

Engineering & Science research in conflict?

The Irish university science academics are worried with the recent changes in the Government's policy for funding research. In their letter to the I. Times on March 18th, signed by several hundreds of scientists from academia, they spoke of the Government's short sighted drive for applied research which has a potential for industrial innovation, saying that these changes created the perfect storm for basic scientific research, undermining their ability to carry out world class research. However, they go on to speak of their support for a national strategy for a well-balanced mix between basic and applied research, which is surely what these recent national funding changes will bring about, but which was absent and sorely needed in our university research activity in recent years.

The establishment of the Science Foundation Ireland in the SFI Act of 2003, referred exclusively in its functions to the promotion and development of basic research, thereby excluding applied research, which generally describes the research that is carried out in the university faculties of engineering. It thus gave rise to a major increase in the university research activities in the scientific disciplines of chemistry, physics, biology, zoology, biochemistry, mathematics, botany, and pharmacology, where the research is generally of a basic nature. The result was that in the years following the 2003 Act, scientific research in Irish universities expanded greatly, deserving and obtaining widespread respect in the international scientific communities as was described in full detail by Dr. David McConnell in the Irish Times Opinion article on April 2.

Engineering researchers however, understandably played a very poor second fiddle in those years since 2003 to the basic research of their scientific colleagues in the Irish universities. This is not to say that the research in the

university engineering schools was of an inferior standard. It was unquestionably of high international standards, and certainly at least the equal of the research in the sciences, but because of its low funding by the State, it had a much lower activity across our university campuses. The Irish Academy of Engineering undertook in 2011 a study of the engineering research activity in the Irish universities which it published in its paper “ **Engineering Research & Irish Economic Development**”, noting that in the previous five years, only 8% of the total Government’s funding for research was allocated to engineering, whereas some 85% went to the sciences. In that paper, amongst its other recommendations for the improvement of engineering research in the Irish universities, the Academy understandably recommended that the functions of the SFI should be amended to allow for the funding of applied research. It seems that the Government took note and in the Industrial Development (Science Foundation Ireland) Amendment Act of 2013, it included in its **Amendments of the 2003 Act**, to “ **promote, develop, and assist the carrying out of basic research and applied research in strategic areas of opportunity for the State**”.

Engineering research was thereby finally put on an equal footing with scientific research, and this amendment will assist in the development of a vibrant engineering research activity to partner that of the scientific research community. It is perhaps unnecessary to say that from a university’s educational viewpoint, engineering research, whether basic or applied, is every bit as good as the research in any other university discipline. In addition to supporting the funding of applied research, the 2013 Amendment Act also encouraged the support of research that is seen to have potential for industrial innovation, and for some reason, this seems to be the particular issue that upset the scientific community. One is reminded of the famous statement by a Cambridge Science Professor of some many years ago who

boasted that scientific research was pure, not having in any conceivable circumstances, any practical use. This may or may not be the viewpoint of Dr. McConnell's and our contemporary scientific academic community but it is hardly makes any sense in today's world. Engineering and science are distinct human endeavors, where science is about discovery and engineering is about innovation. There are gray areas in between and of course there is traffic between these disciplines, one notable being the great scientist and mathematician Albert Einstein, who made numerous forays, successful and otherwise, into engineering innovation, and conversely the great US engineer, Theodore von Karman, who received the National Medal of Science from President John F. Kennedy. Von Karman is attributed with the saying "***Science is the study of what is; Engineering is the creation of what never was***"

It is vitally important that the Government supports basic research, but as regards its allocation from the national purse, this is surely a matter of balance for our Government, and the SFI, together with the Research Council of Ireland, which supports mostly basic research, must be directed and trusted to arrange that.

The academic backdrop to this debate on research funding is the larger question of the role of research in the university, a major and hot topic. Perhaps not all will agree, but the prime role of a university is education, in teaching and graduating the youth of our country, where research is an adjunct to that activity, an important adjunct to be sure, but an adjunct only primarily because of its input to teaching. With the occasional exception of outstanding teachers in introductory courses, a good lecturer should always be engaged in research. Research also has an important role in its contribution to the university's international university rankings, which are based primarily on research output, with little or no evaluation of teaching, largely because its

not easy to measure, whereas research output is. These rankings are said to have an important role in influencing the enrollment decisions of high fee paying international students and in recent years these students have become important to the financial viability of universities.

Finally it should be noted that all our Irish universities actively promote and financially support the creation of industrial start up companies by their research students and staff across all disciplines, and these are undoubtedly having a major input into the country's economic development. UCD Nova for example has assisted in the establishment of some 60 companies over these past ten years, all now trading successfully, and currently has 36 at incubation stage, shortly to be launched in the Irish and international marketplaces. The other Irish universities have similar data. This activity is part of a wider emerging ethos in the university world involving all disciplines whereby there is greater contact by staff and students with the world outside. With over some 70% of our youth now in higher education, the ivory towers of yesteryear can no longer survive, and not only is the prime teaching function of the university not interfered with by this activity, it engenders a more stimulating educational ambiance for our students, embracing greater relevance to their future careers.

(Select from below!)

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