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## **Getting technical**

### **Does your professional development need some science?**

#### **Science isn't just for geeks**

The United Kingdom has a strong science base built upon historical achievements in its basic research (think of all those Nobel prizes) and applying it in many different industries, including pharmaceuticals and aerospace. This strong performance is now harder to maintain in the face of increased competition from developing economies. China for example, now has the second largest scientific publication rate in the world after the US. More worryingly there is a significant falloff in UK student numbers for science subjects at school and university. Part of the problem is that science can be hard work with little immediate reward. It is also perceived to be “uncool” in comparison with other subjects and is really only suitable for nerds and geeks. This is a false impression, as anyone who has been to the social events attended by scientists at conferences will testify, but unfortunately impressions matter.

#### **The Two Cultures**

It is now fifty years since the novelist and Civil Servant C.P. Snow gave his famous lecture about “The Two Cultures” of science and the arts and the gulf of incomprehension that existed between their practitioners. He challenged a random selection of “intellectuals” to describe the Second Law of Thermodynamics, expecting them to know this as much as they would know some Shakespeare. Many didn't of course, and while this mutual incomprehension has diminished over the years, it is still very much alive.

#### **Why should you learn about science?**

You don't need to know the Second Law of Thermodynamics, although it does help explain why that glass you knocked onto the floor won't put itself together and fly back onto the table. Most executives (if they're any good) have an intuitive understanding of how to use scientific logic to evaluate the best course of action during negotiations and decision making. Risk/benefit analysis has a solid foundation in science and mathematics and is undertaken by non-scientists all the time. However, most people are quite happy to

develop their interpersonal and other “soft” skills while leaving the technical stuff to the experts. This may be perfectly acceptable in many cases, but can be a problem for people who have professional dealings with scientists in industry and academia. If you as a non-scientist don’t understand the jargon and culture of the people you are negotiating with (or indeed your own scientific colleagues), this could put you at a real disadvantage. These considerations apply to journalists, translators, lawyers, accountants and business development managers among others.

### **But isn’t science difficult?**

While the general public is exposed to plenty of science in the media, many people have avoided science subjects at school because of their perceived difficulty. “It’s easy when you know how” as the phrase goes, but it takes a particular mindset and years of study to gain real scientific knowledge. This means that there is a significant challenge facing anyone who has to teach science to non-scientists. The trainer has to condense technical material learnt over several years into a short course or workshop and still make it comprehensible. However, things are made easier because many adult professionals are more open minded about science than when they were at school and have less fear of approaching the subject. They realise that it is to their professional advantage to learn more about the technical background to their business.

### **Self education and training courses**

All the information you ever need is out there somewhere – nowadays of course, “there” mostly is the World Wide Web. There is no shortage of science education material from online teaching resources, Wikipedia entries and outreach programmes from science organisations. In addition, many companies do a decent job in explaining their technologies to professionals and the general public through their websites. The problem is that this vast amount of information is not placed in the relevant context for someone trying to understand a particular industry or process. Using my own experience of the pharmaceutical industry as an example, it is possible to find all the technical processes involved in drug discovery just by surfing the internet. However, this is not enough to create real understanding of such a complex business. You need a clearly laid out framework on which to build up information on such diverse areas as chemistry, genetic engineering, clinical trials, safety regulation, marketing authorisation etc. This framework can be pictured as a physical pipeline in which drug targets are fed in one end and emerges as fully developed medicines from the other.

It is also important to learn from informed sources. The trainer must have an insider’s view of how a particular business operates at the technical level so that he/she can explain the correct jargon. They must also critically evaluate the current strengths and weaknesses in an industry to help delegates make better business decisions. Perhaps most importantly of all, the trainer must never assume that the student knows even the most basic science. Even the simplest concept has to be approached as though it were an obscure fact. Various teaching techniques have to be brought into play, including extensive use of analogy and slightly quirky background material to stick in the mind. In describing the chemistry of life, for example, one could start off with the

following statement by S. Rasmussen: “Hydrogen is a colourless, odourless gas which, given enough time, turns into people”. For props, I find that the different coloured biscuits supplied with the coffee make useful atoms and molecules – and taste good afterwards. Pictures and animations convey more information than text alone, along with case histories of particular processes to pull everything together.

Compromises will inevitably be made when covering large subject areas in a very short time. It isn't possible to get every nuance and shade of meaning, but at least it sets the scene for further learning *via* books or the internet. This further learning can be directed by the trainer in the form of recommended books and websites. Glossaries of jargon and lists of acronyms are particularly useful as reference materials that can be used later on in the workplace.

To conclude, the most effective way for non-scientists to learn about technical subjects is through attending a professional development training course or workshop to understand the basic foundations and then be guided towards the appropriate external resources to get more detail about specific topics.

So what do the course delegates think? The following comments were received after a typical one day course for technology transfer managers and recruitment consultants and sum up the thoughts expressed in this article.

"This was a real “light bulb” course where a lot of things I have been exposed to suddenly came together. A vast subject matter is covered succinctly using a language anyone can understand”.

" Too many courses, including e-learning and web searching, rely on some pre-knowledge, often approaching degree level; [the courses] have made a significant difference to the understanding and professional development of our staff and has improved performance”.

Ed Zanders has been involved in scientific research and management for over thirty years. His training company ScienceInform Ltd offers professional development courses related to the pharmaceutical and biotechnology industries. The company also runs a course on presentation skills for scientists which forms the basis of a book of the same name to be published by Cambridge University press in 2010.

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