



Quality 'STEMs' from the Planning Process at the University of Wisconsin-Stout

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The University of Wisconsin-Stout, a campus of more than 9,000 students in west-central Wisconsin, has made a deliberate effort to increase the number of students majoring in science, technology, engineering and mathematics (STEM) fields. This initiative is the result of an inclusive, comprehensive approach to strategic planning that has been used at UW-Stout for more than a decade. The strategic planning process was developed, implemented and refined through the use of the *Baldrige Criteria for Performance Excellence*.

This inclusive process includes developing five-year goals, two-year priorities and annual action plans aligned with the university's mission, vision and values. The planning process is designed to balance short and long-term challenges and opportunities, as well as all key stakeholders' needs. Each year, more than 300 faculty, staff, students and external stakeholders provide input to the process through a series of campus listening sessions. Every six months, UW-Stout's strategic planning group formally monitors and evaluates all action plans and university priorities.

The initiative to increase enrollment in STEM fields was developed from two university priorities related to enrollment management and academic program array expansion. The STEM initiative includes several components: administrative realignment, new program development and a focused student recruitment initiative. In 2007, the academic departments were reorganized, and all of the programs dealing with STEM were placed into the new STEM College.

The STEM College was created so similar programs, departments and disciplines would be able to address common issues, share curricula and resources, develop new programs, maximize capabilities, minimize duplication and work under common leadership. It was also created to allow the university to capitalize on trends and opportunities that have emerged throughout the past decade and position the campus for growth, including the growth of STEM as a concept in education, research and industry. It was also believed this new structure would strengthen UW-Stout's mission and polytechnic identity, and position UW-Stout among its national peers.

STEM academic programs

New undergraduate programs were developed that would build on UW-Stout's existing
ASQ Higher Education Brief February 2011 (Vol. 4, No. 1)

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program array and serve the needs of employers and students. Over the past four years, UW-Stout has implemented several new STEM majors, including cognitive science, computer game design and development, computer engineering, information and communication technologies, plastics engineering, science education and sustainable management. The information and communication technologies and sustainable management programs are offered as online degree-completion programs for adult learners.

New master's degree programs are being developed in industrial and applied mathematics and biomedical sciences. The university is able to launch new programs during a period of restricted resources through a number of strategies:

- Expanding existing subprograms, such as computer game design and development, into standalone majors.
- Receiving state funding to expand engineering programs in western Wisconsin.
- Receiving industry support for laboratory equipment.
- Charging increased tuition for online degree completion and graduate programs.

STEM student recruitment

A systematic student recruitment plan was developed that provides students with exposure to STEM fields as early as middle school. The Summer Technology and Engineering Preview (STEPS) camp is held annually for middle-school girls to spend a week at the UW-Stout campus engaging in hands-on activities in STEM areas. An advanced STEPS camp continues the experience for high-school girls. Originating at UW-Stout, the STEPS program has now been replicated nationwide through the Society of Manufacturing Engineers Education Foundation.

A STEM career day is held annually for high school students to tour campus, sit in on classes and take part in laboratory activities. Students and their parents can also participate in UW-Stout's extensive campus visitation program or attend a Stout Saturday program to learn about all UW-Stout majors. A STEM recruiter works with area and regional high schools and community colleges to bring groups of potential STEM majors to campus.

UW-Stout also participates in Project Lead the Way (PLTW), a national program that prepares students to be the most innovative and productive leaders in STEM fields and to make meaningful, pioneering contributions to the global society. PLTW partners with middle schools



and high schools to provide a rigorous, relevant STEM education through an engaging, hands-on curriculum. UW-Stout accepts selected PLTW high-school courses as equivalent to other college preparation courses, and UW-Stout certifies PLTW instructors through a series of specialized courses in its technology education program.

UW-Stout hosts several annual state and regional competitions for high-school students in STEM-related areas, including a Rube Goldberg Contest, a Skills USA Competition, a regional First Lego League Tournament, a Science Olympiad competition and a Supermileage Vehicle competition. The competitive STEM Scholars program provides generous scholarships for high-achieving students majoring in STEM fields, and the STEM Stars program provides scholarships for qualified students enrolled in the applied science program. The university also provides polytechnic scholarships, as well as numerous scholarships for students in specific STEM majors that are funded through alumni, employers and professional associations.

Through a comprehensive enrollment management system, freshman and transfer student applications and acceptances are tracked weekly against established enrollment targets. Over the past five years, the resulting enrollment increases in the STEM majors have been impressive. For example, enrollment in the applied science program increased from 104 students in the fall of 2006 to 272 students in the fall of 2010 (see below). Enrollment in the manufacturing engineering program increased from 116 students to 216 students during that same time period. The computer game design and development program, now in its second year, has 126 students enrolled, and the computer engineering program, also in its second year, has 77 students enrolled. The number of transfer students from two-year colleges into UW-Stout's STEM majors has also been increasing steadily over the past five years.

School year	Applied science program enrollments
2006-07	104
2007-08	109
2008-09	141
2009-10	195
2010-11	272



Retaining, graduating STEM students

UW-Stout maintains a formal retention plan that integrates high-impact practices for students at all levels in an effort to continually improve retention and graduation rates. Freshmen are involved in learning communities in which students are co-enrolled in specific courses and can also live together on a single residence hall floor. Green Living, Applied Science and the Google Generation are learning communities that are attractive to STEM students. Sophomore and juniors are involved in experiential learning activities, including cooperative education, internships, practicum, field studies and student teaching. Nearly 90% of UW-Stout graduates have completed a formal experiential learning experience. Students at all levels participate in undergraduate research, community service and serving learning at rates higher than their peers. The number of students studying or completing a cooperative education experience abroad is steadily increasing.

The Portals of Discovery Project is an National Science Foundation-funded collaborative effort between UW-Stout and the UW universities designed to increase the number of STEM graduates in Wisconsin. This project is helping create a seamless pipeline of STEM students bridging high schools, two-year colleges and four-year colleges through the integration of research and mentoring experiences. Through this project, mentoring teams of faculty and students have been established. The project focuses on outreach to underrepresented students and the development of new curricula, which will increase STEM skill sets early in a student's college career, including early opportunities for faculty-student research.

To prepare students for STEM careers, UW-Stout provides comprehensive career services, including assisting students in identifying co-op or internship opportunities, creating resumes and practicing interviewing skills. UW-Stout hosts the largest annual career conference in the Midwest and boasts a graduate job-placement rate of more than 95% throughout the past decade. According to a recent young alumni survey conducted by the American Council on Education, more than 90% of UW-Stout graduates reported that they were effectively prepared with the knowledge and skills they needed at graduation. Nationally, 81% of alumni reported the same. Employer satisfaction with graduates, as measured by an employer follow-up survey, also remains high.

UW-Stout has been using the *Baldrige Criteria for Performance Excellence* for more than a decade to achieve institutional goals and improve performance. These criteria include an



inclusive strategic planning process, a comprehensive understanding of student and stakeholder needs and expectations, and systematic processes, including processes for integrated enrollment management, student recruitment and student retention. UW-Stout's success in increasing the numbers of STEM students is a direct result of using the Baldrige criteria and is evidence of how the criteria can be used to improve institutional performance.

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