Evolving Needs for an Improved Engineering Design Education

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Numerous discussions have taken place in recent years in Canada between industry and academia on the need for more input on engineering design education. Typically, industry representatives have indicated satisfaction with the level of basic science education and problem solving capability in existing baccalaureate engineering degree programs. The most dissatisfaction has focused on the “soft” skills of interpersonal relationships, communications skills and a dearth of skill levels in software designs tools (CAD, CAM, CAE).

Canadian engineering schools have responded fairly quickly with some minor curriculum changes that have emphasized presentational elements within project-oriented courses, as well as additional electives in liberal arts or business programs to broaden the exposure of undergraduate students to more diverse subject matter. A few universities have approached responding to these industry voices with more strategic approaches, such as Waterloo’s professional development engineering courses (PDEng), which are delivered via untraditional teaching channels, i.e. web-based.

In the short term, these sorts of immediate curriculum responses have been moderately effective in improving communication skills. However, industry is now beginning to realize that there are still shortfalls, or gaps, in the competencies being demonstrated by new engineering graduates. While these engineering graduates are competent enough in many problem-solving skills, they still exhibit difficulties in their capability to learn to seek out new information from non-engineers/customers to define design parameters, to clearly grasp the design process, and how to improve their productivity through systematic creativity and innovation.

This presentation will identify some of the experiences GM of Canada has had with turning around the driving motivation with otherwise creative engineering staff, to re-energize these professionals with the opportunity to achieve meaningful professional and personal growth while making significant innovations in product and process design in the Canadian organization. The effort identified in this evolutionary process has great ramifications to Canada’s engineering schools and their curricula. The greatest challenge to making these modifications is significant – nothing less than sustained cultural change by the leaders and role models in the entire engineering organization.