Building Strong and Mutually Beneficial Networks Between the Pharmaceutical Industry and Universities

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Through building strong educational networks with science and engineering faculties, GlaxoSmithKline hopes to improve the quality, focus and context of teaching, and raise the profile of the pharmaceutical industry as an attractive place to start and build a career. Links to CS8 and CS15.

Reasons for engagement

GlaxoSmithKline (GSK) has long been active in supporting and improving science and engineering education within the UK and worldwide, with the aim of developing an understanding of science and engineering issues in everyday life and inspiring young people to take up careers in technical subjects. GSK works with primary and secondary schools as well as higher education institutions to achieve this goal through a large number of schemes and initiatives (see Kellett – CS8 and Rielly – CS15).

More recently, it has become apparent to the organisation that it is becoming increasingly difficult to attract top quality science and engineering graduates not just to GSK, but to the entire fine chemicals and pharma sectors. One of the key reasons for this is the content of many degrees; this is typified in chemical engineering, where the vast majority of teaching is aimed at large-scale, liquid phase, continuous processing, and predominantly oil and gas. In such a challenging global business climate, it is essential to all UK industries to attract a steady stream of top engineering talent if they wish to thrive.

Through building strong networks with top science and engineering faculties, GSK believes that it can address both of these areas: responsibly improving the standard and availability of education; and raising the profile of the organisation to potential future technical leaders of the company.

On a personal level, having graduated from Loughborough with a degree in Chemical Engineering in 2007 and now working within the pharmaceutical industry, I was both pleased with the quality of my University education but also amazed at how biased the degree course is against smaller-scale fine chemicals and pharma processing. Although I was aware of this during my degree studies, it became more obvious once I started working within the pharmaceutical sector. I have a keen passion for getting involved with education initiatives, and wanted to help to re-address the balance through a collaborative project which would mutually benefit the students, the University, GSK and me.

The engagement

In order to initiate and develop the concept of a collaborative project between GSK and technical departments, I thought that the best place to start would be with what I already know. Along with contacts within the Chemical Engineering department at Loughborough, I discussed the opportunity to provide a real-world design problem for the MEng final year design project. The department – known for its strong links with industry – was very keen and, after a short period to jointly develop the design brief and supporting information, the project started in earnest.

One of the key concepts that the industrial and academic sides were keen to reinforce was that it is common to begin a project without all of the required information and data, and that one of the necessary skills was to be able to identify the gaps and what to do about them. Because of this, it was decided to give the students a general project brief – similar to the first intent information often received in industry – and for their tutor to hold a lot more information, which could be released to them as and when they asked for it.

Supporting the design project process was relatively straightforward after the initial set-up: an intermediate trip was made to the University department to meet with the students and review the state of their design and to answer questions. Some of those questions could be answered directly, some required further investigation, and some required the students to make a 'best-guess'. The realism of this is especially key to development, and is easy to overlook when studying at University.

Later in the design project (which lasted a total of 16 weeks), the students were invited to a manufacturing facility where they presented their project work to the Site Leadership Team (no pressure!) and took a tour of facilities to improve their understanding of the concepts relevant to their own design: how can you load toxic solids to a reactor? Do you have to transfer fluids using pumps? What does Good Manufacturing Practice (GMP) look like in reality?

The students learned a lot from the visit to site especially, as it allowed them to visualise their own designs more fully, and learn another key industrial concept: if you want to learn more, ask the people who work with, or on the plant!

Besides feedback on the progression and technical details of the students' design, GSK was not involved with the formal assessment of the project, which remained the responsibility of the students' tutor.

The project concept has now been rolled out to other universities and is believed to be meeting the original aim of building a strong network with engineering faculties.

Issues

The most likely issue that is raised when trying to arrange an engagement of this type is that of resource: how much time is required to set up the project, and how much time and money to support it? Experience has shown that a project of this type only needs to be fully set up once, and will likely only take a matter of hours over what ever period is available for planning. It's a matter of pulling together data and literature pertinent to the project, and then creating a suitable project brief: easy!

Ongoing support is whatever is decided to be feasible and appropriate by both the industrial and the academic parties: in the case of the GSK – Loughborough Chem. Eng. Project, the students' questions were handled by their project tutor, filtered and sent forward by email. It is important to note that this was limited to align with the project meeting at the University and then at the GSK site. This way, minimal time was required to support the project once it had kicked off. The beauty of it is its reproducibility – the same project can then be rolled out at any University,

any year, so long as the necessary Confidentiality Agreements are in place. Again, in experience, due to the nature of the project, this is a very straightforward document to produce and gain agreement for.

Benefits

The most important aspect of the engagement is that all parties: the University, the company, and most importantly the students all mutually benefit.

For the University, stronger links with industry and individual companies serves to increase the flow of knowledge in both directions, opening up chances for further collaboration. In addition, at a time where companies seek to cherry-pick talent at the earliest stage, strong links with universities should result in an increased likelihood of placements or full-time employment being offered.

For the company, there are several aspects: first and foremost for GSK is that it is part of our core mission to improve the quality and availability of science and engineering education wherever it can. Besides the corporate social responsibility aspect, it is quite logical to see that if students are leaving University better prepared, then the whole of industry can reap the benefits. This can be delivered through complementing the students' core academic technical understanding with an advanced understanding of industrialised processes, business factors and 'softer skills' borne from team working in a collaborative project of this kind. The company benefits more individually in a further way, especially if the company is less well known or less visible: a student is much more likely to apply to a company that they know about, especially if they have had a positive experience of working with them.

For the students, there are multiple benefits to undertaking a project as part of a collaboration with industry. Firstly, the subject is placed strongly in context – the students can do research on the topic using public domain literature in conjunction with the supplied information covered by intellectual property rights. The students also learn that the scientific and technological skills they have acquired through the education system forms the basis for a career in a field such as chemical engineering. Further development can only be derived through experience and exercising judgement.

Academic/Industrialist/Student perspective

The initial reasons for engaging with universities were to develop strong links with top technical faculties in order to raise the profile of the pharmaceutical industry as a good place to begin and develop a career; to enhance the core University curriculum by means of a real-world case study; and to build a foundation for future collaborative projects.

Reflections

Having now rolled out the initial project concept across different universities, it is clear that if good preparatory work is done for the first project trial, far less resource is required for subsequent projects. The projects have been enthusiastically taken on by the students, and it was found that the level of information supplied to the academic allowed a multiple-tier structure for obtaining information, much like is commonly found within industry. The students responded particularly well to the visit to the industrial site, as this allowed them to put some of their paper concepts into context and helped them think about more practical problems and potential solutions. If this can be supported, it is strongly recommended, and it also allows for the students to present to senior managers at the site – good preparation for the real world of industry that awaits them!

Context

Greg Simmonds is a Technical Development Process Engineer for GlaxoSmithKline working at the Dartford Primary Pharmaceutical Supply site. He graduated from Loughborough University with a MEng in Chemical Engineering in 2007 and is a member of the GSK Global Manufacture and Supply Graduate Technical Development Programme.

GlaxoSmithKline (GSK) – one of the world's leading research-based pharmaceutical and healthcare companies – is committed to improving the quality of human life by enabling people to do more, feel better and live longer.

GSK produces medicines that treat six major disease areas – asthma, virus control, infections, mental health, diabetes and digestive conditions. In addition, we are a leader in the important area of vaccines and are developing new treatments for cancer.

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