

# Advanced engineering, technology and project management education

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The Council on Higher Education (CHE) and specifically the Higher Education Quality Committee (HEQC) recently completed their investigation to determine the quality of MBA programmes in South Africa. The findings of this investigation led to pandemonium amongst stakeholders in post-graduate management education.

Typical stakeholders are business schools (parastatal and private), business and industry, a variety of management and business publications, the press and obviously MBA students and Alumni.

The nature of the excitement ranged from disappointment and disgust, withdrawal from South Africa, very strong reaction towards disagreement with the validity of the process and elation. These reactions can be understood because from the 27 institutions offering 37 MBAs in South Africa only seven programmes of six institutions received full and another 12 conditional accreditation.

The accreditation process driven by the HEQC, striving towards improving the quality of programme content and delivery was long overdue. It was arguably not a perfect process, but very much needed. The HEQC and participating evaluation panels should be saluted for the strong message to providers: "Get your act together or discontinue your programme."

Apart from the traditional general management focus of a typical MBA, three other 'management focus areas' strongly emerged over the past decades namely engineering management, technology management and project management.

A variety of global institutions and bodies have been established to enhance and formalise these disciplines and related education. These management disciplines all stem originally from engineering and related scientific fields.

The development of management thinking started late in the 19th century. Because of their technical knowledge of products and manufacturing processes, engineers came to the fore as natural industrial leaders and thinkers.



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Two persons who are regarded as the fathers of modern management theory are Frederick Winslow Taylor of the USA and Henri Fayol of France – both of them were engineers!

It is clear that engineers played a key role in the development of systematic management. The objective of modern technical management development and education is therefore to equip the engineer with the knowledge and techniques needed to become a manager of technical functions in the business enterprise.

The need for the management of the 'technology driven value chain' in technology based enterprises became paramount in the current technology and knowledge society (refer to in a previous issue of this journal). The level and magnitude of technological innovation proved to be a strong predictor of economic success of companies and consequently countries worldwide.

South Africa seriously needs economic

growth and job creation in order to sustain our political successes over the last decade. Real economic growth based on the mastery and exploitation of technology for business success is therefore not negotiable. Against this background it is relevant to investigate the status of formal education in engineering, technology and project management in South Africa.

Each of the (traditional) engineering disciplines such as civil, mechanical, electrical and electronic, industrial and chemical engineering has its own established institute promoting the discipline and the profession. Probably the most well known and active on a global scale is the Institute for Electrical and Electronic Engineers (IEEE).

Other engineering management focus areas such as production, logistics and maintenance also have their relevant institutes. They seek to promote the discipline across traditional engineering boundaries. Significant development towards the management of underlying disciplines occurred globally and in South Africa.

The IEEE is a very large international body with about 500 000 members. The objectives are typically to promote the creation and sharing of relevant knowledge amongst academia, industry and business in general to the advantage of participants.

The international body is divided into geographical sections covering the globe. A variety of relevant topics are addressed by smaller interest groups. South African organisations participate in conferences and various projects.

An active and successful chapter in South Africa is the Engineering Management Society (EMS). The EMS specifically focuses on the management aspects of engineering in its broadest sense. The well known IEEE Africon bi-annual conference also hosts an engineering management stream.

The University of Pretoria (specifically through its Graduate School of Management and its Department of Engineering and Technology Management) plays a lead-

ing role. Senior academic managers are the chair and co-chair of the South-African chapter of EMS for any number of years already. One of them was also elected to chair the Southern African section of IEEE for 2005 and 2006.

Another prominent global event is the Portland International Conference on the Management of Engineering and Technology (PICMET). PICMET is hosted by the Department of Engineering and Technology Management of the Portland State University, Oregon, USA. Typically 500 to 600 delegates from all over the globe participate in this conference. This is arguably the most notable event of its kind in the world today.

An important development is the founding of the Engineering and Technology Management Education and Research Council (ETMERC) in 2003. It is of significance to mention that senior academic managers of the University of Pretoria were elected as the first president and vice-president of this organisation.

The objectives of ETMERC are to formalise and promote the discipline of engineering and technology management. Specific focus will be to enhance education and research, resulting also in formal definition (description) of programmes allowing for later accreditation.

Such candidate programmes are a masters degree in engineering management (MEM) and a masters degree in project

management (MPM) offered by UP.

The International Association for Management of Technology (IAMOT) is the prominent body in the world focusing on the management of technology. Important to note is that academic and industry role players from South Africa were co-founders of this prestige international organisation. IAMOT has an education council as well as a research council enhancing the discipline of the management of technology. UNIDO (the United Nations Industry Development Organisation) officially supports IAMOT.

True pioneering work was done in this field during the past 17 years. South African universities and industries have participated over the years and significant progress has been made towards formalisation and accreditation of educational programmes.

In the field of project management significant developments took place over the past few years. The Project Management Institute (PMI) in the USA is stretching its wings well beyond the borders of the USA. It already has more than 100 000 members worldwide.

The Department of Engineering and Technology Management at the University of Pretoria is a registered education provider (REP) of the PMI. The PMI has also started a process to accredit masters' degree programmes in project management. The programmes of only three universi-

ties worldwide have so far been accredited and the University of Pretoria is in the process of applying for accreditation of its masters' degree programme in project management (MPM).

The South African chapter of the International Council on Systems Engineering (INCOSE) was founded in 2003. Two successful international conferences were hosted already. Systems engineering plays a vital role in the engineering management world.

The Southern African Maintenance Association (SAMA) was formed in 1997 to promote the interests of maintenance professionals in southern Africa. This action followed the worldwide trend where maintenance engineering and maintenance management were becoming recognised as professions in their own right.

The chairman of SAMA is currently held by a professor from UP. SAMA has established international connections with professional societies in the maintenance field, for example the Society in Australia (MESA) and the Society for Maintenance and Reliability Professionals (SMRP) in the USA.

SAMA this month hosts the annual International Conference on Asset and Maintenance Management (ICAMM).

In the spirit of the University mission statement, we strive to keep our programmes internationally recognised, yet locally relevant. ■