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Implementing an Industrial Approach into Physics Graduate Education

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Physics graduate education has attracted a student population with a both high independence and interest in individual professional work. These personality tendencies have been validated in the students' eyes by both the observed professional behaviors of the majority of their faculty, and by the public acceptance of the persona of "eccentric but brilliant" physics students. This has resulted in a self-perpetuating cycle of professionals entering the academic workplace whose interest in whole-organization optimization, as well as the skills needed to optimize organizations, are low to non-existent. But at the same time the needs of the country's technical work force, as defined by national gatherings of prominent leaders from academic, industrial, and governmental communities, continue to list human interaction "soft skills" as one of the most important professional traits needed by professionals in their careers. This gap between the physics graduate education and requirements needed by next generation physicists provided an opportunity for experimental approaches to graduate physics education. The University of Arkansas' Physics Department lead the formation of a new experimental approach to interdisciplinary education in the broad field of microelectronics and photonics (microEP) in 1998, resulting in the formation of a stand-alone MS/PhD microEP program. This program implemented an industrial work group approach to graduate education, and won several educational grants including a NSF IGERT and a Department of Education FIPSE. The FIPSE grant in 2001 supported the modification of the industrial work group approach for implementation by the UA physics graduate program to address the gap between national need and current education. This talk will address the key goals of this implementation, the tactics that were put in place to address the goals, and the results of this educational approach since its implementation with the Fall 2001 entering class.