Engineering Education as a logical Body for modern generalist Professionals

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Abstract *— The development of telecommunications and information technology led to the fast growth of global activities absorbing the large-scale use of continuously changing technology and related updating research. This fact extended the career of the Engineer away from traditional areas like construction, urban infra-structure, or industry related technology and production to new challenges such as urbanization, education, logistic, environment and deal with subjects as distant to the traditional engineer as safety, entrepreneurship, poverty or even corruption. The new professional needs encompass competencies like technical and scientific knowledge, managerial skills and the comprehension of cultural aspects. The global economy is visible to the engineer by the new production mechanisms; across the border exchange of materials, products and information; job migration and also the continuous change of the industry market share, even in places distant from the original area of production. Engineers became engines of globalization and face challenges that are far beyond the technical and scientific aspects that characterized the profession of engineers in the last decades of the past century. This paper discuss the necessary changing aspects of Engineering Education led by the new realities, the categories of the needed competencies to be a competitive and socially responsible professional, and possible mechanisms to form a modern professional. The formation of the new Engineer is presented as a logical body that is necessary for any modern professional, even the one that will necessarily tackle activities a while ago not related to the profession of Engineer. Essentially, the new engineer is characterized as a problem solver, working on technology-based problems in a social, economic, ecological and political environment. In this context, technology is seen as a social practice that needs logical, mathematical and physical modeling, besides the development of systematic methodologies, software, algorithms, or physical devices to be improved, under criteria to be given or to be discussed within market realities. The production and use of technology defines new activities and professional functions, which are distinct from the ones to be performed by lawyers, physicians, educators and other professionals, in spite of eventual team working. This paper presents also a holistic vision of some aspects of the curriculum of Schools of Engineering as well as educational tools that must be taken into consideration when this new breed of cross-disciplinary professional is educated within Schools of Engineering. Since the professional activities became very distinct along ones lifetime, professional titles could be also distinct from the name of the Higher Education title obtained in the School, and, on the other hand, the new competencies taught in the School of Engineering became relevant for a new breed of generalist professional not directly interested in the title of Engineer. A brief discussion is also conducted on the delicate question that a professional that is an Engineer with these extended activities could hardly be classified as Electrical, Civil, Mechanical or any other traditional denomination. The posed questions should be discussed within professional organizations and even accreditation boards.*

Index Terms *— Engineering Education, Logical Body, Modern Professionals.*