Royal Society of Biology

Bioscience Teacher of the Year 2017

Case Study

Kevin Moffat

3rd Year Science Communication

School of Life Sciences
University of Warwick

I. Background for Introduction:

"A world that understands the true value of biology and how it can contribute to improving life for all."
The Royal Society of Biology's vision statement.

As a Higher Education (HE) teacher and Director of Outreach I am committed to developing an understanding of the value of biology both with the students, schools and wider public that I work with. As the lead for a Science Communication module, I strive to inspire an interest in communicating biology and engender an understanding of the importance of science engagement and the scientific method in whatever career they choose. An inspirational mentor once told me "You may not become a great scientist, but you might teach someone who does, or in turn they might….and if not we all might just remember something useful". This one statement inspired me at an early stage in my career to believe that my teaching, and therefore my communication, is every bit as crucial as my research for the people I work with and those train, inspire and support.

Through the Year 3 Science Communication module I aim to share my passion for biology and communication, enabling students to develop the skills to become science communicators themselves.

"Kevin is the leading teaching innovator in our School. Over the years he has introduced a wide range of novel techniques to all aspects of teaching"
Prof. Lorenzo Frigerio - Director of Learning and Teaching

I have always aimed to challenge didactic methods of teaching, learning and assessment, largely in response to student discussions. First, for Years 1 and 2 I introduced peer-assessment, group work and posters and have worked with technology as it has developed to engage students outside the classroom. The opportunity to develop the Science Communication module provided the scope to build on the expertise that I have developed through teaching and designing a wide range of modules, labs and tutorials. Further, as Director of Outreach I regularly engage with schools, museums, theatre companies and the media, enabling me to develop a rounded and engaging module. Science Communication is designed to set students up to communicate science in whatever field of study or employment they choose to go into.

II. Reasons For Introducing

Professionally scientists require communication skills, but this interaction is now far wider, more immediate, and with increased responsibility and scrutiny than ever before (Brossard, 2017; Watts, 2014). Futurists such as Prof. Andy Miah (University of Salford) have proposed, "Science shouldn't start until it's communicated". This is in part inspired by Miah's examples of engaging public perceptions on deciding future approaches (Rich and Miah, 2014). Such approaches move beyond the traditional peer review process and engage the public, recognising the importance and the value of interacting with these communities for the development of science. These approaches are important for the scientist and an

avenue for students to reflect on how they may affect change themselves; understanding communication routes with an understanding of society is required.

"…… this is perhaps the pinnacle of teaching within the School of Life Sciences. …… a module that is not only intellectually challenging, but delivers meaningful and important transferable skills."

Dr Phil Young - Associate Director of Studies

Students are frequently assessed during their degrees in communication, through essays, reports, presentations and seminars. Nonetheless opportunities that assess external communication are few and often narrow in their range. It was clear to me from my own outreach activities that there was a requirement for students to be aware of the need for scientific communication beyond their own assessments to ensure that they are able to communicate with a wide range of audiences and further to open up a range of career opportunities. Academically it requires reflection, critiquing and creativity.

III. Lecturer's perspective

"I was struck by the innovative teaching practices used in the science communication module ... In particular, I was delighted to see the enthusiasm for science communication from the students on this course which clearly stems from Professor Moffatt's visible enthusiasm..."

Dr Gary Kerr (University of Salford)

The course is delivered through five 3-hour workshops. Students are required to reflect and blog on each week's subject: Politics, Festivals and Schools, Media and Museums. Each workshop consists of a short introduction, guest experts; exercises which offer an opportunity to try out communication in a particular sector (e.g. create videos, science busk, or craft a press release for an academic paper) together with instructions on blogging activities. The blogging requirements are to write ~500 word blogs each week for five weeks. Blogs are about communicating an idea or persuading a wider audience of their viewpoint and this must be evident in what is submitted. Feedback is given online to the cohort and individually within office hours to help students with this activity.

IV. Student perspective

"....a truly unique module …. this topic is practical and can't be taught in a linear lectures and exam way…... This kind of structure allows us to use assessment tasks as learning…"

Gaby Bodero Jimenez - 3rd year Biomedical Sciences

Blogging is a very different from traditional scientific writing and often students are initially unsure and unable to find a "voice" that feels both scientific and authentic to them. Students are asked to reflect and edit their blogs and ultimately to submit two of these for assessment. Students also complete short video presentations, in small groups, that are aimed at an audience of their choosing. Again formative feedback is provided and short deadlines set for titles, content and first impressions. Finally students are assessed through an "open book exam" in which students compare the reporting of a scientific discovery in two different news

publications. This enables the assessment of students' critical engagement with the news media.

V. Benefits and Issues

".....given us an insight into the huge variety of careers a degree in science can lead to. Professor Moffat will always go the extra mile to ensure we all have the best learning experience.....".

Lucy Rippington - 3rd year Biomedical Sciences

For many students being able to develop the confidence to synthesise their knowledge of a scientific subject and create a defined output is a challenging task. Barnett (2007) suggests that students in HE need to develop two "voices", the pedagogical and the metaphorical. The first voice represents the "capacity or willingness of the student to express their thoughts or feelings". Students are often reluctant to verbalise in the immediacy of a large lecture hall, the delivery via blogs, videos and online feedback avoids much of this. The metaphorical voice is referred also as the educational or distinctive voice (Barnett, 2007). Barnett proposes a need for students to receive affirmation of their identity in order for them to establish their voice in higher education. He suggests that for an individual student to participate fully, he or she must first feel acknowledged as an individual. While the video work speaks to the first voice, the individuality of the blogs and the accompanying feedback is empowering identity and individuality with significant results. Students I had previously judged to be struggling to engage have used the blogs to reveal astounding personal stories with powerful insights of how their lives are interwoven with science. These students have been able to express their interests without pressure of competition and receive feedback and acknowledgement directly, a process in which I feel privileged and fortunate to learn and share with them.

VI. Reflections and Feedback:

Balanced assessment should use a variety of strategies and tasks. Students should have varying contexts to demonstrate their knowledge and abilities, as well as reflect and perfect. The Science Communication course aims to enable students to demonstrate the highest levels of Synthesis and Evaluation in Blooms taxonomy (Bloom et al. 1956) – "Evaluation and Creating" in the later revised versions (Anderson et al, 2000).

Sir Mark Wolpert stated in 2013, in a speech to the Centre for Science Policy (University Cambridge), "Science isn't finished until it's communicated". As scientists we are in a privileged position and in the current days of 'alternative facts' we have an ethical responsibility to form views and communicate these based on our practice. This has recently been emphasised by the Parliamentary Inquiry into Science Communication (2016) that suggested that science communication is important at postgraduate level. However, I believe that these skills are also crucial at undergraduate level; for the higher learning levels explored, the development of confidence and creativity and to instill a commitment to communication in scientists at all levels.

In its first two years the module has already been a huge success. Feedback has been extremely positive from students, staff and external examiners. Students have visibly gained confidence and commitment to communication and talk about taking that forward post graduation. Students have engaged in extra-curricula science communication through opportunities highlighted in the module. These include setting up regular outreach visits to a local school, volunteering for the annual Big Bang Fair and for the 2017 International Biology Olympiad at Warwick. Others have taken up internships in organisations such as the Science Media Centre in London.

VII. Publications:

Anderson, L. W.; Krathwohl, D.R., eds. (2001). Taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Allyn and Bacon. ISBN 978-0-8013-1903-7.

Barnett, R. (2007) A Will to Learn: Being a Student in an Age of Uncertainty (Society for Research Into Higher Education) McGraw Hill Education and Open University Press ISBN-13: 978-0335223800

Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York

Brossard, D. (2017) Address at the Annual Meeting of the American Association for the Advancement of Science (February 18th 2017)– *Phys Org* https://phys.org/news/2017-02-expert-science-fake-news.html Last accessed 21-02-17 22:47

Parliamentary enquiry: Open enquiry http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/inquiries/parliament-2015/science-communication-inquiry-15-16/ Last accessed 20-02-17 22:25

Rich, E and Miah A (2014) Understanding Digital Health as Public Pedagogy: A Critical Framework. *Societies* 4(2) 296-315 doi:10.3390/soc4020296

Watts, S. (2014) Society needs more than wonder to respect science. *Nature* 508, 151 doi:10.1038/508151a

Wolpert, M. (2013) Centre for Science Policy Speech 2013 on Climate Change http://www.csap.cam.ac.uk/news/article-mark-walport-csap-lecture-on-climate-change/ Last accessed 20-02-17 22:00

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