

Science and Engineering Provide the Most Effective Solutions to Humanity's Foremost Problem

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Abstract

The foremost problem facing humanity today is sustaining human development and preserving the planet. Science and engineering provide the most effective solutions to these problems. This can happen only if there are a sufficient number of qualified professionals in these disciplines.

Effective partnership consisting of all stake holders in science and engineering is important to establish sustainable human development and preserve the planet. There is currently a shortage of qualified professionals in these disciplines. The global shortage of well qualified scientists, engineers, and technologists can be solved by a partnership consisting of governments, policy makers, and educational institutions with the goal of educating and training people to work in these disciplines. The partnership should establish life-long training at all stages of people's professional lives to significantly improve their professional competencies and innovative capacities. Governments should increase funding of these efforts while working synergistically with other stakeholders. Science and engineering education should be modified to focus on innovation and problem based interdisciplinary learning that responds to the changing needs of the industry. Capacity building in these sectors should be significantly increased to achieve sustainable development.

Partnerships should also occur at a global level, working to significantly strengthen gender and geographical diversity in science and engineering. Special focus must be employed to ensure and encourage participation of women and people from Least Developed Nations.

These partnerships are necessary to not only increase the number of professionals available to identify the problems but also to design and implement sustainable solutions.

Key Words: Science, Engineering, Sustainability, Preserving the Planet, Human Development, Partnership, Problem, Solution

INTRODUCTION

The foremost problem facing humanity today is sustaining human development and preserving the planet. For many hundreds of years science and engineering have grown synergistically with humanity. Science and engineering, with

their range of sub-disciplines, have been important contributors to humankind's survival and to the improvement of our quality of life.¹ The complexity of the problems faced by humanity today, however, demands an interdisciplinary approach and an emphasis on sustainable development. Sustainable development is development that meets present needs without compromising future generations' ability to meet their own needs. This requires balancing environmental, social, and economic considerations.¹⁰ While science and engineering can provide effective solutions to many problems, partnerships must be built with multiple stakeholders (e.g., governments, universities, museums, professional bodies, private and public actors, non-governmental organizations) in order to design and implement effective solutions for sustainable development.

According to Irina Bokova, Director-General of the UN Educational, Scientific, and Cultural Organization (UNESCO), Sciences, Technology, and Innovation (STI) provide key answers to build peace and bolster sustainable development. The World Federation of Engineering Organizations (WFEO) has done an outstanding job in many areas of engineering. These include but are not limited to the UN's Sustainable Development Goals in the areas of energy, water, standards, ethics, code of practice, and information.²⁻⁹ Other non-governmental organizations, industry and governments need to increase their contributions to building sustainable solutions to the problem.

The lack of professionals working in science and engineering is another aspect of the problem. Professionals are needed to identify the problems and design and implement the solutions. National and international partnerships can help increase funding for the training and professional development of professionals in these fields.

THE PROBLEM

Successful sustainable development requires partnerships between institutions, governments, and agencies. Current efforts to incorporate sustainable development programs and solutions often focus on only one aspect of the problem because they come from individual institutions, governments, or agencies. There is, currently, a global shortage of well qualified scientists and engineers who can design, build and maintain sustainable development plans and structures.

THE MOST EFFECTIVE SOLUTION

Science and engineering can provide safe and economical solutions for humanity in ever changing environments using a wide variety of materials, processes, and design strategies. These disciplines can stimulate sustainable socioeconomic development when they address basic human needs, alleviate poverty, promote secure and sustainable development, respond to emergency situations, reconstruct infrastructure, bridge the knowledge divide, and profit intercultural cooperation.^{1, 11} This can happen only if there are enough qualified, competent professionals to do the work.

Science and engineering educators and practitioners alone, however, cannot solve the problem of insufficient, qualified professionals. The global shortage of well qualified scientists, engineers, and technologists could be reduced if governments, policy makers, and educational institutions educate and train more people in these professions. These organizations and institutions should also establish professional, life-long training to improve professional competencies and innovative capacities. Science and engineering education should be modified, focusing on innovation and problem based interdisciplinary learning to meet the changing needs of the industry.¹² An excellent example of this is building smart cities for future sustainability.¹³ These sectors' capacity building should be significantly increased to achieve sustainable development.¹⁴⁻²⁰

Governments should increase funding for these efforts while working in coordination with other stakeholders. Global partnerships should also strive to significantly strengthen work force and geographic diversity in science and engineering. Special focus must be placed on participation by women professionals and professionals from Least Developed Nations.²¹⁻³¹

It is no longer appropriate or realistic for each discipline, organization, government or institution to work in isolation. Partnerships must be established to provide sustainable solutions to humanity's complex problems.

CONCLUSIONS

- 1) The foremost problem facing humanity today is sustaining human development and preserving the planet.
- 2) Science and engineering provide the most effective solutions to sustaining human development and preserving the planet.
- 3) Developing effective partnerships consisting of all stakeholders in science and engineering is important for establishing sustainable human development and preserving the planet.
- 4) The global shortage of well qualified scientists, engineers, and technologists can be solved if governments, policy makers, and educational institutions educate and train more people.
- 5) Partnerships should establish professional, life-long training at all stages of people's professional lives to significantly improve their professional competencies

and innovative capacities.

- 6) Global partnerships should work to significantly strengthen gender and geographical diversity in science and engineering.

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