EDITORIAL

Support Your Local Undergraduate Programs, Students and Educators

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Some of you might suspect that this editorial is a plea for money since it appears in the December issue. Fear not, that is not the case! Instead, I will be appealing for your goodwill and guidance in helping our undergraduates (and future builders and leaders of our society). It might seem that I am preaching from the high tower of academe. Well, someone has to do it . . . in fact, I have worn a few hats in the education community: a practicing engineer (4 years), an educator (25 years) and an evaluator of academic programs (over 5 years).

Some of the topics covered by this magazine are often left to graduate education programs in engineering and specialized continuing education courses beyond the undergraduate programs in engineering, applied sciences or architecture. In fact, various professional societies, instrumentation companies, universities and the like offer many, many short courses for practicing engineers that help fill the demand for more knowledge (or tricks) needed to solve specific noise and vibration control or measurement problems. People often ask: Why were these issues not discussed in the B.S. degree program? Most undergraduate programs barely touch upon acoustics, vibrations, modal analysis and so on.

The question arises: What are we really teaching at the undergraduate level in engineering, physics, mathematics, architecture and related subjects? First, consider that most undergraduate programs have trimmed down the credit hour limits to graduate; the threshold is now about 120 semester-hours. This is partly to satisfy the demand of parents: Why can't Johnny (or Jane) graduate in 4 years? Additionally, accreditation programs such as ABET (Accreditation Board for Engineering & Technology) in engineering www.abet.org have required a checklist of engineering fundamentals that must be met, though there is more room now to be innovative, introducing elements of real-world application in the curricula (disclosure: I have been an ABET evaluator in mechanical engineering). Additionally, many of the S&V topics demand exposure to expensive instrumentation or software, and many programs cannot afford such laboratory experiments.

I have suggestions for those in industry, business or government who would like to address these problems. Consider volunteering time helping educators – I know we are all busy and sometimes bosses may frown upon frivolous activities, but finding time to help the future generation is a worthy pursuit.

Please contact your local educational institution(s). It need not be a full-fledged research institution (nor exhibit high rankings in the ESPN or AP polls in whatever college sports you may follow). One could even start with high school programs where laboratory science courses (such as physics, chemistry, etc.) are taught. We should motivate high school students to pursue careers in engineering or applied sciences. Invite them for a field trip. Show them role models. Counsel them in terms of future career possibilities in the engineering or applied sciences fields – even as professional counselors steer students towards liberal arts programs. (I have nothing against such programs but we in engineering deserve our fair share of a limited number of bright and gifted students.)

Next, consider physics and math courses in the first years of a typical B.S. degree. For instance, there is opportunity to supplement theory with practical examples – including experimental or computational demonstrations in the mechanics and waves portions of standard physics courses. Calculus or statistics teachers often look for real-life examples of various techniques and formulas. Further, there are opportunities to interact with engineering professors in courses including dynamic systems, vibrations, measurements, signal processing, controls, structural/mechanical, aerospace design, etc. Other instructors seek open-ended problems and mini-course projects. Invite students for tours of laboratories, computational facilities and manufacturing plants. Show them how fundamentals could be applied. Likewise, if possible, arrange free tickets for students to attend an equipment or instrumentation show. Exhibitors (and your vendors) would enjoy having them around. Some students may even volunteer to help collect tickets and/or set up demonstrations.

Finally, the most important elements of your involvement could come in capstone courses: final year project courses addressing the design, experimentation or manufacturing aspects of a specific problem. Teachers are often looking for high-quality senior design topics and assistance from practicing engineers in terms of suggested methods, solutions and interdisciplinary approaches. In these courses, it is possible to integrate elements of safety, economics, ethics, environmental issues, global competition, etc. Consider providing a personal perspective in addition to cut and dry statements on ethics and professionalism. For example, I have invited experts from local industry to discuss electrical safety, interactions between the power generation company and community, and relationships between aerospace system integrators and suppliers.

Please do not confine yourself to the suggestions listed above. There is plenty of room to accommodate any topic you may think is relevant, including your own "war stories." Support your local educators and help raise the proficiency of the next generation of community leaders, especially in the topics of noise and vibration control; structural analysis including FEM, BEM and multi-body dynamics codes; dynamic measurements; and machinery health monitoring. It takes a village to educate undergraduates. SV

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