

American Society of Mechanical Engineers

GLOBAL SUMMIT

THE FUTURE OF MECHANICAL
ENGINEERING

PANEL SESSION II

Future World of Engineering – Critical Knowledge &
Competencies

THE FUTURE OF ENGINEERING
IN LATIN AMERICA

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THE PAN AMERICAN ACADEMY OF ENGINEERING

Founded in Panama in 2000

Today 80 Members from the Americas
8 Corresponding Members (Europe,
Asia)

Gathers individually engineers
proposed by UPADI Member
Organizations or by
3 Academicians from different
countries

THE PAN AMERICAN ACADEMY OF ENGINEERING

MAIN ACTIVITY: THE POLICY FORUMS

- Tegucigalpa 2002 – Cooperation for Technological Development
- Montevideo 2003 – Accreditation in the Regional Context
- Mexico 2004 – Ethics and Integrity in the Provision of Engineering Services
- Atlanta 2006 – International Practice of Engineers
- Brasilia 2008 – Strategies to Reduce Global Warming through Engineering

THE LATIN AMERICAN REGION

Many aspirations and hopes are waiting to be fulfilled through the activity of a new generation of well trained engineers.

UN Millennium Development Goals: "make development a reality for everyone, eradicating poverty and protecting the Planet from environmental degradation.

THE ENGINEERING ORGANIZATIONS

USAI – 1935. Buenos Aires. The first international society gathering the Engineering Associations of South American countries.

UPADI – 1949. Sao Paulo. Pan American Federation of Engineering Societies. Activity through Technical Committees and Congresses. In Brasilia next December:

XXXI Pan American Convention

XXIV P. A. Congress on Engineering Education

THE ENGINEERING SCHOOLS IN LATIN AMERICA (LA)

In many countries, Engineering Education is full of theoretical and abstract knowledge that retards the growth of professional attitudes.

- They form scientific-oriented Engineers
- Should form engineers capable of producing goods and services through original creative projects and products based on advanced technologies and the value-added engineering systems

THE ENGINEERING SCHOOLS IN LA

- QUALITY of teaching Staff is a critical factor

PROFESSORS THAT

- Generate in students professional attitudes of a particular discipline

“to teach how” not only “teach what”

- With humanistic and socio-economic criteria as a synthesis of the student's own construction that they must be able to motivate on the basis of life experiences

THE ENGINEERING SCHOOLS IN LA

-ES in LA are adapting to outcomes criteria: Means what students

have learnt
have retained and
can apply

-Countries of LA are implementing Evaluation/Accreditation Systems based on peer review

Key factor for quality assurance

A NEW TYPE OF ENGINEER FOR LATIN AMERICA

GLOBALIZATION

- Is a consequence of science & technology efficiently administered by ENGINEERING
- Aims at progress with equity and participation
- Means an opportunity to reach
 - economic welfare
 - social cohesion
 - political liberty

GLOBALIZATION

- 1932 Karl Jasper for scientific field
- 1973 Trilateral Commission for economic field

Is a powerful tool for diffusion of new technologies, increase economic growth and enhance quality of life.

Means a controversial process that

- endangers national sovereignty
- erodes local cultures and traditions
- molds public opinion
- threatens socio-economic stability

THE IMPACT OF GLOBALIZATION IN SOCIETY & UPON EDUCATIONAL SECTOR (1)

- To pass from a national vision of the problems to an international vision
 - Overcome the complex typical of closed communities
- Take care of resources allocated to education and impose efficiency in their use
 - To develop strong links with secondary level articulating the improvement of math, science and engineering education at K12 level

THE IMPACT OF GLOBALIZATION IN SOCIETY & UPON EDUCATIONAL SECTOR (2)

- Encourage the reduction of the number of specialties in engineering and consequently limit the undergraduate programs to the main orientations.
- The formation of an engineer tends to be more fragile the more specialized it is.
- To cover the specialties through post-graduate studies.

THE IMPACT OF GLOBALIZATION IN SOCIETY & UPON EDUCATIONAL SECTOR (3)

- To not form more engineers than those necessary to cover the future needs of the country.
- To educate future engineers for the real world of the production and services sectors favoring their rapid employability.
- To form engineers with an international culture allowing their mobility.

THE IMPACT OF GLOBALIZATION IN SOCIETY & UPON EDUCATIONAL SECTOR

(4)

- Pay special attention to continuing education, CPD, both for graduate engineers and for the faculty sector of ES. Encourage programs for personal and professional development that include levels of direction and administration.
- Accept the irreversible process of the creation of virtual universities, demanding excellency and pertinence in their programs.

NEW ABILITIES INDUCED BY GLOBALIZATION (1)

- Ability for self-development and continuous improvement
- Flexibility to accept diversified functions
- Adaptation to mobility
- Know and manage their own emotions, strengths and weaknesses.
- Understand the total business in the organization where they work.
- Get accustomed to proposing and pursuing objectives.
- Accept competitiveness as a natural thing.

NEW ABILITIES INDUCED BY GLOBALIZATION (2)

- Work in an integrated manner, in multidisciplinary teams.
- Develop systemic thinking and perspective.
 - Anticipate the social impact of technical solutions
- Be aware of the changes in their cultural and socio-economic environment.
- Make all possible efforts to improve his oral and written communication.
- Cross over the barrier of their own language

NEW ABILITIES INDUCED BY GLOBALIZATION (3)

- Use intensely computer science and communications
- Handle in a critical manner the delivery terms
 - Assimilate multiple demands, without losing control of all of them
- Pay attention to reality, that is at times chaotic and ambiguous
 - Accept, sometimes, marginal tasks that are disagreeable.
- Not wait for detailed and precise instructions.

NEW ABILITIES INDUCED BY GLOBALIZATION (4)

- Understand that they do not always have the necessary information.
- Work in teams, towards collective goals with persons that they have not chosen.
- Confront the changes in scenery being one step beyond the immediacy
 - Always protect the biosphere.
 - Live with a flood of information, identifying what is useful.
- Reject all forms of violation of ethics and show integrity in their professional behavior

ENGINEERS AS LEADERS ENTREPRENEURS (1)

- People with intellectual honesty trained to orient and give cohesion to the talents of the group
 - To develop a Vision
- Ability for analysis, reflection and synthesis
- Ability for diagnosis of complex situations that require valuing more than one alternative
 - Adopting decisions in conditions of uncertainty
- Risking strategies for their implementation

ENGINEERS AS LEADERS ENTREPRENEURS (2)

- Will be able to act as protagonists of changes in the social environment
- They were trained as:
 - strategic thinkers
 - decision makers
- With capacity to plan and be
 - public opinion formers

ENGINEERING FOR THE AMERICAS (1)

To promote excellency in Eng. Education, a group of leaders of:

- high-tech industry companies
- educational institutions
- the government
- professional societies

Coincided in creating this Program.

- Aimed to build local engineering capacities
- Open minds for innovation – New, competitive activities
- Create employment to face poverty for development

ENGINEERING FOR THE AMERICAS (2)

- OAS, working with the initial group prepared a
DECLARATION AND PLAN OF ACTION

Adopted in 2004 by the Ministers of Science & Technology

- 2005 SYMPOSIUM OF LIMA

OAS with the support of USTDA and hi-tech companies

- To impulse the mobility of engineers and high-tech industries to homogenize the knowledge based production and distribution of wealth.

Could the EA Program be adopted by all nations?