Review of: "Why Engineering Education is Losing Charm among Students in India? A Discussion"

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Because I mainly am concerned with undergraduate engineering education in the US, I found this paper about India interesting. If I were a student in India, and looked at the success rate of students entering engineering, which is about 50%, and the employment rate, which is below 30%, coupled with the expense, I would be discouraged from undertaking an engineering degree as well. But I am not sure that the solution to these issues is to increase the number of students going into engineering. In the US we produce about 145,000 bachelor's degree engineers per year (not counting computer scientists) according to the ASEE report Engineering by the Numbers, which is freely available online. India's population is about 4 times the US population, so a comparable number of BS engineers would be about 600,000, and that's just about where India is. I would say that there are still too many engineering schools, and that the capacity should be reduced, which may happen naturally as students gravitate toward the better schools. Then I would expect the graduation rate and the employment rate to both rise, and that in turn will encourage more students. It is not a fast process, but I expect that things will stabilize at an appropriate level.

I can't imagine that the rapid growth in the 90's allowed for the hiring of qualified faculty at all schools who knew how to use the best evidence-based methods of engineering education. Our experience is that PhD students are rarely taught anything about teaching even now. So it is worth considering the extent to which the large attrition of students is due to outdated teaching methods, and if there is any real evidence about this, it would be good to include it in the paper. This could be too much reliance on presentation, which is easier for faculty, and not enough hands-on problem solving (especially open-ended problems) or formative feedback. It could also be insufficient attention to the topics in column 1 of table 3, which some engineering faculty may de-emphasize in the belief that many specific engineering topics have to be covered, and the feeling that they are not qualified to teach communication skills. But as the author rightly points out, the lasting value of an engineer is in those topics in the first column, often called soft skills, plus one other thing that I would add, which is the motivation and ability to learn on one's own - life-long learning it is called by the US engineering accreditation agency ABET. The technical topics will change during the engineer's career. And those soft skills cannot be separated from the engineering content, but need to be taught in an engineering context. In terms of engineering content, what we have found is that statistics and data analysis are more important than anything else.

I would suggest that another strategy for the future would be for each engineering department at each engineering school to engage members of industry and their own successful alumni in advisory boards. I have seen in the US that this can have a big impact both on undergraduate curriculum and on the understanding within industry about what an engineer

from a given department is actually capable of.

I also agree with another reviewer who thought that engineering needs to be sold to students on the basis that the will play critical roles in solving societal problems and helping humanity with the many challenges we face. Of course this involves technology, but that's the method, not the goal in itself. That needs to be kept in front as a major motivator. This messaging is best controlled by each engineering school, which needs some resources for that type of marketing, to bring this back to economics!