part of molecular biology. But I was much taken by a cartoon I saw in which there were four toga-clad figures. The first two in the lotus position were labelled "I think" and the second "Therefore I am". The third figure looked pretty doleful beside a computer screen labelled "I am" and, in the final one, the figure was busily typing away with the label "Therefore I try not to think".

The lecturer's task today is getting harder than ever to ensure that this vital activity is not lost in morass of material.

The role of the casual teacher

Introduction

With the theme for this issue of *Microbiology Australia* being Education, it is timely to reflect on the role of the casual teacher in both the university and vocational education and training sectors.

Many hours of laboratory instruction, tutorial sessions and lectures are conducted by casual teachers who have a diversity of qualifications, industrial expertise and teaching experience. Virtually every student in a microbiology laboratory class would have been instructed at some time by a casual teacher. This article aims to present a personal account of the casual teaching experience over the past 20 years.

The logistical challenges

As a microbiologist whose working life for the past 20 years has been entirely

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devoted to casual teaching, there are many challenges. A typical week can involve a different teaching location each day, sometimes involving more than one site, and classes which can be scheduled in the mornings, afternoons or evenings. The simple logistics of travelling across the city, remembering which notes and resources to have in the boot of the car, and then finding parking can, at times, be rather daunting – not to mention having to juggle family life!

In the past, very few workplaces had desk or secure storage space available for their

casual teaching staff. Consequently, almost all preparation and marking was done at home and resources were squeezed into every corner of the house. When at work, one frequently had to find an empty place at the bench or chair in the tea room at which to sit and collect one's thoughts before class. Access to rooms, photocopiers, computers, stationery, even the telephone often depended on one finding some full time staff member with the appropriate key, swipe card or password.

However, this situation has been changing over the past few years. A number of workplaces now acknowledge the vital role played by casual teachers. Many of us now have shared desk accommodation, access to e-mail and the internet, and keys to the building.

Lack of job security is always an issue for



the casual teacher. Not only does one have to negotiate work from semester to semester, classes can be cancelled at short notice if student numbers fall. In some institutions, laboratory class may run for only a few weeks per semester, while others have classes every week. Teaching may be continuous or divided into short blocks, especially in faculties where students participate in clinical work. As there is no holiday pay and very limited access to sick leave, casual teaching cannot be relied upon for a steady income.

The professional challenges

The greatest professional challenge for a casual teacher is maintaining one's professional standards. This includes both the maintenance and updating of one's technical skills and one's professional development as a teacher. Funds are not readily available for casual teachers to attend staff development activities, professional conferences or return-to-industry programmes. The responsibility for participation in such activities relies on the individual.

One needs to maintain a good network of colleagues in industry and discipline oneself to keep abreast of developments via discussions, reading and, when financially possible, attendance at meetings and conferences.

When teaching university students in the laboratory, it is important to liaise closely with lecturers in order to complement and reinforce the material discussed in lectures. In the past this has often meant physically attending lectures when teaching a particular course for the first time. Today this is considerably easier as much lecture material is available via the internet.

One's professional development as a teacher is equally as important as one's professional development as a microbiologist. Twenty years ago, students and teachers had limited access to computer facilities. Today we constantly use the computer in our

teaching – powerpoint presentations, internet research, on-line course delivery, e-mail enquiries and group discussions, computer records of student attendance and assessment. The casual teacher has to keep abreast of all these developments in order to be creative, innovative and flexible in teaching and assessment.

The past 20 years have seen many reforms and restructuring throughout the university and vocational education sectors. It can be difficult for casual teachers to be fully informed about these changes. Brief conversations and passing remarks from full time staff are often the main source of information.

The National Training Reform Agenda has seen the development of a national qualification system and the introduction of competency based training in the vocational education and training sector. Industry and occupational competency standards now underpin all training and there is a greater emphasis on skill demonstration in the workplace. Where this is not feasible, every attempt is made to simulate workplace conditions in the teaching laboratory.

All teachers, including casuals, employed by a registered training organisation must have a Certificate IV in Workplace Training and Assessment as a minimum teaching qualification as well as their professional qualifications in microbiology. One must now be prepared to teach and assess students in a traditional teaching laboratory, in the workplace and even on-line.

A significant difficulty for students can be arranging contact time with a casual teacher. Understandably, students often wish to discuss their work outside scheduled class time and become frustrated when unable to meet with their teacher. Once again, access to e-mail has been a tremendous help in this regard and many student enquiries can be effectively addressed in this way.

The rewards

One feels a great sense of achievement when a student suddenly appreciates the relevance of microbiology to their chosen career path. High achieving tertiary students with inquiring minds are a joy to teach and inspire.

It is equally rewarding to teach mature students who, through a variety of circumstances, have never had the opportunity to study. Some of these students have had no formal education since leaving school at 15. They approach study some 10, 20 even 30 years later with understandable fear and anxiety. The very thought of learning about microorganisms and doing practical work in a laboratory is completely foreign to them. There can be no greater thrill for a teacher than seeing these students appreciating the relevance of microbiology to their work and enjoying the opportunity to learn.

On a personal level, casual teaching provides an opportunity to meet and work with a vast number of people – lecturing staff, other tutor/demonstrators, technical and administrative staff. Many of these people have been wonderful mentors willing to share their knowledge, skills and resources. The opportunity to work in many different laboratories, each with different equipment, resources and practices, enables the casual teacher to incorporate the best that each has to offer into one's teaching.

In conclusion

A career as a casual teacher of microbiology and other biomedical sciences has been fulfilling and rewarding. It has enabled me to combine my love of both teaching and the biological sciences. I would like to take this opportunity to thank the many microbiologists with whom I have worked for their professional assistance, friendship and generosity. Thanks also to the thousands of students with whom I have interacted at the University of Sydney, University of Western Sydney, Macquarie University and TAFE in both the science and nursing faculties.