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CHALLENGES FOR THE THIRD MILLENNIUM

Lights and shadows on the sySTEM

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ABSTRACT

“Change is hard [...]. But it’s worth it – and it’s working”. Thus ended Barack Obama’s section on education in the 2014 State of the Union address, after asserting that high school teachers from a number of states were making great progress when preparing their students for the new capabilities required by the new economy: problem solving, critical thinking, science, technology, engineering and mathematics. His words were followed by an announcement of a 2.9 billion USD investment for 2015 (a 3.7 % increase compared to 2014) in programs devoted to encourage training in the fields of science, technology, engineering and mathematics (summarized in the acronym STEM). The goal for the upcoming decade is to prepare 100,000 excellent teachers to obtain 1 million STEM graduations. What kind of problem has brought the first world economy to promote this initiative?

Every 20 or 30 years, matching successive revolutions or technological waves, societies in the most developed countries receive alarming messages about the risk posed by the available engineering pool not being able to satisfy demands by industry and research. After the recent wave, where digital networks, TIC and biotech have played leading roles, reaching its maximum in the year 2000, a new one is being announced associated to sustainable engineering, nanotechnology, renewable energies, fight against inequality, and biomimetism; its peak will be reached in the 2020 to 2025 period. Consequently, once again the alarm is ringing about the need to count upon enough engineers or STEM graduates in general to answer to the new challenge. This is why numerous reports commissioned by different governments and prestigious institutions have appeared, and all of them concur in forecasting a strong increase in the engineering demand for the upcoming years. Nevertheless, secondary education students’ vocations in most developed country drift away from engineering degrees, slowly but firmly. This observation, valid also in Spain, calls for a careful analysis and constitutes the essence of this paper.