Engineering Institutions as the custodians of Engineering Professions

Professor Dr Reza Ziarati BSc (Eng), PhD (Eng), Cert Ed, CMechE, CElecE, CMarEng, CEng, FIMechE, FIET, FIMarEST - Centre for Factories of the Future

The author has been a member of several professional institutions for many years and has supported professional institutions in different capacities. He was the Midlands' representative of the Engineering Council Regional Organisation and served on the Engineering Senate of the Engineering Council for several years. He initiated a number of projects with EEF, CBI and served as the Chair and a member of the accreditation panel for several professional bodies. He has held senior appointments in academia and industry; and has been an external examiner for several colleges/universities and was the chief engineering examiner for BTEC/Edexcel/Pearson for many years.

This paper is written in a generic form and should be of interest to all engineering institutions. It is clear from the recent discussion groups that many engineers especially the young ones do not see the benefits of becoming a member of the Institute. This is not a challenge just faced by Mechanical Engineers or Marine Engineers but also by several other institutions. So it seems the first task for engineering Institutions is to set in clear terms what is the added value to a working engineer in industry, commerce and in academia for being a member of a professional institution. In doing so the Institution should define their main reason for their existence viz., what are they for, is it for their individual members and/or organisations/companies and/or non- or Governmental entities, and if for all then in each case the institution should state the main reasons for supporting each category followed by a clear statement of value added.

It is often stated that the institutions often claim that they are for their members and their institution is member focused. Such macro statements often assume that all members have the same requirements which cannot be true; the needs of student members for instance, are very different to the needs of CEng members. Maybe the time has come for a review of the target groups and the reassessment their needs.

Student Membership

The key issue for almost all professional engineering institutions is to encourage young engineering students or graduates to join them.

The key question of why should students join an engineering institution is as shown in the diagram below. The following are some of the benefits:
- Improving their employability
- Giving them the opportunity to join a network of professional engineers, different sectors of industry, commerce and academia
- Providing opportunities to apply for awards, funding, grants to support their studies and/or progression into higher status
- Having the benefit of joining without paying a fee
- Provision for distinction by allowing the students to use the designation SIMechE, SIMarEST or SIET
- Having access to a range of benefits such as lectures, learning resources, technical support and advice

By joining a professional institution students will be given the opportunity to work with their peers at university or college or mentor young pupils at primary and secondary schools.

Why join as a student member?
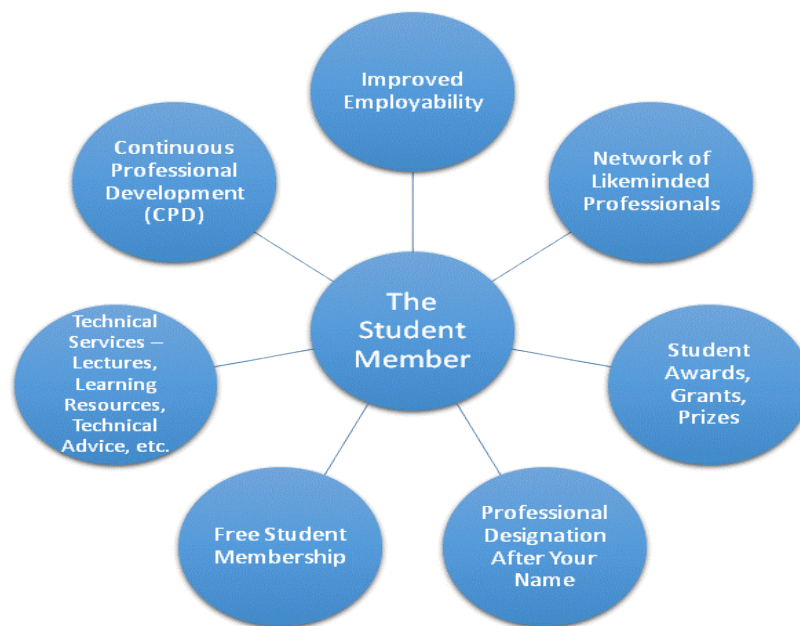
The Challenges for the Engineering Institution

It is strongly supported view that engineering institutions exist to promote their given profession. Systems and components are designed, developed, marketed and maintained. The academia has a role in educating the young people in engineering subjects for industry's needs, therefore our role should be supporting the universities to in-built as much as reasonable the industry's requirements into their courses bearing in mind the young graduate engineers might end up working for commercial and banking organisations or even opting to enter a teaching profession.

It has to be realised that the interests which business has in wishing to establish or improve links with academia are different from those of the academia, and may not always be compatible. The educationalists can aspire to be altruistic; business people can only afford to be altruistic when they have made more than enough money for the maintenance and development of their businesses. This is not a moral judgement – it is a pragmatic one. Academia needs the industry to support it in the development of its programmes so that they can identify and respond to the needs of industry and commerce. It needs industry to seek funds to progressively develop its laboratories, and it needs industry to develop its staff members. Industry needs academia to improve the quality of its employees, present and future; it needs academia for technological progress useful to business, and to better management of business; it needs academia for the formation of its future customers, and so of demands for its products and services (Ziarati, 2015)[1]

Furthermore, another article (Bozbura, Ziarati, 2017)[2] describes the mismatch between the two worlds of academia and business and offers a means to help young people to learn using novel technologies about opportunities available in the business world and how to prepare themselves for a career that would fulfil their aspirations.

The article by Singh (2017)[3] states that in today's competitive economic environment, the need of being open and staying connected with the eco-system actors has become crucial for a firms'

performance (especially for science-intensive companies)1 , 2 . Particularly, collaboration with universities has proved itself as an instrument for companies' generating radical innovations – products/services that are novel to the market. However, several barriers like differences in organisational culture and internal characteristics keep the university-industry collaboration particularly challenging.

A review of these articles which is also an argument behind the ongoing EU funded UniBus project[4] clearly provides an opportunity for professional institutions to fill the mismatch between academia and business and help young people to acquire the skills and competences needed by industry and commerce and by working closely with the schools, colleges and universities.

The engineering institutions, through their accreditation services, have managed to find a means of ensuring colleges and universities diplomas/degrees in-build the respective industry's needs. They also ensure a balance programmes which include non-engineering subjects, with topics such as social sciences or business related subjects, to broaden the minds of young engineers.

If there is mismatch between academia and business, how deep is this mismatch? What about exposure of engineering subjects such as Science, Technology, Engineering and Mathematics (STEM) in primary and secondary education tiers? Clearly, there is a role for professional engineering institutions to promote STEM in all schools.

It is now becoming apparent that the engineering institutions are the custodian of their respective profession/sectors and while member-focused; their members have a moral and professional duty to work closely with schools to provide opportunities for the young pupil and students to find out more about engineering; it is crucial that this commitment is followed through to the tertiary education. Arranging meetings with students from year 1 to the final year ensures that student members become involved with their institution work. It is equally important to involve student members in the accreditation process so that colleges and universities would value the membership of their students with the engineering institutions. It is well known that major and well respected universities value the accreditation of their programme by professional institutions and this is one way of ensuring that their students are encouraged to become a member of appropriate institutions.

The same vision would encourage involvements with schools. The Continuous Professional Development (CPD) practice currently in place would give the institutions a chance to take a young pupil from a primary school right through to a professional job and then through CPD ensuring the engineer goes through a life-long learning.

The concept of Engineers as mentors is therefore an important role for all engineers once incorporated. Engineers should also be seen as a bridge between academia and business helping to bring these two distinctive entities together without adding extra burden on them.

As identified by Singh (2017)[3] the engineers can support companies, particularly the SMEs, with technical issues particularly in helping these companies to seek resources including financial benefits and R&D funding for improving their products and/or services or for developing new products or services.   A portal similar to that developed by C4FF[5] could be used by professional bodies to support the needs analysis/idea generation and management at the SMEs which could

help institutions to provide a rational support to these companies/businesses. A life-long cycle of learning and the role professional institutions are depicted in the following diagram:
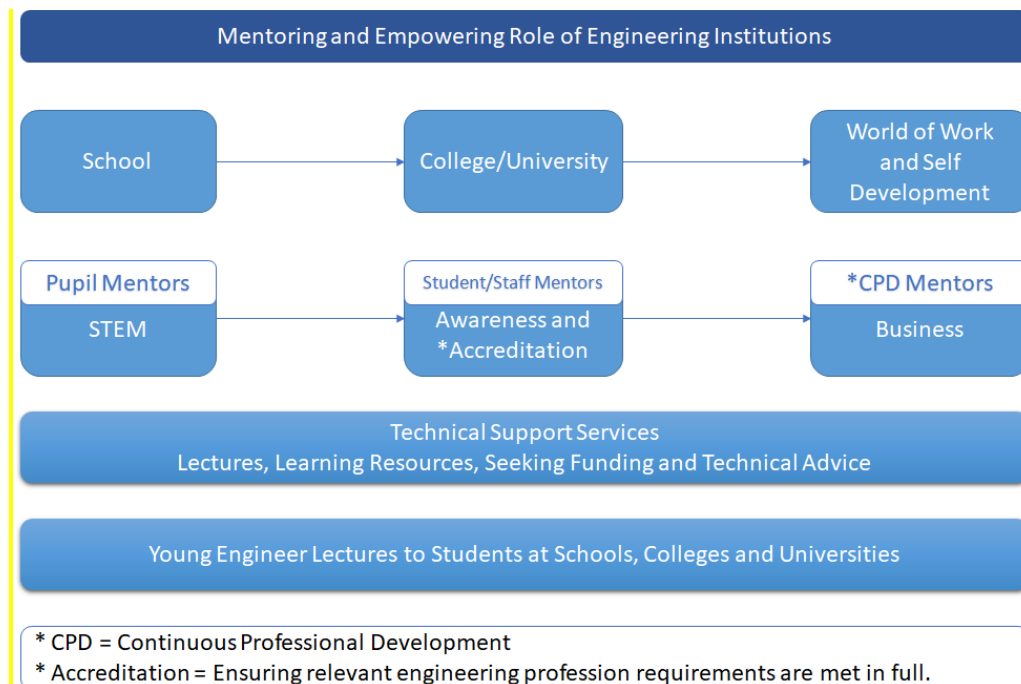
There is no reason as to why the institution themselves should not identify the SMEs' needs and seek national, European, international funding or funds from the business itself to initiate education, research or development projects. The institution would benefit in identifying their highflyers to take a lead in such developments and in institutional activities supported by young engineer lecture programme which would then give them the platform to promote their profession. What about a dedicated young lecturers programme which encourages young engineers to go to schools and give lectures about their pathway to Engineering designations and the role the professional institutions play in mentoring them and helping to keep them up-dated through a programme of life-long learning and development (CPD), all linked to UK education qualifications including Apprenticeship opportunities.

Key References

[1]Ziarati, R., (2015), The Importance of Accreditation and, Research and Development – Developing Staff and Supporting Industry and Commerce, European Platform for Education, Research and Innovation, Marifuture, February 2015 - http://www.marifuture.org/Publications/Articles/The_Importance_of_Accreditation_and_Research_and_Development_Developing_Staff_and_Supporting_Industry_and_Commerce.pdf).

[2]Ziarati, R., Bozbura, T., (2017), Academia-Industry Mismatch, European Platform for Education, Research and Innovation, Marifuture, March 2017 - http://www.marifuture.org/Publications/Articles/Academia-Industry_Mismatch.pdf

[3]Singh, L., (2017), Industry-Academia Collaboration, European Platform for Education, Research and Innovation, Marifuture, April 2017 - http://www.marifuture.org/Publications/Articles/Industry-Academia_collaboration.pdf

[4]http://www.marifuture.org/Projects/Projects.aspx)

[5]Ziarati, M., Singh, L., Ziarati, R., Design of an Innovation Platform for Manufacturing SMES; Proceedings of the 11th International Conference on Manufacturing Research (ICMR2013 - http://www.marifuture.org/Publications/Papers/90-ICMR2013_15_03_2013.pdf