

The Evolution of Science Communication Courses: Training Scientists to Communicate

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Introduction

Scientists have a reputation of being unable, or unwilling, to share their knowledge and expertise with the general public, either directly or through media outlets. The public image of scientists is one of nerds in white coats unable to communicate at a level outside their peer group.

Is this image a fabrication of the media or does it have some merit in reality? The role of the media in their portrayal of science and scientists is not the issue of this paper, but rather the training available to science students and graduates to equip them to communicate effectively with a general audience.

Over the last two decades we have evolved a unique educational facility at the Australian National University (ANU) which culminated in 1996 with the establishment of the National Centre for the Public Awareness of Science (CPAS). The premiere educational program is offered jointly by CPAS and Questacon - The National Science and Technology Centre. Students enrolled in the Graduate Diploma in Scientific Communication, which predates CPAS by six years, are science graduates who staff the Shell Questacon Science Circus which has been very successful and continues to be the major outreach program of the ANU and Questacon.

In the early 1990s there was pressure to establish further graduate programs in science communication at the ANU. A coursework Master of Science was established with the first student enrolling in 1993. Research degrees at the Master and PhD levels have also been established. These degrees provide for in depth studies of issues of communication associated with science and the public.

Most graduates from our programs find employment within the science communication industry, which still seems to be growing. This raises the question: Are these programs preaching to the converted? All students in our graduate programs have a keen interest in science communication and generally already have quite good communication skills.

The problem, real or perceived, of scientists' lack of communication skills cannot necessarily be solved if we are not reaching science graduates who remain in mainstream research areas. This prompted the development of workshops for scientists and an undergraduate Bachelor of Science program with a strand of science communication, which is offered for the first time in 2001. It is anticipated that graduates from this degree will take with them useful communication skills into traditional research areas producing a new generation of scientists who are able to effectively communicate with the general public.

The National Centre for the Public Awareness of Science (CPAS)

The ANU Faculty of Science, in 1996, agreed to create an innovative Centre by combining elements from the ANU's Faculty of Science and from Questacon. CPAS is concerned with the public awareness of science and is unique in Australia.

Last year the National Centre for the Public Awareness of Science, jointly with Shell Australia and Questacon, was the proud recipient of a Business and Higher Education Round Table Award.

The citation describes the Centre as "a university centre whose brief is to empower Australians by encouraging in them the confidence of 'ownership' of modern science. It is intended to increase science awareness in the Australian community and to improve communication skills of scientists."

The Centre has since built on this success and in March 2000 became an accredited National UNESCO Centre, with the task of collaborating both within Australia and with our Pacific neighbours in raising the awareness of science in many diverse communities.

Since its establishment in 1996, the Centre has come a long way, but, along with Questacon - The National Science and Technology Centre, it had its origins in a very modest back room of the Physics Department of The Australian National University.

In the Beginning...

In the late 1970s Dr Mike Gore, then a senior lecturer in physics at the ANU, made a visit to the *Exploratorium* in San Francisco. He returned to the ANU with much enthusiasm and began to recreate what he had discovered. Small school groups were invited to visit and interact with the exhibits that Mike had built himself.

In 1980, Australia's first interactive science centre was established on an experimental basis in Canberra under the auspices of the ANU. It occupied an old school building and it hoped to encourage in its visitors the desire to explore and understand the natural world.

When Questacon first opened it was staffed by ANU undergraduate science students. Their enthusiasm led Mike Gore to approach Professor Chris Bryant (then Dean of the Faculty of Science) to formalise the training by offering the students a post-graduate certificate in science communication.

In 1988 the building which now houses Questacon, a Bicentennial project jointly sponsored by the Japanese and Australian Governments, was opened with Mike Gore appointed as the founding Director. He held this post until his retirement in late 1999.

The post-graduate certificate was subsequently upgraded to a graduate diploma with the students staffing the Shell Questacon Science Circus.

Graduate Programs in Science Communication Offered at the ANU

The Graduate Diploma in Science Communication is a scholarship-based award with an intake of 15 students each year. Nearly 200 graduates from this program since 1988 are now making their marks in a wide range of communication-oriented careers. They are the scientists and communicators who, unencumbered by yesterday's attitudes, will guide Australia into the 21st century.

Partners in the program are the ANU which, through CPAS, provides the academic support and coursework components of the program; Questacon, the staff of which provide training in exhibit design and show presentation, and the galleries providing a "living laboratory" of hands-on interactivity. Shell Australia provides a generous amount of sponsorship, which allows the Circus to go on the road.

Geographically Australia is a very large country having approximately the same area as the USA, excluding Alaska. Each year there are six tours to remote and regional areas right across the country. Ten students accompany each tour with the five remaining in Canberra to do coursework, work placements and assignments.

Further graduate academic programs have evolved from the original graduate certificate. These provide a more academic and theoretical framework for the discipline of science communication with less emphasis on the performance aspects of show giving.

The Master of Science by coursework and research covers practical areas such as writing science for a general audience; interactive multimedia design and process; public speaking techniques; and design of interactive science exhibits. Theoretical coursework deals with theories of communication; language in science and misconceptions; use of analogies; and aspects of gender and multiculturalism. Students also are required to complete a research project on some aspect of

science communication.

Generally the MSc attracts students who are interested in combining practical skills with academic and theoretical approaches to the study of science communication. Pure research degrees at the level of Masters and PhD are also available. Research topics in these degrees include the relationship between industry and universities; public perceptions of mental health experts; and decision making processes in immunisation.

Undergraduate Degree in Science Communication

In 1998 CPAS introduced an undergraduate unit in science communication into the Bachelor of Science program. This is a skills-based unit, training students to present science, both in written and oral presentations, to a general audience.

A further unit was introduced in 2000, which provides an overview to issues and problems of communicating science and technology to the general public. Topics include the image of science and how science is reported in the media; issues in science in relation to specific examples such as genetic engineering and climate change; cultural issues of science and technology; risk and uncertainty. The emphasis of the unit, and indeed all our courses, is on active learning and teamwork approaches.

In 2001, for the first time, the ANU is offering a Bachelor of Science (Science Communication). This degree incorporates the existing science communication units and new units at third year level will be offered covering science journalism and science ethics and risk. The program is not designed to produce science communicators, but rather to provide science students with the skills and awareness that reportedly are lacking in the current science community.

Conclusions

The joint ANU-Questacon Graduate Program in Scientific Communication has been in existence for eleven years and has achieved a national and international reputation for its innovative approach. Its Graduate Diploma program is unique, and uses the ANU Shell Questacon Science Circus as a travelling laboratory in which carefully selected scholars of high academic achievement develop their communication skills. In 1994, the Graduate Program was extended to include courses leading to Masters and PhD degrees.

Unlike many other programs in science communication, ours is not aimed at providing only training in journalism, but providing broad-based skills to enable graduates to communicate with the general public through various media.

All the students in our programs are science graduates (graduate programs) or science students (undergraduate program). The majority of students completing graduate programs find employment in the science communication industry as communication officers for government departments and research organisations; within science centres; or as editors and writers. Few of them go into or return to scientific research.

The aim of the undergraduate degree, BSc (Science Communication) is to provide science graduates who may well continue in a traditional research career, with the necessary skills to communicate and be aware of the scientific issues that concern the general public. By not providing appropriate training in the area of science communication is a disservice to science and will perpetuate the image of scientists as nerds in white coats unable or unwilling to communicate at a level outside their peer group.

To quote Marcel Proust:

The real voyage of discovery consists not in seeking new landscapes but in having new eyes.