

I. Source

May 9-10, 2013 Workshop Report, Arlington, VA, Hosted by the American Society for Engineering Education and sponsored by the National Science Foundation

II. Credibility of Source

The report is the work of a cross-disciplinary team of twenty-eight industry reps plus eight academics over two days. ASEE and NSF are highly credible sources.

III. Summary of Content and Conclusions

The results of the workshop are voluminous and hard to summarize in a few paragraphs. It is recommended that interested parties read the entire document but especially the pre and post surveys summarized in the appendices. ASEE launched a series of meetings to develop a new strategy for undergraduate engineering education that meets the needs of industry in the 21st century. It aims to produce a clear understanding of the qualities engineering graduates should possess and to promote changes in curricula, pedagogy, and academic culture needed to instill those qualities in the coming generation of engineers. A multi-year sequence of four meetings is planned to end with a large workshop in 2018.

The target is a T-shaped engineering graduate who brings broad knowledge across domains and the ability to collaborate within a diverse workforce as well as deep expertise within a single domain. Industry still values a solid foundation in math and science, although the relative importance of math may diminish slightly in the years ahead. Students must have a sufficient grasp of these fundamentals to understand the dimensions of a problem without relying on models. That foundation should incorporate programming, systems thinking and ability to use relevant tools. Less well-defined but necessary, in the view of many participants, are good communication skills, persistence, curious learning capability, drive and motivation, economics and business acumen, high ethical standards, critical thinking, and willingness to take calculated risks.

To instill these skills and qualities in future engineers, changes in approach will be required by academe and industry, participants agreed.

Universities will need to adjust faculty reward structures to place more of a premium on teaching, promote more cross-disciplinary instruction, and welcome involvement by industry in supplying case studies, mentorship of students, and shared laboratory experiences. For its part, industry will need to recognize a shared responsibility in developing T-shaped engineers.

The workshop produced numerous concrete suggestions of ways industry and academe could collaborate – from faculty internships in industry to company involvement in authentic learning experiences that occur before traditional capstone projects. A post-workshop survey asked participants to assign principal responsibility for development of 36 Knowledge, Skills, and Abilities traits(KSAs) to each or some combination of the following: students; parents and home; academia (K-12 and universities); industry; and government. Apart from education in hard sciences and engineering fundamentals – a responsibility of academia – most KSAs required that two or more parties play a role. Respondents, for the most part, saw only a modest role for government in developing these KSAs. Detailed survey results with an detailed enumeration of KSAs can be found in the appendices of the report.

IV. Relevance to the Department of ECE

This report is especially relevant to the Department.

V. Recommendations for the Department or the IAB

First it is recommended that all board members and all faculty read this report and the survey results. Second it is recommended that someone be assigned responsibility to track down the reports from the three subsequent workshops alluded to in this report that may have taken place. Third, it might be a good idea to explore the possibility for active department participation in the scheduled workshops that have not taken place yet.

VI. Contact Information

Verret@IEEE.org

The full article can be found here:

https://www.asee.org/TUEE_PhaseI_WorkshopReport.pdf