

The Natural Sciences Sector
UNESCO

*The UNESCO Engineering Report
&
The UNESCO Engineering Initiative*

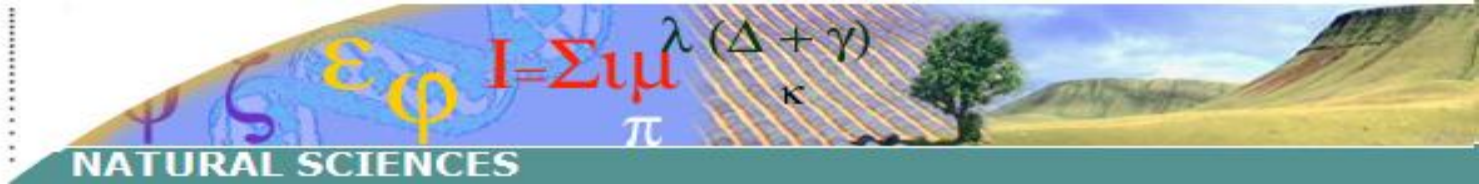
Rovani Sigamoney

UNESCO Engineering Initiative

Occupational and Career Structure of the National Technical University of Athens

21 June 2012

Athens, Greece

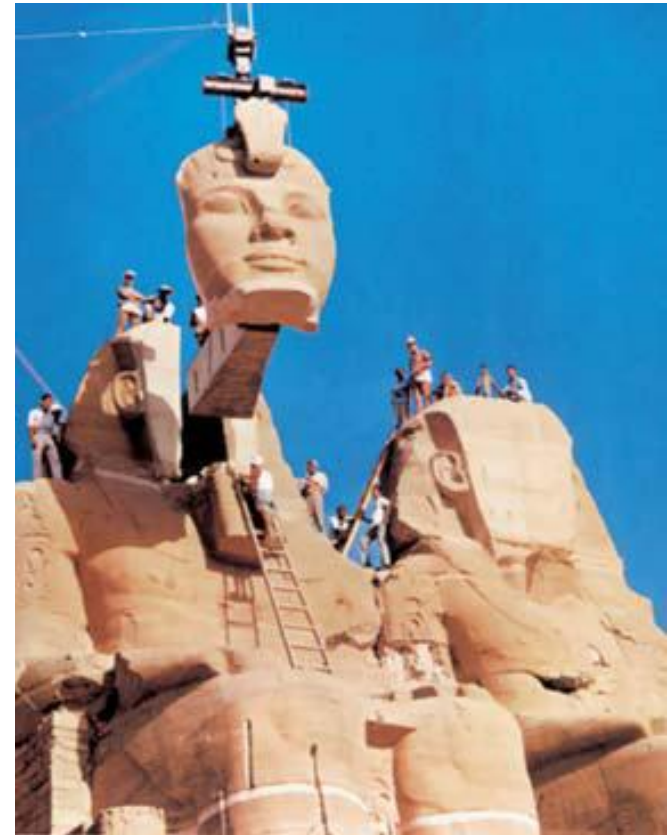


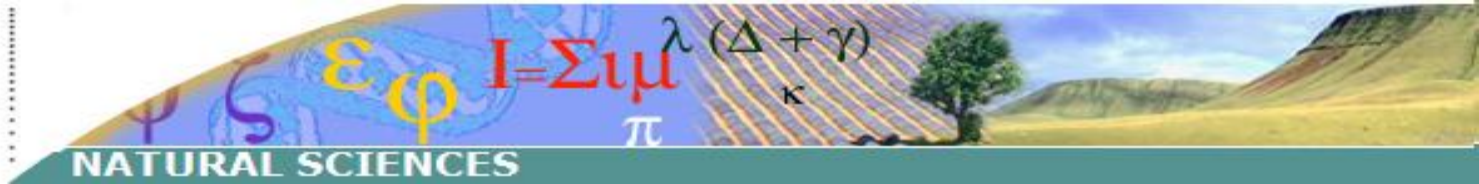
Outline

- *Background*
- *UNESCO and Engineering*
- *The UNESCO Engineering Report*
- *Main Topics*
 - *Education in Engineering*
 - *Global Challenges*
- *Way Forward*

Background

- *Engineering is a major driver for social, economic and human development*
- *Engineering is also a complex and increasingly diverse area of expertise*



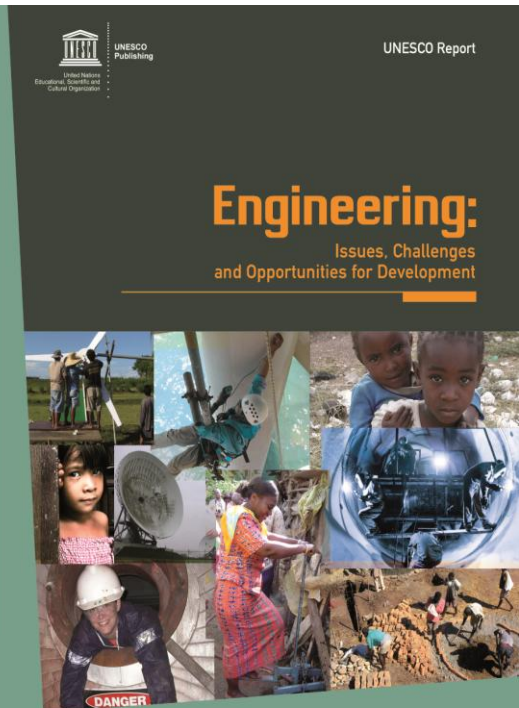


Background

- ***Problems currently faced***
 - ***shortages of engineers around the world***
 - ***a decline of interest and enrolment in engineering by young people, especially women***
 - ***problems of brain drain for many developing countries***
 - ***need for greater awareness by the public and policy-makers of the need and importance of engineering***

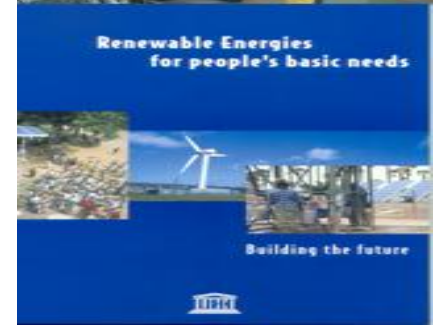
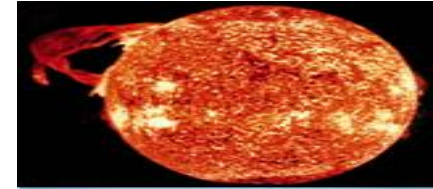
UNESCO and Engineering

- UNESCO - diverse in terms of Culture, Education, Communication and Information as well as Science
Engineering Initiative - cross-cutting thematic proposal to draw on engineering related strengths across all Sectors
- *To promote human and institutional capacity-building, particularly in developing countries, to reflect on the UN MDGs and UNESCO priorities*
- *Concentrate on sustainable development and poverty eradication*
- Innovation - clean technologies for sustainable development; robotics, nano-engineering, life-cycle analysis



Education in Engineering

- One of the main aims of the Engineering Initiative
- Strengthening engineering education, training and continued professional development
- Standards, quality assurance and accreditation
- Development of curricula, learning and teaching materials and methods



Education in Engineering

- Distance and interactive learning (including virtual universities and libraries)
- advocacy and public understanding of engineering and technology;
- addressing women and gender issues in engineering and technology;
- inter-university and institutional cooperation, including fellowships



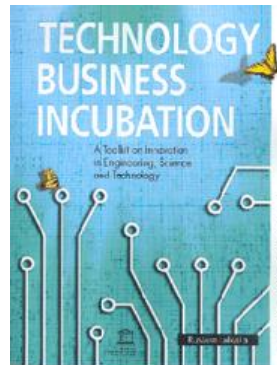
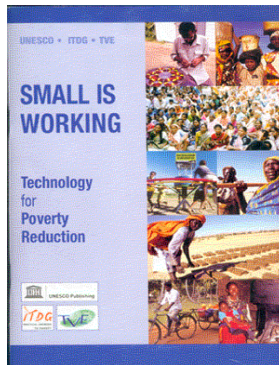
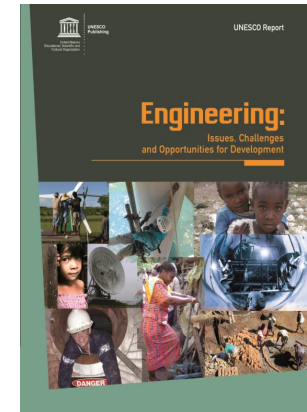
Engineering Sciences -Publications

UNESCO Report, “Engineering: Issues, Challenges and Opportunities for Development” - 2010

“Small is Working: Technology for Poverty Reduction”

“Technology Business Incubation” toolkit on innovation

“Gender Indicators in Science, Engineering and Technology”



UNESCO Engineering Report

- First engineering report by international organization
- Over 120 expert perspectives on the importance of engineering for sustainable development
- **Challenges for the engineering profession include:**
 - Attraction and retention of youth to engineering, particularly women
 - Strengthening education institutions
 - More interdisciplinary activities in engineering curricula
 - Focus on innovation, entrepreneurship, and job creation
 - Promoting increased public awareness and support for the profession

Objectives - Engineering Report

- Develop public and policy awareness - as a drive for innovation, social, and economic development;
- Emphasize the human component of engineering -
Make it more accessible to the public
- Highlight need for better statistics and indicators on engineering
- Transform engineering education to emphasize problem-solving approach
- More effectively innovate and apply engineering and technology to global challenges, particularly climate change

Engineering Capacity: Education

- Need for a new model of engineering education with international perspective
- Development of green or sustainable engineering is critical for climate change mitigation
- Need for better statistics and indicators to aid policy-makers
 - Disaggregate scientists and engineers
 - Separate fields of engineering and type of employment (industry, academia, research)

Engineering Capacity: Training

- Competent technical workforce leads to economic development
 - Address local and national technical needs
 - Develop small business start-ups and competent entrepreneurs
 - Create and attract technical companies for investment
 - Technically competent people to maintain and operate appropriate infrastructure
- Investment in job generation policies and enhancement of quality/quantity of engineering education is needed concurrently
- Growth in engineering works contribute to job creation and poverty reduction

Engineering Capacity: Mobility

- Mobility of manpower or resources is critical to compete in global market
- Changes that affect concept of mobility for engineering education
 - Globalization
 - Information and communication technologies
 - Real competences
 - Sustainability and sustainable development



Way forward

- **Transformation of Engineering Education**
 - Shift toward **Problem-Based Learning (PBL)**
 - Learning centered around problems that are solved by collaborative teams using interdisciplinary approaches
 - Change toward student-centered learning methods and international collaboration
 - **Rapid curriculum renewal considerations**
 - Awareness raising and developing a common understanding
 - Graduate attribute matching - program objectives
 - Curriculum audit
 - Course development and renewal - create new degree or integrate sustainability into existing program?
 - Outreach and bridging - share course offerings with other universities or collaborate with industry
 - Campus integration

Way Forward

- UNESCO build on existing partnerships eg. With WFEO, IEEE, ASME and other organisations
- Program partnerships with governmental agencies, universities and education institutions, international organisations and NGOs
- Work inter-governmentally as well as mobilise support from UNESCO Field Offices, National Commissions for UNESCO and other UN Agencies



Way Forward

- Partner with engineering educational institutions and encourage fellowships for applied research and training
- Fostering stronger university-industry partnerships
- Fostering innovation through such partnerships and through establishment of science parks and similar hubs of scientific exchange and excellence





United Nations Educational,
Scientific and Cultural Organization

NATURAL SCIENCES



Thank you