

TOM SWAN SPEECH – 23rd November, 2004
STRATEGIC SUBJECTS IN HIGHER EDUCATION
HAVE WE GOT IT RIGHT?

Good evening - I have been volunteered to address this theme from the point of view of an employer, and someone who has had a life long interest in education. For the record, I am the owner of a chemical company, with extra-curricular activities in various technologies, employing about 300 people. My interests in the educational field have been confined to Primary Schools, which I will briefly cover later.

One interpretation of the theme would be to discuss the actual subjects that are offered for study in Higher Education. As an industrialist I find that commenting on this is relatively easy. As long as the subjects that are relevant to my business are available for study, which on the whole they are, I am a happy man. I may be unhappy about the quality of output, but that is a different matter. What do I need, in terms of subjects? I need the purely academic ones, such as chemistry, physics and engineering. In another universe I need electricians, fitters, plumbers and welders. It is my contention that we need two fundamentally different types of university to address these two aspects of my requirements. In this country today, I think there is a greater shortage of people with vocational qualifications than with academic qualifications, which is not to imply that the academic situation is satisfactory – I will come to this later.

Not having any vocational experience myself, I find it difficult to come up with fixes for our current system. However, at the risk of entering uncharted territory for me, I have a few comments and ideas. It is my perception that the Germans, with their technical high schools, have got this part of higher education right. I am envious of the out put of these Universities – for so they may be called – even at the lab technician level, let alone the other skills, such as plumbing and fitting that they produce. Combined with modern apprenticeship schemes, Germany has at its beck and call a deep fund of skills, which we are lacking.

So, where have I got to in terms of subjects. Simple really, the menu looks like:

1. Have two types of University – academic and vocational.
2. At the academic universities, concentrate on the traditional science and arts subjects, modernised where appropriate. An important aside here – do not dilute these subjects with bolt-on options, for example Chemistry with Business Studies. UGH!
3. At the vocational universities, cover a broad range of skills, and methods of acquiring those skills, for example sandwich courses and apprenticeships.

I would now like to go on to the other interpretation of tonight's theme, namely, have we got the strategy for Higher Education right.

As an employer of science graduates I can only judge the results of the current strategy, and make proposals for the future.

The results have two aspects

1. The quality of graduates
2. The quality of research

1. Quality of Science Graduates

Compared to 30-40 years ago, the quality of 1st degree graduates has plummeted. This is a quote from a department head of a well known university. What are the reasons for this?

1. Could it be the fault of the schools, in that their output has deteriorated to such an extent that the Universities are left to pick up the pieces?
2. Could it be that there are too many Universities, with too many undergraduates not capable of benefiting from a University education?

3. Could it be that, since secondary school children have such a wide selection of “easy subjects”, there is such competition amongst Universities to attract students into Sciences that they lower their entry requirement, thus creating a vicious downward spiral in quality?

I was taught not to make more than three points, otherwise they get lost! So let's take these three as a starting point.

What strategy could start to address these problems, because, in terms of the theme of this talk, no – we have not got it right. (Just in case you had any doubt as to my stance on this).

We have to get those capable of high intellectual achievement onto a clearly defined platform of being able to achieve high, and respected, grades in testing examinations that lead to an in-depth understanding of the subject. We also have to attract them to the subjects, the first port of call being inspirational teachers. Teachers are fundamental to any strategy and there are numerous schemes and programmes to help them learn and be more efficient – for example the recent National Science Learning initiative. However, the only way of getting the choice of excellence in Science teaching, in my opinion, is to pay the good teachers very generously indeed. To state the obvious, everything depends on them, and all the schemes are useless unless you have attracted the right quality of person by a decent salary.

The second port of call which also depends on good teachers, is to make science and the application of science interesting at a young age, namely adopt the thesis of the Jesuit, Ignatious Loyola, which was “give me the boy until he is 7 and I will show you the man” (women didn't exist in those days!). It is my firm belief that you start the required process of improving secondary schools and hence Universities in primary schools.

I believe in this sufficiently to have put a considerable amount of my money where my mouth is by founding a primary school programme at the Chemical Industry Education Centre at the University of York called “Children Challenging Industry”. I am tempted to dwell on this tonight, but I will resist! Nevertheless, it is a serious attempt to bridge Key Stage 3, especially for hormonal boys, by creating a deep seated interest in manufacturing industry and science.

We must achieve excellence throughout primary and secondary schools – breadth of education, from an employers view can come at a later stage, that is after a 1st degree. As an employer, first and foremost I need a chemist, for example. To my mind, the fact that a graduate has a degree in Chemistry and Business Management is a disadvantage. If a chemist shows signs of wanting to go into management, as their employer I will train them, but to begin with, I want a chemist – as good as possible. In a similar vein I will develop their presentational skills – a university degree associated with presentational skills is, in this context, a nonsense.

It is, of course right that everyone should be able to go on to further or higher education. Whether 50% can benefit from what we now call a University education is questionable. If, however, vocational subjects are included, then I would guess the total would be 60% or more. However, without going into the detailed whys and wherefores tonight, I plead again for a clearly visible split between academic universities and vocational universities.

So far you may have noticed that I have not once mentioned the Tomlinson Report. This is because I wanted to put my thoughts forward in my own simple language. Tomlinson, of course, expresses these points far more cogently than I, and in some cases, with different priorities. He is of course also covering all subjects, not just the Sciences. I disagree with his proposals for course work. As an employer, I would want a science graduate to have got to University through a system of testing external examinations rather than subjectively examined course work.

So what is the potted version of all this:

1. Start young
2. Aim for excellence

3. At the risk of repeating myself, have two types of University – academic and vocational
4. Within the academic universities, not every university should offer the whole spectrum of sciences – it should be decided who will specialise in what and how many places would be available, thereby ensuring that only the best applicants would be offered places. I do not know if this can be applicable to non-science subjects.

Today I have read that Exeter is the most recent university to shut its chemistry department. While many may lament this, it is unfortunately a tough world out there and I believe only the best departments, on a national basis, should survive.

2. THE QUALITY OF RESEARCH

This latter point about specialised universities leads me to the second part of the subject, namely, the relationship between industry and universities in the field of scientific research, the subject matter of the Lambert Review. Broadly speaking, I agree with the Lambert Review. Of course this has nothing to do with the fact that my company was cited as an example of a successful collaboration with Cambridge!!

In actual fact we have done a great deal of collaborating with many universities, and not just in the UK. I have not dared to add up the amount of money that we have committed to these collaborations, but in my mind, they have all been successful. What makes for a successful collaboration? Well, that's easy – a good result, manifested either as a spin-out company or as new products or processes. But how can good results be assured?

There are two main headings in this context, namely Centres of Excellence and Managing the process.

1. Centres of Excellence

The Industrial partner will usually seek a Centre of Excellence, and the Universities must make such centres easy to identify. The analogy with the Football Premiership is inescapable. The Clubs (Universities) each try to attract the best players (Researchers) within their resources. The Clubs hope to attract sponsorship and fans because they become a centre of excellence. Of course, in this analogy, there is only one subject, football!, so I am guilty of the perilous crime of implying that football is simple!

I believe this requirement for centres of excellence supports the argument for specialisation in science subjects. Take Chemistry as an example. It will be much easier to attract 'stars' to a relatively few but excellent Chemistry Depts, rather than many moderate ones.

Or to put it another way:-

As an industrialist, I am more interested in a chemistry department that employs a Nobel Prize winner in the type of chemistry in which I am involved, as compared to the equally 5 star rated department that has no "stars" – if you follow my meaning.

Creating and maintaining these centres of excellence which then develop close links with industry also creates a tremendous "pull" for highly skilled post-docs into industry. From the employers point of view they are a known entity that hits the ground running. Again, a matter of quality and excellence.

2. Managing the process

It is essential, that once collaboration is set up, the industrial partners invest the appropriate time and quality of management in progressing the project. I have been astounded to hear that a large well know company, having established an EPSRC grant with a very well known University, felt that it was adequate to visit and discuss the project *once* a year. Evidently this is more the rule than the exception. I don't think that does any favours to anyone, least of all the University. By comparison, we visit at least once a month, and although some academics grumble at the discipline that this introduces, they all acknowledge that the project, and therefore the University department, is the better for it. Also, as far as funding bodies are concerned, delivery of results *on time* establishes a favourable track record for future funding applications.

One may therefore draw the conclusion that good industrial management input benefits the research activities of a university department, and combined with the centre of excellence concept, acts to further enhance its reputation. This is valuable to attract more people of quality, from undergraduate to professorial level.

So where does all this leave us. I would contend that we have a lot to do at the input end, namely schools, to enthuse students *and* teachers. Science and Industry have got to be made attractive, as indeed they were in the 50's and even 60's. If this is not achieved, and it will take time, I cannot see any other way of supplying employers in the technical field with the quality of graduate or post-doc that they need.

Doing nothing is not a realistic option, which I think is demonstrated by the fact that my company is now having to employ graduates from Europe. Why can't we produce enough internally? This is the manifestation of why we have got the strategy wrong.

The current quality of graduates is tolerable, but declining and will not be rectified or improved unless the input end is put right. Nevertheless we need to reorganise the university system to ensure specialisation that leads to centres of excellence. It is also true that centres of excellence cannot be created unless suitable financial incentives are on offer to attract the "stars" (where have we heard that before, oh yes, teachers in schools).

In terms of a menu, this would look like:

1. Start young with enthusing programmes
2. Have two types of University – academic and vocational
3. Within academic Universities, have specialisation particularly within the sciences
4. This should facilitate the idea of centres of excellence
5. Industrialists will become involved with Centres of Excellence, thereby opening a pipeline of graduates etc

I have, of course, simplified the whole subject, and I am aware that there will be many "oh, but....'s" to every point I have raised. Nevertheless, I have presented one employers point of view. This will have to be merged with the views of educationalists, to hopefully achieve $2 + 2 = 5$.

THANK YOU