6. BIOLOGY EDUCATION IN THE FUTURE

ABSTRACT

Biology today is a popular and influential discipline that dramatically shapes our lives and affects the development and operations of societies around the world. Biology educators thus play a crucial role in ensuring the global community is made aware of the biological bases of everything we do. However, as biology teachers and educationists, we face unprecedented challenges in making our discipline relevant, meaningful, attractive and respected. Some of the challenges include: (i) the explosion of knowledge and the feeling that we are being over-whelmed by new developments and applications, (ii) challenges to the scientific method from fundamentalist and other groups, (iii) urgency of challenges that confront society, so that long term solutions are less considered than immediate, short-term ones, (iv) shift to more applied studies that do not have the intellectual rigour that underpins disciplines like biology, and (v) specialization of the disciplinary components of biology and the challenge to integrate and generalize. On the other hand, I am optimistic about the future importance and potential success of biology education. Some guiding principles may need to be followed – these include, ensuring relevance, using the latest educational technologies wisely, stressing the applications as well as the discovery aspects of science, and ensuring biology makes meaningful contributions to economic, social, cultural and environmental sustainability.

KEY WORDS

Biology Education, Future, Conservation Biology, Natural History, Landscapes, Ecosystems

INTRODUCTION

Biology is a broad science and its teachers, lecturers and educationists face many challenges in maintaining its popularity, relevance and applicability in the Twenty First Century.

Some challenges are exciting and positive. These include the so called explosion of knowledge – the seemingly exponential growth in scientific information accompanied by an increasing number of academic publications in biology. How is it possible for faculty charged with teaching the subject BIOLOGY to keep up with all this knowledge, let alone cover so many sub-disciplines in a way that maintains the integrity of the subject and interest by our students? Another such challenge is the very
positive contribution Biology can make towards sustainable development – not only in its obvious relevance to environmental sustainability, but also in social, economic and cultural aspects. Convincing decision makers of biology’s valuable contributions to advancing society’s towards social sustainability is thus another important challenge!

Other challenges are threatening and negative. The rise in fundamentalist religions and zealots who pronounce biological science is anathema to their basic tenets is disturbing. Arguments raised by such groups are impossible to challenge since the very bases of their assertions are anti-science and rooted in a faith drilled into followers as unchallengeable.

There has been an emergence of new subjects that are appealing and popular with students, but which ‘cherry pick’ the ‘entertaining’ aspects of our discipline, are sometimes shallow and lack the intellectual rigour that necessarily underpins our discipline and that produce ‘experts’ who lack any real understanding of other related biology fields. Interestingly, many graduates of these new areas seek to acquaint themselves with ‘real’ biology later in life when they realize a comprehensive knowledge and understanding of the fundamentals of biology – and of the foundation sciences that underpins it – is needed.

Nonetheless, I am optimistic about the future of biology education and the role it can play in improving the world population’s quality of life, health, appreciation of nature and its contributions to social, economic, environmental and cultural sustainability. I believe we can overcome the challenges and exploit the opportunities they present by ensuring biology is relevant for our students, stresses the discipline’s applications and is taught using sound pedagogy and the correct use of instructive strategies.

NEW CURRICULA

Most of the challenges I have listed above have been dealt with elsewhere and there have been recent developments that have produced novel and exciting curricula in biology that aim to address these challenges (e.g. Boulton and Panizzon, 1998; Committee on Undergraduate Biology Education to Prepare Research Scientists for the 21st Century, National Research Council, 2003; National Research Council of the National Academies, 2009).

I would instead like to concentrate on a case study for ‘biology education in the future’. While this might touch on some of the aforementioned challenges, I think it addresses to me one of the most significant problems facing those of us who are concerned about developing a keen appreciation of nature in the biologists of the 21st Century; I would argue, such an appreciation is what drove so many of us in the first place to a love of our discipline.

A CASE STUDY – FIELD STUDIES, CONSERVATION BIOLOGY AND DEVELOPING AN APPRECIATION OF NATURE

Conservation biology is the scientific study of biodiversity with the aim of protecting species, their habitats and ecosystems from excessive rates of extinction.