2009 AQIP Systems Portfolio

Table of Contents
Overview .............................................................................................................................................. 1
Category 1 Helping Students Learn ...................................................................................................... 11
Category 2 Accomplishing Other Distinctive Objectives ................................................................. 29
Category 3 Understanding Students' and Other Stakeholders' Needs .............................................. 38
Category 4 Valuing People .................................................................................................................. 48
Category 5 Leading and Communicating .......................................................................................... 58
Category 6 Supporting Institutional Operations ................................................................................ 64
Category 7 Measuring Effectiveness .................................................................................................. 72
Category 8 Planning Continuous Improvement ................................................................................ 77
Category 9 Building Collaborative Relationships ............................................................................ 87
Index to Accreditation Criteria ........................................................................................................ 95

List of Tables
Table O.1 Certificates, Minors, and Degrees Offered by School and College ........................................ 3
Table 1.1 CoE Student Self Assessment of Program Outcomes .......................................................... 22
Table 1.2 SME Certification Test Results for SoT MET Graduates .................................................... 23
Table 1.3 Results of 2008 Senior Exit Survey: Michigan Tech and All Institutions ........................... 26
Table 1.4 Results of 2008 Fundamentals of Engineering Examination ............................................ 26
Table 1.5 Placement of Graduates .................................................................................................... 27
Table 2.1 Michigan Tech’s NSF Research Rankings ......................................................................... 34
Table 3.1 Measures of Michigan Tech Alumni Satisfaction ............................................................. 45
Table 4.1 Average Responses to Selected Climate Survey Questions .......................................... 54
Table 4.2 Injury Data per 100 FTE .................................................................................................... 55
Table 8.1 College of Engineering Comparison Metrics: PhD Degrees Granted ............................ 84
Table 8.2 College of Engineering Comparison Metrics: BS Degrees Granted ............................ 84

List of Figures
Figure O.1 Student enrollment (undergraduate and graduate) in fall 2008 by college/school .......... 2
Figure O.2 Overall organizational structure ......................................................................................... 6
Figure O.3 Academic organizational structure ................................................................................... 7
Figure 1.1 "Binder Process" to add, drop, or change a course ............................................................... 13
Figure 1.2 Program approval process ................................................................................................ 13
Figure 1.3 Results of attitudinal survey taken by students upon completion of Perspectives of Inquiry ............................................................................................................................ 21
Figure 1.4 Results of the assessment of student portfolios from the Spring 2008 offering of Revisions ....................................................................................................................................... 22
Figure 1.5 On-campus recruitment measures ..................................................................................... 23
Figure 1.6 Graduate placement by category for 2005 through 2008 ................................................. 23
Figure 1.7 Average of scaled responses for undergraduate and graduate students from the annual student satisfaction survey ........................................................................................................ 24
Figure 1.8 Average of scaled responses for undergraduate and graduate students from the annual student satisfaction survey ........................................................................................................ 24
Figure 1.9 Results of Physics major field test ..................................................................................... 25
Figure 1.10 Results of Chemistry major field test ............................................................................ 25

Michigan Technological University
June 2009

i
Figure 2.1 Proposals submitted and awards received for FY05 to FY08 ..................................................31
Figure 2.2 Number of research centers and institutes and their research expenditures for FY05 to FY08 ..........................................................31
Figure 2.3 New sponsored program awards and federal awards received in millions ..........32
Figure 2.4 Funding sources for FY08 new sponsored program awards in millions ...............32
Figure 2.5 Graduate student enrollment from 2005 to 2008 by program ........................................32
Figure 2.6 Percentage of students enrolled in doctoral programs that are externally supported..........................................................32
Figure 2.7 Michigan Tech technology transfer results for 2003 to 2006 ........................................33
Figure 2.8 Ethnicity of youth programs participants in 2008 .......................................................33
Figure 2.9 Gender of youth program participants in 2008 .......................................................33
Figure 2.10 Funding sources for the 2008 youth programs ...............................................34
Figure 2.11 Percentage enrollment for each youth program by high school graduation year ....34
Figure 2.12 Comparison of total research expenditures in millions with institutions in Michigan and the US .........................................................34
Figure 2.13 Comparison of technology transfer measures to selected Michigan and US institutions ................................................................................35
Figure 2.14 Comparison of 2006 NSSE results ........................................................................35
Figure 3.1 Undergraduate enrollment yields and retention rates ........................................43
Figure 3.2 Results from the annual student satisfaction survey indicating the overall level of undergraduate and graduate student satisfaction .............................................43
Figure 3.3 Library usage statistics for 2005 to 2008 .........................................................44
Figure 3.4 Results from the annual student satisfaction survey indicating the type of relationship the undergraduate and graduate students have with the university .................................................................44
Figure 3.5 Donations to the Parents Fund for the past four years ................................................46
Figure 3.6 Comparison of retention rates at Michigan Tech to those of other Michigan institutions and national public and private institutions .................................................46
Figure 4.1 Histogram of responses from hourly staff, faculty, and professional staff to a question about work/life balance from the 2005 climate survey ........................................54
Figure 4.2 Histogram of responses from faculty and professional staff to questions of overall satisfaction and support for professional goals from the 2005 climate survey ..........................................................55
Figure 5.1 Average ratings of the president’s performance from annual evaluation ..................62
Figure 5.2 Average of scaled responses indicating agreement with statements about the president’s performance from annual evaluation .....................................................63
Figure 6.1 Average of scaled responses for undergraduate and graduate students from the annual student satisfaction survey ..................................................68
Figure 6.2 Average of scaled responses for undergraduate and graduate students from the annual student satisfaction survey ..................................................69
Figure 6.3 Average of scaled responses for undergraduate and graduate students from the annual student satisfaction survey ..................................................69
Figure 6.4 Student rating of facility upgrades to the SDC Multipurpose Room (exercise facility) and the JR Van Pelt/Opie Library .........................................................69
Figure 6.5 Percentage of transactions taking place through direct deposit by subgroup; employee reimbursement, students, and vendors ............................................70
Figure 8.1 Incoming student average ACT composite, math, and English scores for the fall of 2005 to the fall of 2008 .................................................................81
Figure 8.2 Incoming student average ACT composite, math, and English scores for the fall of 2007 and fall of 2008 for College of Engineering and School of Business and Economics ..................................................81
Figure 8.3  Number of PhD degrees awarded by Michigan Tech and for each PhD degree granting unit for the past four academic years ................................................................. 82

Figure 8.4  Sponsored programs new awards (in millions) for Michigan Tech and for the colleges and schools having more than a million dollars in new awards in a given year for a four year period .................................................................................. 82

Figure 8.5  Endowment value (in millions) for Michigan Tech and for the colleges and schools having more than a million dollars in endowment in a given year for a four year period .................................................................................. 83

Figure 8.6  Comparison of Michigan Tech incoming student average ACT composite scores to those for all institutions in Michigan and the Nation ................................................ 84

Figure 8.7  Measurement of the effectiveness of the strategic planning process taken from the 2008 evaluation of the president ........................................................................ 85

Figure 9.1  Number of companies in the SmartZone and the number of students employed by those companies from 2006 to 2009 .............................................................. 92

Figure 9.2  Number of companies recruiting on campus from 2005 through 2008 ............ 92

Figure 9.3  Number of student with co-op assignments from 2005 through 2008 .......... 92

Figure 9.4  Admission and enrollment results for students from high schools with established collaborative relationships ............................................................... 93
Overview

Mission

We prepare students to create the future.

Vision

Michigan Technological University will grow as a premier research university of international stature, delivering education, new knowledge, and innovation for the needs of our technological world.

The Michigan Tech Plan

The Michigan Tech Plan, our university strategic plan, focuses on great people; distinctive programs; and innovative research and creative work. It has evolved from a working to a living document that is reviewed and updated regularly, discussed frequently, and implemented daily. The two-page plan is located at http://www.mtu.edu/stratplan/.

Michigan Technological University

Michigan Tech was founded in 1885 in response to the first mining boom in the US – the clamor for Michigan’s copper, which preceded the California Gold Rush by several years.

At the outset, the college trained mining and metallurgical engineers. Today Michigan Tech is poised to support the new economy that will be the foundation of a strong future for the state and the nation. The university offers certificates, associate, bachelors, masters, and doctoral degrees in arts, humanities, and social science; business and economics; computing; engineering, forestry and environmental science; sciences; and technology.

Michigan Tech undergraduates benefit from an education that emphasizes study across disciplines, team learning, and research. Our graduate students receive intensive, advanced instruction and the opportunity to pursue research in a wide range of academic programs. Overall, our institution has gained worldwide attention for innovative education; our faculty members strive to be mentors; our academic programs stress learning hand in hand with application; and our students learn to inquire and discover knowledge.

The rigors of an education at Michigan Tech are complemented by its unique and tranquil setting. Houghton lies in the heart of Upper Michigan’s scenic Keweenaw Peninsula. The campus overlooks Portage Lake, a long, winding ribbon of water that divides the Keweenaw in half. Just a few miles from campus, on either end of the Portage, lies Lake Superior, a majestic body of water.

Upper Michigan’s expansive waters and forest offer students unparalleled opportunity for outdoor recreation, such as hunting, fishing, backpacking, hiking, camping, boating, swimming, snowshoeing, and skiing. The university owns an eighteen-hole golf course and both downhill and cross-country ski areas. It also has a full array of men’s and women’s Division II sports programs plus Division I men’s ice hockey.
Houghton, rated tenth-safest college town in the nation and the safest in Michigan, is part of the Houghton-Hancock twin-city center of approximately 12,000 residents. The university’s more than 6000 students from many states and foreign countries make the area a vibrant, multicultural community. Houghton is home to many exciting cultural activities, from Bridgefest, a summer event commemorating the building of the Portage Lake Lift Bridge connecting the two communities, to the annual Parade of Nations, a celebration of Michigan Tech’s diversity.

Michigan Tech is a relatively small institution, with approximately 6000 undergraduate and 1000 graduate students, and is ranked in the top tier of national universities according to US News & World Report “America’s Best Colleges 2009.” The majority of our students are pursuing degrees in the sciences, mathematics, engineering, and technology, or STEM, fields as indicated in Figure O.1. As one of 15 state supported institutions, the majority (66.5%) of our students are residents of the state of Michigan, 21.8% are residents of other states, and 11.7% are international. Our annual expenditures of approximately $185M are divided almost equally between funding received from our state appropriation (25%), tuition and fees (26%), grants and contracts (22%), and auxiliary and other revenues (27%).

**Figure O.1:** Student enrollment (undergraduate and graduate) in fall of 2008 by college/school.

Michigan Tech’s goals for student learning and shaping an academic climate are clearly stated in our strategic plan (Goal 2):

- Deliver a distinctive and rigorous discovery-based learning experience grounded in science, engineering, technology, sustainability, and the business of innovation.
- Provide dynamic experiential learning that integrates instruction, research, and innovation in undergraduate and graduate programs.
- Develop undergraduate and graduate programs in new and emerging areas.
- Provide exemplary student life activities.

Strategies to achieve this goal and the three associated subgoals have been identified and are publically stated.

Michigan Tech offers certificates, minors, and associate, bachelors, masters, and doctoral degrees through our colleges and schools as shown in Table O.1. A complete listing is available at [http://www.mtu.edu/majors/](http://www.mtu.edu/majors/). Ten undergraduate programs in the College of Engineering and three in the School of Technology are accredited by ABET (Accreditation Board for Engineering and Technology, Inc.). AACSB (Association to Advance Collegiate Schools of Business) accredits our BSBA degree offered by the School of Business and Economics, SAF (Society of American Foresters) accredits the forestry program, and fourth year instruction in the 3+1 clinical laboratory science option is conducted in hospitals accredited by NAACLS (National Accrediting Agency for Clinical Laboratory Sciences). Degrees and interdisciplinary options offered by the Department of Chemistry are certified.
by the ACS (American Chemical Society). In addition, the Michigan Board of Education accredits our teacher certification program.

| Table O.1: Certificates, Minors, and Degrees Offered by School and College |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|
|                             | Certificate | Minor | Associate | Bachelor | Masters | Doctoral |
| CSA                         | X           | X     | X         | X        | X       | X        |
| CoE                         | X           | X     | X         | X        | X       | X        |
| SBE                         | X           | X     |           | X        | X       | X        |
| SFRES                       | X           |       |           | X        | X       | X        |
| SoT                         |             |       |           | X        |         | X        |
| Interdisciplinary           | X           |       |           |          |         |          |

General Education is a requirement for every Michigan Tech undergraduate degree. Its goals are to develop fundamental scholastic habits of careful reading, communication, critical reasoning, balance, analysis and argument; the ability to apply multiple disciplinary perspectives in interpretation, analysis, and creative problem solving; respect for diversity and awareness of complex contexts in study and work; and knowledge of a broad range of topics and disciplines complementary to the major. The General Education curriculum is made up of the following requirements: four core courses (Perspective on Inquiry, World Cultures, Revisions, and Institutions), a humanities, arts, and social sciences (HASS) requirement of 15 credits, a science, technology, engineering and math (STEM) requirement of 16 credits, and co-curricular courses/activities.

Students have the option of customizing their degree program through a number of curricular options. These include the Honors Institute, Enterprise Program, Pavlis Institute for Global Technological Leadership, co-operative education, research opportunities for undergraduates, and international experiences. Michigan Tech also has more Peace Corps Master’s International programs and participants than any other university in the US.

A number of educational systems, services, and technologies support our instructional programs. They include the JR Van Pelt/Opie Library, Career Center, eight Learning Centers, ExSEL, COMPASS (Center for Orientation, Mentoring, Parents, and Academic Student Success), learning communities, computer labs, and an extensive wired and wireless network.

**02 Key organizational services provided to students and other external stakeholders and programs to achieve them**

Michigan Tech provides a number of services, other than instructional programs, to students and other external stakeholders. The four that make the greatest contribution to the achievement of our mission and vision are Research, Scholarship, Innovation, and Creative Work; Student and Community Enrichment; Community Outreach; and Economic Development. These objectives contribute to all three goals of the Michigan Tech Plan and to the educational experience of our students.

The university-wide programs that support the development of Research, Scholarship, Innovation, and Creative Work are the most extensive and are administrated by the Office of the Vice President for Research through four offices. The Sponsored Programs Office assists faculty in identifying external sources of funding and coordinating the grant application process. The Sponsored Programs Accounting Office works with other central administrative offices to
assist principal investigators with the administrative functions of their research work. The Office of Research Integrity and Compliance is dedicated to supporting an environment that fosters the responsible conduct of research by promoting the principles of scientific and administrative excellence and compliance with both the letter and the spirit of governing regulations. Technology and Economic Development facilitates connections between Michigan Tech’s research capabilities and prospective industrial partners. In addition, the vice president for research oversees the operation of eight research institutes and 14 research centers that facilitate multi-disciplinary research activities. Research, Scholarship, Innovation, and Creative Work at Michigan Tech is integrally connected to the education of graduate students (and a growing number of our undergraduate students). Therefore programs operated through the Graduate School, including recruitment and retention of graduate students also contribute to the realization of our objectives in this area.

A number of programs contribute to providing Student and Community Enrichment, which due to our location plays an important role in attracting, retaining, and supporting a world-class and diverse faculty, staff, and student population; the first goal in our strategic plan. The Rozsa Center for the Performing Arts is an 1100 seat entertainment complex that is committed to presenting world class performances for Michigan Tech and the surrounding communities. In this facility Michigan Tech provides special programs for area schools, a variety of traveling performances, and productions by the Fine Arts Department. The university runs a number of recreational facilities that take advantage of our superior outdoor environment. These include the Mont Ripley Ski Hill, Portage Lake Golf Course, and Recreational Forest and Nordic Ski Trails. In addition, the Student Development Complex and the Gates Tennis Center offer student, faculty, staff, and the local community a wide range of indoor recreational opportunities.

Community Outreach is of importance to Michigan Tech because of our emphasis on STEM education and the importance of those fields to the promotion of the sustainable economic and social development of Michigan, the nation, and the world (Goal 3 of the Michigan Tech Plan). It is therefore conducted by several individuals and units across campus. There are two primary university-wide outreach efforts. The first is Youth Programs, which provides explorations in careers and knowledge for pre-college students, conducted by Educational Opportunity. These include Summer Youth Explorations, Women in Engineering, Explorations in Engineering, and Women in Computer Science. The other is the YES! Expo, which is a unique collaboration among state agencies, corporations, universities, youth organizations, professional societies, and business development organizations from all parts of Michigan. The goal is to inspire middle- and high school students to pursue education and careers in science and engineering.

The promotion of Economic Development in Michigan and the nation is a strategy that supports achievement of our mission and is explicitly stated in the Michigan Tech Plan. Naturally the programs that support our achievements in Research, Scholarship, Innovation, and Creative Work contribute to this objective. Programs operated by Technology and Economic Development (TED) and our partnership with the Michigan Tech Enterprise (MTEC) Corporation SmartZone directly contribute to achievement of this objective. TED facilitates connections between Michigan Tech’s research capabilities and prospective industrial partners by identifying people, facilities and technologies that can develop unique and innovative solutions to challenging technical problems. The TED office also supports the transfer of knowledge and technology from the Michigan Tech campus to the private sector. MTEC offers programs and services that encourage entrepreneurial development and that help ensure the success of start-ups and small companies. These programs and services include incubators, business development programs, business services, and student programs.
O3 Short- and long-term requirements and expectations of students and other key stakeholders and our primary competitors

In both the short- and long-term our students require a high quality education that is delivered to them efficiently. They expect a friendly and safe campus environment and personal attention from faculty and staff; the typical qualities of a small campus in a small town. At the same time they also expect Michigan Tech to provide the same opportunities and services provided by a larger campus in a more urban location. Their expectation is that upon graduation they will obtain a high paying job that will be the beginning of their successful career. These requirements and expectations are addressed in our vision and mission and in Goal 2 of the Michigan Tech Plan.

As for any institution, Michigan Tech has many stakeholders. In the current context we consider the following; Business and Industry, Parents/Family, Alumni, State, and the Local Community. The short- and long-term requirements and expectations of these stakeholders mirror those of our students, with those of Parents/Family being the most closely aligned. Business and Industry and our Alumni who recruit our graduates require them to not only be highly educated but also able to contribute from day one or be able to “hit the ground running.” This is a quality of our graduates in which Michigan Tech takes great pride. In addition, Business and Industry expects our graduates to have the skills and abilities necessary to contribute throughout their careers in this increasingly global economy. Most of these stakeholders expect us to provide research, scholarship, innovation and creative work that will contribute to the advancement of society locally and globally. These expectations are reflected in Goals 2 and 3 of the Michigan Tech Plan.

Our primary competitors are the other state supported institutions in Michigan, other technological institutions, and public and private institutions in the region. Our list of competitors from among these institutions depends on the specific aspect being considered. For instance, currently our competitors for undergraduate students are peer institutions in our region but for graduate students our competitors can be institutions or businesses anywhere in the world.

O4 Administrative, faculty, and staff human resources and key factors determining their organization and use

In the fall of 2008 Michigan Tech employed 1666 non-student employees; 445 of these are faculty and 1222 are staff. (Administrators are classified as faculty or staff depending on position and reporting requirements.) The gender distribution was approximately 45% female and 55% male. The vast majority of these employees (85%) are declared to be white/non-Hispanic. Of those who declared, the next highest ethnic groups represented among the employees were international (3.7%) and Asian/Asian American/Pacific Islander (3.3%).

Staff are classified as professional (46%), represented (30%), or non-represented (24%). Represented staff are members of one of three organizations depending on job duties; United Auto Workers (UAW), American Federation of State, County, and Municipal Employees (AFSCME), and Police Officers Association (POA).

In addition to relevant contracts, human resources are organized and used in accordance with the Board of Control Policy Manual, University Policies and Procedures, and Faculty and Staff Handbooks.

To achieve our vision and mission, Goal 1 of the Michigan Tech Plan is to attract and support a world-class and diverse faculty, staff, and student population. This will be accomplished by
providing an outstanding work environment and support opportunities for all members of the Michigan Tech community and by increasing the diversity of our faculty, staff, and students. Key strategies identified to achieve these goals include providing competitive compensation; expanding professional development opportunities for all; promoting and tenuring faculty with national and international reputations; supporting and rewarding successful faculty and staff; providing vibrant cultural enrichment programs; achieving diversity consistent with national norms; and implementing unit diversity plans, rewarding those achieving diversity goals.

**05 Strategies that align leadership, decision-making and communication processes with mission and values; policies and requirements of oversight entities; and legal, ethical and social responsibilities**

Michigan Tech is one of 15 state supported higher education institutions in Michigan. Each is autonomous, and therefore there is no central oversight entity. Michigan Tech’s eight member Board of Control is appointed by the Governor, with the advice of the Michigan Senate, and is responsible for the bylaws that govern the institution, fixing tuition rates and other fees and charges, appointing and removing personnel, determining compensation, conferring degrees, managing gifts, entering agreements, and acquiring and disposing of property.

The president reports to the Board of Control and works with the Executive Team to run the day to day operations of the institution and facilitate realization of its vision and mission through enactment of the strategic plan. The overall organizational structure is shown in Figure O.2 and the academic structure is shown in Figure O.3.

---

**Figure O.2:** Overall organizational structure.
Leadership, decision-making, and communication processes are aligned with our mission and values through a set of essential performance competencies. These include visionary leadership, building community, informed decision making, managing resources and risk, leading change and embracing innovation, developing people/enabling performance, leveraging diversity, and initiating service excellence. Members of the Executive Team are evaluated against these competencies, and it is anticipated that these will in the future be used to evaluate all those in leadership positions at Michigan Tech.

Several strategies contained in the Michigan Tech Plan focus on our legal, ethical and social responsibilities. They are to achieve diversity consistent with national norms; implement diversity plans, rewarding those achieving diversity goals; promoting and encouraging student engagement and civic responsibility; producing graduates with strong leadership capabilities; integrating sustainability into all our endeavors: supporting technological education and entrepreneurship at the K-12 and community college levels; and developing cross-cultural exchanges to increase understanding and discovery of new knowledge and processes.

**Figure O.3:** Academic organizational structure.

06 Strategies that align key administrative support goals with mission and values and services, facilities, and equipment to achieve them

The administrative support goals contained in the Michigan Tech Plan are to provide an outstanding work environment and support opportunities for all members of the Michigan Tech community and provide exceptional facilities and an aesthetically pleasing environment. These goals are supported by the following strategies: attract and retain bright, motivated, and adventurous students; construct and renovate technologically and ecologically superior facilities; and optimize the use of resources, laboratories, and equipment. Expanding the use of technology in campus and distance education is a strategy identified to achieve the goal of providing dynamic experiential learning that integrates instruction, research, and innovation in undergraduate and graduate programs.

The services, facilities, and equipment that are provided by Michigan Tech to achieve the key administrative support goals is a subset of those available on a daily basis that are far too numerous to describe here. The broad set naturally includes the university’s physical plant, student support services, information and technology support services, budget and financial services, unit support services, and numerous others.
The services, facilities, and equipment that assist in the achievement of the key administrative support goals cited above include the following:

**Campus Master Plan:** The Campus Master Plan developed for the university, created in 1999 by JJR Incorporated, addressed plans for the main (North) side of campus for 2015-2020. A supplementary plan was added in 2003 that also considered an additional 500 acres of land the university owns and discusses possible directions for development for this land over the next 50 years.

**ASPIRE:** This custom-written, web-based application is used to access, update, and easily maintain most of the key space data in an authoritative database. The tool allows users to interrogate and analyze space data to achieve an optimal assignment of space.

**Student Services:** The wide variety of services offered to undergraduate and graduate students work to attract and retain them. At the undergraduate level a number of these are offered through Enrollment Services and include Admissions, Financial Aid, International Programs and Services, Enrollment Services Information Systems, and Registrar’s Office. At the graduate level parallel services are offered through the Graduate School and department and school offices. Additional services are offered through Student Life including Housing and Residential Life, and Student Activities.

**Educational Technology Services/Online Learning:** This unit distributes instructional resources, manages the electronic display system, produces educational media, delivers online learning, and provides audio/video teleconferencing for the Michigan Tech community.

**Data and information that is collected and distributed and information resources and technologies that govern the management and use of data**

The Office of Institutional Analysis develops, maintains, and transforms data into information critical to university planning, policy making and reporting, and provides consultation on analyses of university issues. Some specific tasks performed by Institutional Analysis include: serving as internal consultants to administrative officers and university committees regarding operational studies and data; presenting information that is relevant to sound management and effective strategic and tactical planning issues; serving as the university contact for all survey information requested by national and regional publications; providing data submissions to the Federal and State Governments; developing and maintaining resource models for the university; representing the university on various state-wide committees and task forces; and serving as Michigan Tech’s official repository for statistical information about the university.

The functions performed by the Office of Institutional Analysis necessitate a close cooperation with the other campus constituencies. The data used in their analyses are generated by other offices or processes. Therefore their efforts are concentrated on assuring that the data are accurate, concise, consistent, and timely.

On a national level, Michigan Tech participates in the Common Data Set and the Voluntary System of Accountability and therefore collects and distributes the data required for these reports. These data are reported externally and internally on the Institutional Analysis webpage. The Compendium is a data resource available only to the Michigan Tech community on the web using a secure login. It contains fixed reports and a data filtering tool to generate custom data reports. Michigan Tech produces an annual Fact Book, which provides a quick reference for information, generally statistical, about the university. The Fact Book is publicly available at [http://www.admin.mtu.edu/ia/Fact_Book/index.html](http://www.admin.mtu.edu/ia/Fact_Book/index.html).

The Michigan Tech Dashboard is used to measure progress on the university strategic plan, and make data related to planning and improvement efforts easily accessible to the campus.
community. It is publically available on the Michigan Tech website (see response to 8R2 for web link). It is periodically updated as new data become available and in some cases automatically through direct linkages to existing databases.

Regarding technologies and information resources, Michigan Tech deployed the Sungard BANNER system in 1994 and uses this system for most key business processes. All the important data regarding students, courses and academic records, employees, expenses, and finances resides in BANNER. Data is accessed either by web-based tools, or by custom-written database queries and applications. The Enterprise Application Services group employs 10 programmers who help university constituents obtain data in useful formats.

### O8 Key commitments, constraints, challenges, and opportunities with which we align short- and long-term plans and strategies

Our key commitments are stated in the Michigan Tech Plan.

Michigan Tech’s focus is improving lives and preserving our world through sound, innovative uses of science, engineering, and technology. Our society strives for economic prosperity, improved health, and responsible use of environmental resources. Moving forward, Michigan Tech will be a leader in responding to these needs and challenges in Michigan, the nation, and the world. We will attract exceptional faculty and students who will develop, understand, apply, manage, and communicate science and technology – all with the goal of a prosperous, sustainable world.

In short, our primary commitment is fidelity of our middle name; Technological.

The primary constraint with which we align our plans and strategies is resources; financial, space, and human. As a public institution a portion of our funding comes from the state of Michigan. The percentage of state funding has dropped over the years in real and adjusted dollars, and, given the current economic climate, this trend is not anticipated to change in the near- or even mid-future. As we continue to grow, space to house faculty and their research facilities, graduate students, undergraduate students, and the increase in staff to provide necessary services is another constraint. The location of the university places us in a land and water locked situation, and therefore, in the short term, space farther from the institution within the local community must be utilized. However, this threatens our culture of cohesiveness, which is considered by most as a strength of the institution. Michigan Tech is located in a small community at a considerable distance from an urban center, and this limits the type of human resource availability. For instance, we have a limited group of local professionals from which to draw adjunct faculty.

Some of our challenges are obvious, such as location, while others would not appear to be challenges at all, such as our outstanding reputation as an educator of undergraduate students. As previously mentioned, we are located in a small town, over 200 miles from a major city, in the Upper Peninsula of Michigan. In addition to the remoteness, the location is a challenge due to the average annual snowfall of just over 200 inches per year. Car travel around the area during the winter is not a major issue, but at times, sometimes days at a stretch, travel by air is severely limited. The combination of a small town that lacks the amenities of a major city and the extreme winter climate can limit our ability to recruit and retain students, faculty, staff, and administrators.

Another challenge is our exceptional reputation for undergraduate education. We are extremely proud of this distinction that is due to the many dedicated faculty and staff who preceded us.
However, as we strive to grow our graduate programs and research, the challenge we face is to do so while maintaining our excellence in undergraduate education, in the face of our previously stated constraints. Adding to this challenge is our emphasis on STEM programs. One aspect of the challenge this poses is also faced by the US, that being a lack of students wishing to pursue a STEM education. Locally, this presents a recruitment challenge with the number of high school graduates declining in the state of Michigan. In addition to the enrollment challenge, STEM programs are more expensive to offer, which furthers our financial constraint.

In spite of the aforementioned constraints and challenges, Michigan Tech is poised to achieve our strategic goals by taking advantage of several key opportunities. The most substantial of these is one that we also see as a challenge; our STEM emphasis. As stated in the Michigan Tech Plan “Our society strives for economic prosperity, improved health, and responsible use of environmental resources.” We believe this will only be possible through the sound innovative application of science, engineering, and technology, and Michigan Tech can make a valuable and significant contribution to this effort. Our STEM emphasis, combined with our small size and collaborative culture, positions us to address the complex problems of today through multi-disciplinary teams of excellent faculty, staff, and students. The collaborative culture is a product not only of the size of the institution but also our location. The small town setting and the challenges that we face as a result of our remoteness and winter season creates a unique bond that continues long after our students graduate or colleagues leave us for other opportunities. It is the combination of the Michigan Tech culture and our technical and creative expertise that will ensure the achievement of our mission.

**Key partnership and collaborations, external and internal, that contribute to our effectiveness**

Several key partnerships and collaborations, both internal and external, contribute to our effectiveness. The first is our partnership with the state of Michigan. In spite of the challenges that are presented by the decline in state funding, we clearly benefit from the support given to us by the state of Michigan. In addition to general fund support, the state provides funding for capital outlay projects and research, which supports graduate students.

The state of Michigan was also instrumental in the development of another of our most successful collaborations, which is with the Michigan Tech Enterprise Corporation (MTEC) SmartZone. The MTEC SmartZone provides a means to develop the local economy as well as professional opportunities for our current students and those who want to remain in the area after graduation. As with all of our successful partnerships and collaborations, the SmartZone contributes to the achievement of more than one of our strategic goals.

Nationally, the broader business and industrial community is another key partnership that contributes to our effectiveness. They are engaged in numerous aspects of the institution including the hiring of our graduates, service on advisory boards, and support of research. Many of the partnerships and collaborations that exist with individual businesses are the direct result of our alumni within that corporation. In addition, individual alumni support the institution financially and with their time by service on advisory boards or on efforts focused on student and recent graduates.

Internally, the collaboration between the university and our research institutes and centers advances our research objectives and also serves as a means of communication across the institution. These multi-disciplinary entities bring together faculty, staff, and students from a variety of departments and schools to apply their expertise to broadly defined complex problems.
Helping Students Learn

1P1 Determining common or shared objectives for learning and development for all students

The common or shared learning objectives for our undergraduate students are primarily achieved through the General Education program. This program underwent a major revision approximately 10 years ago in parallel with a change in academic calendar from quarters to semesters. At that time, a General Education Taskforce was created to outline the new program. The Taskforce was composed of individuals from all academic departments and many administrative units, for example, the library and student affairs. Once the program was sufficiently structured in terms of content and administrative responsibility, it was presented to the University Senate for a vote. The Senate presented it to the faculty and conducted a referendum vote. Therefore, there was broad participation by the faculty in determining the nature of the General Education program, including the common learning objectives.

The General Education Council was established to manage the day-to-day affairs of General Education. This council monitors, assesses, makes policy for, and manages the program. It meets approximately every two weeks to review new and on-going issues. It is currently composed of coordinators or representatives of all components of the General Education program: four core courses (taken by all students at Michigan Tech), math/sciences distribution courses, the HASS (humanities, arts and social sciences) distribution courses, and co-curricular courses in physical activities. In addition, representatives from the library, the Writing Center (one of the four General Education-related student learning centers), student affairs, and undergraduate student government serve on the committee. The chair of the General Education council reports directly to the provost, and, as needed, the General Education Council meets with the academic deans to receive input on policy matters.

Major alterations to the structure of the General Education program would be handled through the establishment of a General Education Taskforce, much like the original taskforce. Any major structural change, including a major change to the common learning objectives, would be approved through the faculty by a vote managed by the University Senate. There have been very few changes in the General Education program since its reorganization, although there was a stated intention to review the program regularly. During the 2007-08 academic year the General Education Council conducted a complete review of courses to determine the classes that could be applied to the 16-credit science, technology, engineering, and mathematics (STEM) requirement or to the 15-credit humanities, arts, and social sciences (HASS) requirement. The university broadened the definition of the HASS requirements to include a number of courses that traditionally fall outside the definitions of those fields. Students are allowed to apply up to three credits of these “supplemental list” courses to their HASS requirement. Depending on the student’s major, some of their program specific learning outcomes may be fulfilled through the major subject material and others through the general education program. There is ongoing discussion of what should be covered in the required core courses, and what should be available through distributive electives. In addition, the traditional arrangement of “distribution” courses in either STEM or HASS categories is under discussion as the dichotomous structure makes it difficult to include interdisciplinary courses that could be classified in either area.

Shared learning and development objectives for graduate students are developed by the graduate faculty and the dean of the Graduate School through the Graduate Faculty Council, which is an advisory body for the dean of the Graduate School and is the primary channel for
communication between the graduate faculty and the dean and staff of the Graduate School. The Graduate Faculty Council is the main forum for the discussion of matters of interest regarding graduate education and research programs. The Council includes one representative and one alternate from each graduate-degree-granting department, a representative from the Graduate Student Council, members of the Graduate School staff, and the dean of the Graduate School. Representatives from the offices of other academic deans are also invited to attend council meetings. Council operations are the responsibility of its president, vice president, and secretary. Agenda items may be brought to the council by any member of the university community. A coordinator is appointed to investigate and report on each item of interest to the council. Recommendations made by the Council on agenda items are presented to the dean of the Graduate School and are also communicated to the university community.

1P2 Determining specific program learning objectives
The processes used to determine program learning objectives for undergraduate and graduate programs are particular to each program. The faculty make the ultimate determination with input from various constituents including external accreditation organizations (ABET, AACSB, and SAF), external professional organizations (ACS), and external advisory boards that are made up of Michigan Tech alumni and employers of our graduates. Program assessment results including alumni surveys, employer surveys, co-op reports, nationally normalized examinations, and profession specific established bodies of knowledge are also used to develop learning objectives. In some departments and schools there are established external advisory boards, which may provide input on program-specific objectives; they also provide useful input on trends in terms of the knowledge and skills expected of graduates in the world of professional employment. Most academic units use a faculty curriculum committee to oversee the process of program review on a regular basis. This committee makes recommendations to the faculty of the department for approval.

1P3 Designing new programs and courses that facilitate student learning and are competitive
New courses are typically proposed and developed by an individual faculty member or a group of faculty. Courses that are part of the required curriculum are designed to achieve the program objectives. This process also includes any pertinent results from program or course assessment activities.

Courses may also be designed to meet the needs of a stakeholder group. In this case the stakeholder approaches the university because we have the faculty to design and deliver the course that is needed by their employees. A careful evaluation of the proposed alignment of the course with our strategic plan and our capacity to offer the course with available resources in light of the revenue it may generate is performed before proceeding with the design and offering of the course. Recent courses that have been developed in response to stakeholder needs are the online electric power courses offered towards the MS in Electrical Power Systems Engineering and a course entitled “Advanced Propulsion for Hybrid Vehicles” a special offering developed in cooperation with General Motors and the Engineering Society of Detroit and designed to retrain displaced automotive engineers to use advanced and emergent technologies in the automotive industry in Michigan.

A university level process for the addition, removal, or major revision of a course is undertaken on an annual basis. Since this process may result in a change to the proposed course, it can be considered a part of the design process. This process, called the Binder Process, is shown in Figure 1.1.
New programs follow a similar development process that again is initiated by a group of faculty. Input from interested constituents in industry or potential students assist the faculty in the determination of objectives for the program. The establishment of new programs is also dependent on the resources required, demonstrating its alignment with the university strategic plan and existing strengths, the anticipated demand, and the number and quality of competing programs. Our goal of delivering a distinctive and rigorous discovery-based learning experience grounded in science, engineering, technology, sustainability, and the business of innovation ensures that our programs will be competitive.

Proposed programs may change at any point in the approval process, and therefore it can be considered part of the program development process. The program approval process is shown in Figure 1.2.
Following approval of a new program by the University Senate, it is approved by the provost, and president; then the program is brought for preliminary approval to the Board of Control. After that it is submitted to the Presidents’ Council of the State Universities of Michigan (PCSUM). The program is posted for comment by the chief academic officers (provosts) of the Michigan public universities, who generally seek detailed responses from the deans of the colleges/schools where similar programs are offered. Comments are posted and reviewed at regular meetings (every two months) of the chief academic officers of the Michigan public universities. A vote is then taken on each new program. The chief academic officers consider potential overlap with existing programs in Michigan in the interest of good stewardship of state resources. It is expected, however, that for each university the costs and benefits (at least for that institution) have already been considered by the university administration and its appropriate governing board. Once the program is approved by PCSUM, the program is brought back for final approval to the Board of Control, and then the university is permitted to launch, advertise, and enroll new students in the program.

1P4 Designing responsive academic programming that balances and integrates learning goals, students’ career needs, and realities of the employment market

The majority of our undergraduate programs are designed with the flexibility to allow a variety of curricular experiences such as Honors Institute, research opportunities for undergraduates, Enterprise, co-ops with industry, and international experiences that balance and integrate learning goals, students’ career needs, and the realities of the employment market. All engineering students participate in senior design projects, and several groups are joined by students majoring, for example, in the School of Business and Economics, who gain valuable experience in working as part of a multidisciplinary team. Some students participate in international senior design projects, where their work (particularly in areas such as Civil and Environmental Engineering) has direct beneficial effects for communities in various locations across the world. These experiences are designed by our faculty who are committed to excellence in undergraduate education. The university provides a climate for curricular innovation through the recognition of such efforts in the faculty and staff reward and recognition process. Faculty who are engaged in these efforts are knowledgeable of national trends through involvement in professional societies and reading the latest peer reviewed literature. They seek the funding needed to design and establish innovative programs through external sources such as the National Science Foundation. Examples of successful curricular innovations include the Enterprise Program (designed for undergraduates) and the Sustainable Futures IGERT (Integrative Graduate Education and Research Traineeship), both of which were originally funded by NSF.

1P5 Determining the preparation required for the specific curricula, programs, course, and learning students will pursue

We determine the preparation required of students for the specific curricula, programs, courses, and learning they will pursue based on our prior experience. Student preparation for curricula, programs, and the learning they will pursue is determined based primarily on past academic performance, standardized exam scores, and performance on placement exams for each individual student. A minimum performance threshold is determined based on the experience of our faculty and can be adjusted based on historical data. The preparation needed for a course is also determined by the faculty in the unit that offers the course. This is evaluated on a regular basis and can be changed using the course design, or Binder Process, discussed in response to 1P3.
It is worth noting that the preparation of our applicants, particularly in key areas of science and mathematics preparation is typically quite high so this process is not one on which we have chosen to focus our efforts.

1P6 Communicating the required preparation and learning and development objectives for specific programs, courses, and degrees or credentials

The required preparation for specific programs, courses, and degrees is communicated to current and prospective students in a number of ways. The primary and most effective method is through the university website. Admission requirements and enrollment profiles are posted online and are targeted to future first year students through our Admissions homepage. The online course catalog provides information on course pre-requisites and entrance requirements for degree programs. Academic unit websites may also contain information on the preparation required for specific programs, courses, and degrees.

In addition to online resources, information is communicated through personal interactions with potential and current students. The admissions office meets with prospective students and their families during their visit to Michigan Tech. These representatives discuss degree program requirements ensuring that the students as well as their parents know the preparation that is required to be successful in the program. Often these visits include a meeting with an individual in the academic unit that offers the program during which more specific questions can be addressed. The Center for Orientation, Mentoring, Parents, and Academic Student Success (COMPASS) organizes and delivers a week long orientation program for all new students before the start of classes in the fall. The mission of the orientation program is to familiarize incoming students with the campus, academic requirements, and college life. A parallel orientation is also provided for graduate students. The Center for Teaching, Learning, and Faculty Development administers the SPEAK Test for international graduate students who will be graduate teaching assistants (GTAs). If the test indicates that English language skills do not meet the criteria of an instructor, students are referred to the International Graduate Teaching Assistant Assistance Program (IGTAAP), which assists students in making the transition to a new academic and interpersonal culture. An "English as a Second Language" course, offered by the Humanities Department, may also be required by sponsoring academic units.

Academic advisors communicate directly with current students and discuss the required preparation for a course or program. Peer to peer communication occurs in the Learning Centers, (see the response to 1P8 for a description of Michigan Tech’s Learning Centers) and is provided by student tutors and teaching assistants supervised by highly qualified staff. Often students will advise each other to either talk with their advisors or may suggest a pre-requisite course based on their prior experiences.

The communication of learning objectives is also achieved through the university website. Academic units post the learning objectives for their programs on their websites. The learning objectives for each course are listed on the course syllabus as required by University Senate policy. At the university level, the communication is through the degree audit, which is available online.

1P7 Helping students select programs of study to match their needs, interests and abilities

The overall processes by which undergraduate students select programs of study that match their needs, interests, and abilities are primarily student driven. In general, students are encouraged to speak with academic advisors from a variety of disciplines, faculty, and counselors to assist in the selection of a program of study. Students who need additional
guidance are referred to the Career Center to take the “My Plan” career interest self-test, which helps students decide on a career path.

A number of degree programs provide information to undergraduate students through the first-year courses that are intended to help the students decide on an appropriate major. A common first year in the College of Engineering allows students to explore the various engineering disciplines through a required course in engineering fundamentals that is taken alongside common courses in mathematics and science (and some general education core courses); they therefore have two semesters to select a major without extending their time to degree completion. The College of Science and Arts offers a similar approach through their General Sciences and Arts Program, which allows students three semesters to learn about different programs before declaring a major. The School of Forest Resources and Environmental Sciences and the Chemistry Department offer enriched freshman seminar classes that provide students with information on each degree program and the type of career they can expect after graduation.

The majority of graduate students at Michigan Tech apply to a specific degree program based on their research interests and career goals. The student’s advisor and thesis/dissertation committee assist the student in the determination of a particular program of study based on the student’s background and the research that the student will conduct.

**1P8 Dealing with students who are underprepared for academic programs and courses**

Michigan Tech has a selective admissions process and is not required to accept students who are underprepared for the academic programs and courses that we offer. However, during the course of their studies, students who were thought to be well prepared may struggle academically for a wide variety of reasons. Therefore, we do offer a number of programs and services for students to get the assistance they need to be successful.

A number of preparatory courses are offered in math, chemistry, and physics, especially for engineering students. The ExSEL Program is designed to promote student success and offers academic support through services such as peer mentoring, study groups, study skills and time management techniques, academic progress monitoring, campus resource referrals, campus and community involvement events, and career and personal development seminars. The program is a comprehensive partnership between the Department of Educational Opportunity and the College of Engineering, College of Sciences and Arts, School of Business and Economics, School of Technology, and School of Forest Resources and Environmental Sciences aimed at increasing student success and retention.

Michigan Tech operates eight learning centers, organized by discipline, to help students succeed. The three core learning centers, Writing, Mathematics, and Chemistry are centrally funded by the Provost’s Office, whereas others are supported by the academic departments or schools involved. The centers are staffed by students who have been successful in learning the material. Most centers offer weekly appointments for long-term improvement, walk-in hours for short-term help with an immediate problem, and team learning with peers. Learning Centers in the following disciplines are available to all students: Biological Sciences, Chemistry, Computer Science, Electrical and Computer Engineering, Engineering, Mathematics, Physics, and Writing.

The highly innovative Writing Center offers weekly appointments or walk-in hours for undergraduate and graduate students, faculty, and staff. Any aspect of academic writing, reading, or presentation can be addressed. Sessions can focus on drafting an essay; reading complex course material; understanding course expectations and assignments; developing
revision, editing, and proofreading skills; learning a citation system; using evidence effectively; planning, conducting, and writing a research report; writing group reports, resumes, and cover letters; improving study strategies; practicing English as a second language; and managing learning differences/disabilities.

The admissions process for graduate students is even more selective than for undergraduate students. However, if a faculty advisor discovers that a graduate student is under prepared to complete their research, the student can be required to take advanced undergraduate courses. These courses act as prerequisites for graduate level courses. The student also has the option of studying independently with a faculty member to increase their level of preparedness for graduate study.

**1P9 Detecting and addressing difference in students' learning styles**

Michigan Tech does not use a formal institution-wide process to detect the learning style of individual students, but instructors are encouraged to consider the diversity of learning styles of the students in their class. Students are encouraged to identify their own learning styles during orientation through use of the Myers-Briggs Type Indicator®. Building on this the first year General Education program provides supplemental instruction teams and one-on-one interaction, and in the World Cultures course, which has large lecture sections (150-200 students), students are organized into study teams and faculty use interactive methods to facilitate learning. One of the goals of the General Education program is to develop skills in students so they can learn effectively from professors with contrasting teaching styles. In addition, the students and faculty who staff the Learning Centers are trained to identify a student’s learning style and to present the material appropriately. A goal is to help students develop the capacity to learn in many different ways, rather than to be limited by their current dominant learning style.

The Center for Teaching, Learning, and Faculty Development provides an orientation program to all new personnel with teaching responsibilities, including graduate teaching assistants. A portion of that orientation program addresses learning styles and presents methods that can be used by instructors to present the material so it can be understood by students with various learning styles. Faculty members are encouraged to vary and diversify their teaching methods to encompass the learning styles assumed to be present in their classes. Workshops on these topics are held during the academic year for faculty and graduate students with teaching responsibilities. In addition, we encourage the development of curricula and programs that provide different learning modes to students so they can tailor their educational experience to their learning style. Since many courses are in STEM, where hands-on learning in labs, workshops, and projects are well established, faculty naturally incorporate experiential learning and case-based learning into coursework.

**1P10 Addressing special needs of student subgroups**

As a residential campus, with a traditional student body, Michigan Tech has few non-traditional student subgroups. Some individual students have special needs; they are asked to self identify, through standard text on all course syllabi and regular emails from the dean of students, in order to receive assistance. Prospective students are encouraged to tour campus, and if they request a meeting with the office that coordinates academic accommodations, Admissions will arrange an appointment with the Office of the Dean of Students.

When prospective or enrolled students request special accommodations or accessibility for classes and campus facilities, they provide their most recent documentation and recommendations from appropriate medical or psychological evaluators. The Office of the Dean
of Students reviews the documentation and meets with the student to develop appropriate formal requests for accommodation for the classroom, laboratory, and/or work sites. Each semester letters specifying appropriate accommodations and other recommendations are prepared for the student who is expected to deliver these to their instructors and/or campus supervisors. Students and instructors/supervisors may seek assistance at any time from the Office of the Dean of Students in order to provide or clarify the recommendations. Students may qualify for other services or equipment loans, including some adaptive equipment, priority scheduling, special testing arrangements, and referrals.

In addition to the Office of the Dean of Students, some learning centers (particularly the Writing Center and Chemistry Learning Center) and outreach/mentor programs (ExSEL) provide training about learning differences for their professional and student staff and mentors. Student Orientation staff also receive some specific training for welcoming new students who may have special needs or requests for accommodations.

International Programs and Services (IPS) facilitates the development, promotion, coordination, and execution of quality international programs and services. They assist new international students in their adjustment at Michigan Tech and provide immigration support services and programming for current international students and their dependents. IPS organizes the Intercultural Mentor Program to assist new international students in their adjustment to a new academic environment and culture. This program involves a team of student and community volunteers who devote their time, energy, and efforts to help new international students to adjust to the local environment.

The needs of international students are also addressed through the English as a Second Language (ESL) Program. The ESL Program provides international students with the English language instruction and cultural preparation needed for success in academic study at the university and in North American society in general. We offer high quality instruction and small class sizes. ESL students have access to the same amenities and resources as other Michigan Tech students including the Writing Center, Modern Language Lab, and the Center for Computer Assisted Learning Instruction.

**IP11 Defining, documenting, and communicating expectations for effective teaching and learning**

The provost, as the chief academic officer, sets the tone for the institution. The provost routinely discusses this vision for effective teaching at public events and meetings across campus, in each department, in “Lunch and Learn” sessions sponsored by the Center for Teaching, Learning, and Faculty Development, at the Academic Forum, and in Deans’ Council and speaks on behalf of academic and university affairs in the twice-monthly meetings of the University Senate.

The Assessment Council is formally charged with coordinating the collection of information about teaching effectiveness and the achievement of learning outcomes. Many units perform assessment of learning on an ongoing basis, especially programs that are accredited by external agencies (ABET, AACSB, and SAF) and approved by professional societies (ACS).

Effective teaching is considered in all promotion and tenure decisions and for merit pay increases for faculty. Michigan Tech collects student evaluations of teaching in all classes using a uniform reporting format and that data is transmitted to faculty members, graduate teaching assistants, and their supervisors up the command chain to the provost. All instructors receiving an evaluation score below a level specified by the provost must work with their department chair or school dean on a plan for improvement. This list is submitted to the provost for review and
information. The University Senate has also developed a policy that teaching must be assessed through additional means (besides the standardized student teaching evaluations). In support of tenure, promotion, and renewal recommendations, other forms of evidence of teaching proficiency, such as a teaching portfolio or feedback from colleagues who have attended classes, is required.

The Center for Teaching, Learning, and Faculty Development distributes information about teaching innovation and related issues through weekly articles by the director and guest authors in “Tech Today” and a monthly “Lunch and Learn” workshop program.

**1P12 Building an effective and efficient course delivery system**
The course delivery system at Michigan Tech primarily consists of on-site classrooms and laboratories. We balance implementation of the latest technology with available resources to provide a stimulating learning environment for our on-campus and online students. Most instructors use the Blackboard Learning Management System to present the course content: videostreamed lectures, lecture notes, requirements, homework, objectives, readings, and discussion chains are available. The process used to continually improve and update our course delivery system is discussed in the response to 1I1.

Michigan Tech is a participation in iTunes U, a service that enables faculty to deliver pre-recorded audio/video course content using Apple's iTunes software. Students are able to download or subscribe to this content as it becomes available. Once downloaded, they can use iTunes to play this media on their computer or students can download their selections to an iPod and study anytime, anywhere. In addition, Michigan Tech Online Learning courses are developed for the virtual classroom using the latest distance education technologies.

**1P13 Ensuring programs and courses are up-to-date and effective**
The primary means for ensuring that our programs and courses are up-to-date and effective is through an external review process. For our accredited programs this review occurs on a regular basis. Between the external reviews, this is achieved by benchmarking other programs and courses, and the professional development of faculty in teaching and research. Our programs are also continually reviewed by our external advisory boards that are composed of members from our key stakeholder groups. Also, as mentioned in the response to 1P4, our faculty members are committed to excellence in undergraduate education and the university provides a climate for curricular innovation through the recognition of such efforts in the reward and recognition process.

**1P14 Changing or discontinuing programs and courses**
The process used to change or discontinue a program or course is the same as is used to establish a program or course. This was presented in the response to 1P3.

**1P15 Determining and addressing support needs of students and faculty for student learning, development, and assessment processes**
A variety of methods are used to determine and address the learning support needs of our students and faculty in our student learning, development, and assessment processes. The annual student satisfaction survey is used to obtain general information from students. Given our emphasis on STEM disciplines, appropriate placement in terms of mathematics preparation is very important and is achieved through a placement test for freshmen. A “speak test” is provided for international students for whom English is a second language, so that they can be directed to the ESL program, if necessary. The JR Van Pelt/Opie Library is conducting surveys of users as part of a new initiative to make the library more integral to the learning process.
Many informal avenues of communication serve to communicate the needs of faculty and students. At the present time these processes are not integrated at the university level.

1P16 Aligning Michigan Tech’s co-curricular development goals with our curricular learning objectives
A draft set of co-curricular, designated as extra-curricular at Michigan Tech, development goals has recently been developed by Student Affairs but has not been aligned with our curricular learning objectives.

1P17 Determining that students to whom degrees and certificates are awarded have met Michigan Tech’s learning and development expectations
Our primary means for determining that students to whom we award degrees and certificates have met our learning expectations is through the degree audit process. This ensures that each student has met the course requirements for the degree. While this is an indirect measure, the courses in the degree programs are designed to achieve the learning objectives for the program so successful completion of all courses is an indication that the student has met the learning objectives.

Most programs perform assessment to determine if students have met the learning objectives for a course, degree program, or certificate. At the present time, assessment is used at Michigan Tech as a method to improve programs and not as a means of determining that an individual student has met the expected learning objectives. Assessment of culminating work, such as a senior design project or academic portfolio, is performed by most programs, but the awarding of a degree may not be dependent on these specific assessment results.

The awarding of a degree or certificate is not currently dependent on achievement of the recently established development objectives.

1P18 Designing processes for assessing student learning
Design of the processes used to assess student learning are program specific, as are the assessment processes themselves. In all cases, the faculty members design the processes which are used for a specific degree programs and for the General Education program. In most cases, a portion of the design process includes an examination of national trends in assessment and the adaptation of best practices that are identified internally and externally. The internal sharing of best practices is accomplished through the Assessment Council, which is chaired by the assistant provost and has a representative from each academic unit, the General Education Council, the JR Van Pelt/Opie Library, and Student Affairs.

1R1 Regularly collected and analyzed measures of student learning and development
Some of the measures of student learning that we collect and analyze regularly include, embedded course assessment, performance on major field tests, indirect assessment of teaming, performance on the Michigan test for teacher certification, exit exams, placement data, pre- and post-tests, engineering exit assessment, student portfolios, program specific tests, results of external program review, senior exit interviews, Fundamentals of Engineering exam results, alumni surveys, survey results from industrial sponsors of senior design/capstone projects and Enterprise projects, employer evaluations of co-op students, survey responses of employers attending the Michigan Tech fall and winter career fairs, course evaluation results, and degree program information developed by the curriculum committee and program external advisory board members.

Currently, there is no formal assessment of our common student development objectives.
1R2 Performance results for common student learning and development objectives

An attitudinal survey is taken by students upon completion of the first required course in the General Education curriculum; Perspective on Inquiry. The vast majority of students take this course during their first semester at Michigan Tech. Students are asked for their level of agreement, from strongly disagree to strongly agree, with each statement. Average results from approximately 900 responses for selected statements from the survey are given in Figure 1.3. Based on these results it can be concluded that in general the students agree that their participation in the course has improved their abilities with respect to the stated learning objectives.

![Figure 1.3: Results of attitudinal survey taken by students upon completion of Perspectives on Inquiry (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).](image)

Student portfolios are developed in the third required course in the General Education curriculum; Revisions. After a norming session, these are assessed against specified criteria by several members of the Revisions assessment team. For each criteria, the assessor is asked to state their level of agreement, from strongly disagree to strongly agree, with each statement as it describes the portfolio. The 2008 assessment results from 82 readings of 40 randomly selected portfolios are presented in Figure 1.4. These data show inconsistency in meeting the stated learning objectives.

1R3 Performance results for specific program learning objectives

The College of Engineering (CoE) conducts a student self assessment senior exit survey of the common engineering program learning outcomes, which are based on the ABET learning outcomes. Students are asked to rate, on a scale of one to seven, the degree to which their engineering education enhanced their ability to achieve the stated learning outcomes. 340 Michigan Tech students completed the survey in the spring of 2008. The average results for those students are shown in Table 1.1.
Figure 1.4: Results of the assessment of student portfolios from the Spring 2008 offering of Revisions (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree).

Table 1.1: CoE Student Self Assessment of Program Outcomes

<table>
<thead>
<tr>
<th>Degree that engineering education enhanced ability to:</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply knowledge of engineering</td>
<td>6.00</td>
<td>1.04</td>
</tr>
<tr>
<td>Design experiments</td>
<td>5.24</td>
<td>1.36</td>
</tr>
<tr>
<td>Analyze and interpret data</td>
<td>5.73</td>
<td>1.12</td>
</tr>
<tr>
<td>Design a system, component, or process to meet desired needs</td>
<td>5.34</td>
<td>1.30</td>
</tr>
<tr>
<td>Use modern engineering tools specific to your primary academic major</td>
<td>5.29</td>
<td>1.34</td>
</tr>
</tbody>
</table>

1 = Not at all, 4 = Moderately, 7 = Extremely

The School of Technology (SoT) uses the Society of Manufacturing Engineering (SME) Certification Test to assess student proficiency in meeting the learning objectives for their Mechanical Engineering Technology (MET) degree. These results are presented in Table 1.2. Additional program specific assessment of learning outcome results are presented in response to 1R6.

1R4 Evidence that students completing Michigan Tech’s programs, degrees, and certificates have acquired the knowledge and skills required by our stakeholders

Our stakeholders express their satisfaction with the knowledge and skills acquired by our students by recruiting them to work in their companies or to pursue additional education in their graduate programs. The Career Center maintains statistics on the number of companies participating in our on-campus job fairs and recruiting on campus, the number of interviews scheduled on campus, and the placement of our students. These measures are shown in Figures 1.5 and 1.6. The number of companies that participate in on-campus recruitment efforts...
continues to increase and the placement of our graduates remains consistently high. These indicate satisfaction by our stakeholders with our graduates.

Table 1.2: SME Certification Test Results for SoT MET Graduates

<table>
<thead>
<tr>
<th></th>
<th>Spring 2008 (11) Students</th>
<th>Fall 2007 (8) Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>77.3%</td>
<td>81.3%</td>
</tr>
<tr>
<td>Applied and Engineering Sciences</td>
<td>65.7%</td>
<td>65.3%</td>
</tr>
<tr>
<td>Materials Applications</td>
<td>85.2%</td>
<td>83.7%</td>
</tr>
<tr>
<td>Design</td>
<td>64.2%</td>
<td>69.9%</td>
</tr>
<tr>
<td>Manufacturing Process Applications and Operation</td>
<td>57.1%</td>
<td>65.3%</td>
</tr>
<tr>
<td>Production System Design and Development</td>
<td>66.0%</td>
<td>67.1%</td>
</tr>
<tr>
<td>Equipment/Tool Design and Development</td>
<td>53.4%</td>
<td>60.9%</td>
</tr>
<tr>
<td>Automated Systems and Control</td>
<td>69.3%</td>
<td>68.8%</td>
</tr>
<tr>
<td>Quality and Customer Service</td>
<td>65.2%</td>
<td>74.3%</td>
</tr>
<tr>
<td>Manufacturing Management</td>
<td>63.0%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Personal Effectiveness</td>
<td>71.6%</td>
<td>65.0%</td>
</tr>
</tbody>
</table>

Figure 1.5: On-campus recruitment measures.

Figure 1.6: Graduate placement by category for 2005 through 2008.
**1R5 Performance results for learning support processes**

Michigan Tech performs a student satisfaction survey in the spring semester of every year. This electronic survey is sent to all undergraduate and graduate students. It contains closed-ended rating questions from which qualitative results can be obtained and open-ended questions that give students the opportunity to provide written responses for all categories in the survey. The survey was administered using SurveyMonkey and StudentVoice, in 2007 and 2008, respectively. In 2007 approximately 2100 undergraduate and 560 graduate students responded, giving response rates of 36% and 61%, respectively. In 2008 approximately 1900 undergraduate and 350 graduate students responded, giving response rates of 31% and 36%, respectively.

The average responses to questions about learning support services are shown in Figures 1.7 and 1.8. A very general conclusion that can be drawn from considering these results collectively is that students are satisfied by the learning support processes provided by Michigan Tech, but there is room for improvement.

---

**Figure 1.7:** Average of scaled responses (1 = Very Dissatisfied, 2 = Somewhat Dissatisfied, 3 = Somewhat Satisfied, 4 = Very Satisfied) for undergraduate (left) and graduate (right) students from the annual student satisfaction survey.

**Figure 1.8:** Average of scaled responses (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent) for undergraduate (left) and graduate (right) students from the annual student satisfaction survey.

Additional results from the Student Satisfaction Survey are presented in response to 3R2, 3R3, and 6R2.
Comparison of results for helping student learn to other organizations

Several programs use national examinations to assess the knowledge gained by their students and to compare their performance to that of students completing similar programs of study at others institutions. The physics major field test was taken by 20 Michigan Tech students in Fall 2006 and Fall 2007 and 18 in Fall 2008. The approximate number of total examinees is 450 for those same time periods. The results for this field test are shown in Figure 1.9 and indicate that our students perform very well compared to all test takers. The Chemistry major field test results for 2007 are shown in Figure 1.10. Seven of the total 1286 students who took the exam in 2007 were from Michigan Tech. The Chemistry Department at Michigan Tech has results dating back over four years for this field test but only the 2007 results are reported here as a new test was developed and therefore a direct comparison with prior years is not possible. The results presented in Figure 1.10 indicate the graduates of our Chemistry program perform as well as graduates from other institutions.

As discussed in the response to 1R2, the College of Engineering conducts a student self assessment exit survey. The exit survey Michigan Tech gives to our engineering seniors is distributed nationally by Educational Benchmarking, Inc. (EBI), and therefore the results can be compared across all institutions that administer the survey. In the spring of 2008, 68 institutions administered the survey, and a total of 11,716 responses were received for a response rate of 52% nationally. Table 1.3 contains the overall results, which shows that our students’ assessment of their ability is generally the same as the average across the nation.

Another comparison that the College of Engineering conducts is based on the results of the Fundamentals of Engineering exam. This is the first step in the process for engineers to become licensed. It is administered nationally and between 1/4 and 1/3 of our students voluntarily take the exam. In the spring of 2008, 184 Michigan Tech students took the test. These results, as well as a comparison to the 12,067 students across the nation who took the test, are shown in Table 1.4. Since the Michigan Tech students who take this exam self-select to do so, the results show that this group of student performed as well or better than the national average.
Table 1.3: Results of 2008 Senior Exit Survey: Michigan Tech and All Institutions

<table>
<thead>
<tr>
<th></th>
<th>Michigan Tech</th>
<th>All Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Degree that engineering education enhanced ability to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply knowledge of engineering</td>
<td>6.00</td>
<td>1.04</td>
</tr>
<tr>
<td>Design experiments</td>
<td>5.24</td>
<td>1.36</td>
</tr>
<tr>
<td>Analyze and interpret data</td>
<td>5.73</td>
<td>1.12</td>
</tr>
<tr>
<td>Design a system, component or process to meet desired needs</td>
<td>5.34</td>
<td>1.30</td>
</tr>
<tr>
<td>Use modern engineering tools specific to you primary academic major</td>
<td>5.29</td>
<td>1.34</td>
</tr>
</tbody>
</table>

Source: Educational Benchmarking Inc. (EBI)

Table 1.4: Results of 2008 Fundamentals of Engineering Examination

<table>
<thead>
<tr>
<th></th>
<th>Michigan Tech Average Percent Correct</th>
<th>National Average Percent Correct</th>
<th>National Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>63</td>
<td>66</td>
<td>3</td>
</tr>
<tr>
<td>Engineering Probability and Statistics</td>
<td>69</td>
<td>63</td>
<td>1</td>
</tr>
<tr>
<td>Chemistry</td>
<td>75</td>
<td>73</td>
<td>2</td>
</tr>
<tr>
<td>Computers</td>
<td>80</td>
<td>79</td>
<td>1</td>
</tr>
<tr>
<td>Ethics and Business Practices</td>
<td>81</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>Engineering Economics</td>
<td>65</td>
<td>59</td>
<td>2</td>
</tr>
<tr>
<td>Engineering Mechanics (Statics and Dynamics)</td>
<td>63</td>
<td>63</td>
<td>2</td>
</tr>
<tr>
<td>Strength of Materials</td>
<td>53</td>
<td>54</td>
<td>1</td>
</tr>
<tr>
<td>Material Properties</td>
<td>59</td>
<td>56</td>
<td>1</td>
</tr>
<tr>
<td>Fluid Mechanics</td>
<td>67</td>
<td>65</td>
<td>1</td>
</tr>
<tr>
<td>Electricity and Magnetism</td>
<td>56</td>
<td>51</td>
<td>2</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>58</td>
<td>55</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: National Council of Examiners for Engineering and Surveying (NCEES).

Michigan Tech compares the placement rate of its graduates to several institutions in Michigan and across the United States. For these data, placement is considered entering the job market in a field related to the students major. This comparison is shown in Table 1.5, and clearly demonstrates the high demand for our graduates.
### Table 1.5: Placement of Graduates

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement Within 6 Months of Graduation</td>
<td></td>
<td>97</td>
<td>95</td>
<td>95</td>
<td>90</td>
<td>81</td>
<td>76</td>
<td>74</td>
<td>70</td>
<td>68</td>
<td>68</td>
<td>65</td>
</tr>
</tbody>
</table>

**Source:** US News & World Report

## 11.1 Recent improvements in helping students learn

There have been three significant recent improvements in this category; the standardization of course syllabi, establishment of a set of common developmental objectives, and a process to enhance learning spaces as recommended by the Classroom and Facilities Upgrade Plan AQIP Action Project team.

### Classroom and Facilities Upgrade Plan

A process to facilitate the upgrading of our classrooms and thereby improve our course delivery system was designed through the recently completed Classroom and Facilities Upgrade Plan (or Learning Space Enhancement) AQIP Action Project. The process currently focuses on classrooms that are centrally scheduled and aligns with the annual university budget process. The Learning Space Enhancement (LSE) committee, which reports to the Deans’ Council, facilitates the process. The LSE consists of a faculty representative from each college/school, the Chief Information Officer, and representatives from the Registrar’s Office, Educational Technology Services, the Center for Teaching, Learning, and Faculty Development, Undergraduate Student Government, Graduate Student Council, and Facilities Management. A committee chair is recommended by the committee and appointed by the provost.

Each year the LSE gathers information on the condition of classrooms using ASPIRE (discussed in the response to 711) combined with visual inspections and reports from students and instructors. Using this information, the LSE develops a set of ranked priorities and rationale for submission to the provost and Deans’ Council for review by December. The final recommendation is made to the Deans’ Council and includes prioritization, cost estimates, and assigned responsibilities for each component of the upgrade. After consultation with the Deans’ Council, the provost brings forward priorities to the Budget Committee in the early spring.

At the current time, an annual general fund line item amount has been added to the Provost’s Office budget for the upgrade of classroom facilities. These funds will be spent on maintenance, renewal, and upgrade of existing classroom space.

### Standardization of Course Syllabi

Through the University Senate required and standardized components for all course syllabi have been established. The rationale for this is that students should be provided with the information necessary to prepare and perform well in courses. Therefore, the instructor of every course at Michigan Tech is required to provide each student enrolled in their section of the course with a printed copy of a course syllabus or the URL containing the web-based version of such a document. The syllabus **should** be provided to students on the first day of class but **must** be provided to students within the first week of class. The course syllabus must contain the following information and may contain any additional
information that the instructor deems appropriate or necessary: instructor identification, course identification (including pre and co-requisite courses and course learning objectives), course requirements, grading scheme, schedule, course policies, university policies, and rules. This policy ensures a systematic process that communicates to students the required preparation and learning objectives for all courses.

**Establishment of Common Developmental Outcomes:** Common or shared developmental outcomes (objectives) for undergraduate students were recently established by Student Affairs. The process began in the summer of 2007 at the Student Affairs professional staff summer retreat. Utilizing Michigan Tech’s mission, vision, and guiding principles as a starting point, an educational session introduced development outcomes and reviewed what they are, why they are important, and how to write them. In order to engage the staff in the process, small groups were formed and spent a significant amount of time brainstorming dynamic lists of developmental outcome ideas.

The next step of this process began as the vice president of student affairs brought together a diverse staff team to gather the ideas from the retreat and to discuss how to develop them into developmental outcome statements that reflect our purpose and principles. Team members included representatives from Student Activities, International Programs & Services, Registrar’s Office, Educational Opportunity, Enrollment Services, Student Life, and the Vice President for Student Affairs Office.

This development outcome team met for a period of one year. The team used subgroups for discussion and formulating developmental outcome statements. The result of the team’s efforts brought forth a list of comprehensive development outcomes for the division of Student Affairs. These outcomes were unveiled to the division at the Student Affairs retreat in the summer of 2008. At this retreat, time was spent reviewing and discussing the next level of the development outcome process, which was how to develop development outcomes for each of the Student Affairs areas from these broad based developmental outcomes written for the division.

During the 2008-2009 academic year, each Student Affairs area wrote developmental outcome statements developed directly from the comprehensive Student Affairs developmental outcomes. In addition, all areas are designing assessment instruments that will measure student achievement of the outcomes. This information will assist Student Affairs by providing guidance for decision making concerning our many programs and services to our Michigan Tech students.

**112 Culture and infrastructure for improved performance results for helping students learn**

Michigan Tech has a strong commitment to students and to excellence in education. This commitment creates a culture in which we are always striving to improve our performance results in helping students learn. As mentioned previously, the university provides a climate for curricular innovation through the recognition of such efforts in the reward and recognition process. The presence of several programs that require assessment of student learning for their accreditation promotes the extension of that culture to all programs and facilitates the selection of processes to improve student learning. Because of a long culture of assessment related to accreditation, there is quite a well-developed sense in the academic community that it is important to recognize the need to continually review goals that address process, rather than curricular content alone.
Category 2 Accomplishing Other Distinctive Objectives

2P1 Designing and operating key non-instructional processes that serve significant stakeholder groups

All of our key non-instructional processes are designed to use existing university infrastructure and be as self-supporting as possible. They are designed in alignment with our strategic plan and are intended not only to achieve their particular goals and outcomes but also to support achievement of our instructional objectives. For example, our research programs support graduate education, outreach activities and athletic programs assist in the recruitment and retention of a diverse student body, and local economic development and technology transfer initiatives provide real-world work experiences for our undergraduate and graduate students. As applicable, all federal rules and guidelines are followed in the design of these processes. Most often, we employ a collaborative approach to establish strategic and operational plans to achieve our goals.

The majority of these processes operate within the existing university organizational structure. Exceptions are our collaborative relationships with the Michigan Tech Fund, Portage Gold Course Corporation, and Michigan Tech Enterprise SmartZone (see description in the response to 5P4), which is our primary means of promoting local economic development.

2P2 Determining Michigan Tech’s major non-instructional objectives for external stakeholders; who is involved in setting these objectives

Michigan Tech’s major non-instructional objectives are established through the university-level strategic planning process (discussed in the response to 8P1). The applicable units across the institution develop objectives that align with the university’s strategic plan.

The setting of these objectives is typically a team effort lead by the faculty and staff, and influenced by stakeholder requests and our available talent and resources. We consider state and national statistics and programs at other institutions for guidance to set our objectives. Benchmarking of peer and aspirant institutions is used to determine key measures, taking into account our size. External advisory boards that embody significant representation of our key stakeholders are involved in the setting of objectives and goals. In some circumstances, objectives that are designed in keeping with the strategic plan are decided by the university administration.

2P3 Communicating expectations regarding these objectives

Expectations regarding these objectives are communicated within the applicable units through unit level retreats and meetings, advisory board meetings, through the existing committee communication structure, on the unit website, and in some print materials.

Expectations for some objectives are communicated to the university community and relevant stakeholders through Campus Forums, the Michigan Tech Dashboard, and university publications, including the Research Magazine and the Michigan Tech Magazine. Not all objectives, even those that involve broad engagement of faculty and staff, are communicated to the entire university community. An example would be the goals and objectives for economic development and technology transfer.
2P4 Assessing and reviewing the appropriateness and value of these objectives; who is involved in these reviews

The objectives are reviewed regularly on a unit-by-unit basis, but a systematic thorough review for appropriateness and value is not currently undertaken at the university level. Michigan Tech recognizes this is a future opportunity for improvement.

2P5 Determining faculty and staff needs relative to these objectives and operations

Across the university, the needs of faculty and staff relative to these objectives are most often determined through personal meetings. Needs are communicated at the academic unit level in meetings with chairs, deans, and directors; needs are then communicated up the line to the senior administration. A number of advisory boards, including the Research Advisory Council, Michigan Tech Enterprise Corporation Board, and the Athletic Advisory Board, also participate in this process.

Some units like the Research Office assess the needs of faculty and staff relative to the research objectives by tracking research and scholarly productivity measures and using them for long term planning. These data are included in the annual “vita update” process, which is now entirely carried out online (as of 2009) using a customized version of Activity Insight from Digital Measures. Some surveys are conducted to determine needs and in other circumstances advisory groups are used. For example, to enhance communication with the academic areas, the Educational Opportunity department has established an academic Department Chair Advisory Council that meets once or twice a year to provide information on their needs and the issues they encounter associated with youth programs. Research centers and institutes, such as the Sustainable Futures Institute, frequently meet with groups of faculty to survey their needs and secure input on how processes should be changed to work towards Institute objectives.

2P6 Incorporating information on faculty and staff needs in readjusting these objectives or the processes that support them

Readjusting these objective or the processes that support them by incorporating information on faculty and staff needs may be done on a unit-by-unit basis, but a systematic process for this does not exist at the university level. Michigan Tech recognizes this is a future opportunity for improvement.

2R1 Regularly collected and analyzed measures of accomplishing Michigan Tech’s major non-instructional objectives and activities

The measures that are collected and analyzed regularly are specific to each major non-instructional objective and each unit that contributes to the achievement of an objective. The measure used for a unit must be in alignment with the mission of the unit. The most significant of these measures will be presented here.

Measures used to assess progress on our Research objective include: number of Michigan Tech research institutes and centers, number of proposals submitted, number of awards received, level of multi-disciplinary collaboration on proposals, total research expenditures per year, F&A generated, new awards per year, PhD enrollment, and PhD degrees awarded. The primary measures related to our Technology Transfer objective include: total invention disclosures, invention disclosures per $10M research, and licenses/options per $10M research. We also collect data on license revenue, frequency of faculty producing multiple innovations, and the number of grant applications/proposals faculty members submit.
Several programs contribute to our objectives for Student and Community Enrichment including Athletics, the Rozsa Center for the Performing Arts, Recreation, and the Memorial Union Building. The Athletic program collects measures as required by the Department of Education, which include graduation rates of athletes, measures of equity in athletics, and the academic standing of our athletes. Other measures include the number of tickets sold for athletic events, win-loss records, conference finishes, and post season play. We also measure the local economic impact of specific visiting teams. The Rozsa Center tracks the number of people that attend shows and their home locations, using zip codes, to determine the geographic draw of their programs. Our community recreation programs track financial and participation data over four year periods to assess the success of their programs. Attendance at the Seaman Mineral Museum is tracked as is use of the ballroom in the Memorial Union Building.

Several programs also contribute to our Community Outreach objective. Measures used by the Youth Programs area include responses to evaluations, the number of participants in their programs and their diversity, the number of collaborative projects, the level of external funding that support their activities, and the level of stakeholder, primarily corporate, interest. The Rozsa Center also contributes to this objective, and they track the number of community volunteers and the hours worked as some of their performance measures.

The measures used to assess Economic Development are discussed in the response to 9R1.

2R2 Performance results for accomplishing other distinctive objectives

Research, Scholarship, and Creative Work: The measures of research, scholarship, and creative work productivity are shown in Figures 2.1 to 2.4. The data in Figure 2.1 represent the number of proposals that are submitted and awards that are received per year for a four year period. This is an indication of the productivity of those involved in submitting and receiving sponsored awards. Figure 2.2 gives an indication of the amount of interdisciplinary research that is being conducted at Michigan Tech through our research institutes and centers. As indicated in Figure 2.2, this is an area of growth.

Figures 2.3 and 2.4 show the amount of sponsored awards received in millions. Total funding per year has increased over the four year period. The source of the funding is also tracked, and Figure 2.4 shows the amount of funding from each source for FY2006.
Accomplishment of the research, scholarship, and creative work objective contributes to the education of students by supporting graduate students and providing their dissertation projects. Therefore, the number of graduate students enrolled and the number of PhD students supported by external funds are indirect measures of the success of the research, scholarship, and creative work. Figures 2.5 and 2.6 contain measures of the growth of the graduate program at Michigan Tech. As can be seen in Figure 2.5, there has been growth in graduate enrollment, primarily due to non-degree seeking and MS students. Enrollment in the doctoral program has remained flat from 2005 to 2008. Figure 2.6 indicates that the percentage of PhDs externally supported has dropped and together with the data in Figure 2.5 indicated that the total number of PhDs externally supported has declined during this time period.
**Technology Transfer:** Measures of technology transfer include the number of invention disclosures and licenses/options per $10 million of research expenses. These results for a four year period are shown in Figure 2.7.

![Technology Transfer Results](image)

*Figure 2.7: Michigan Tech technology transfer results for 2003 to 2006.*

**Student and Community Enrichment:** The Rozsa Center for the Performing Arts offers programs year round and tracks attendance as a measure of their impact on the students at Michigan Tech as well as the people in the local community. The attendance for FY2009 was 12,086 and the overall attendance from FY2004 to FY2009 was approximately 80,000. Our local area can be quite large given Michigan Tech’s location, and the Rozsa Center routinely draws individuals from a 50 mile radius and frequently from a 200 mile radius.

**Community Outreach:** A major component of community outreach conducted at Michigan Tech is our summer programs; Women in Engineering, Summer Youth Programs, and Explorations in Engineering. They offer learning opportunities to numerous youth each summer and also expose these pre-college students to the Michigan Tech campus and our academic programs.

Figures 2.8 to 2.11 show the measures used to assess the success of these programs. As seen in Figure 2.10, the programs are primarily self supporting. They bring a diverse group of pre-college student to campus, as shown by Figures 2.8 and 2.9. The data in Figure 2.11 indicate the percentage of the participants that enroll at Michigan Tech. This assists the institution in its strategic goal to obtain a diverse student population.

![Youth Program Participant Ethnicity](image)

*Figure 2.8: Ethnicity of youth programs participants in 2008.*

![Youth Program Participant Gender](image)

*Figure 2.9: Gender of youth program participants in 2008.*
Economic Development: Measures are presented in the response to 9R2.

2R3 Comparison of results for accomplishing other distinctive objectives to other organizations

Research, Scholarship, and Creative Work: Michigan Tech compares total research expenditures with institutions within Michigan and across the US. The results for FY2006 are shown in Figure 2.12. Michigan Tech also maintains an awareness of its ranking based on research expenditures. A four year history of these rankings is shown in Table 2.1.

Table 2.1: Michigan Tech’s NSF Research Rankings

<table>
<thead>
<tr>
<th></th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Institutions</td>
<td>179</td>
<td>179</td>
<td>173</td>
<td>163</td>
</tr>
<tr>
<td>Public Institutions</td>
<td>129</td>
<td>127</td>
<td>125</td>
<td>117</td>
</tr>
<tr>
<td>w/o Medical Schools</td>
<td>79</td>
<td>75</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

Source: Academic Research and Development Expenditures, National Science Foundation
**Technology Transfer:** Michigan Tech compares its success in technology transfer to other institutions using the measures discussed in response to 9R2. The results of these comparisons are shown in Figure 2.13 and indicate a strength in this objective.

![Figure 2.13: Comparison of technology transfer measures to selected Michigan and US institutions. Source: Association of University Technology Managers, 2006 Licensing Survey.](image)

**Student and Community Enrichment:** Michigan Tech administered the National Survey of Student Engagement (NSSE) to first year and senior students in 2006. The results shown in Figure 2.14 indicate the level of involvement these students had in the activities listed and the level to which the students felt their institution emphasized such involvement. We compare our NSSE results to three groups: Association of Independent Technological Universities (AITU), Carnegie Peers, and all NSSE participants. Michigan Tech compares favorably to all groups.

![NSSE Survey Results - 2006](image)

**Figure 2.14: Comparison of 2006 NSSE results. Source: National Survey of Student Engagement, The Carnegie Foundation.**

**2R4 Strengthening of Michigan Tech by accomplishing other distinctive objectives**

As stated in the response to 2P1, our other distinctive objectives are designed to assist in the achievement of our instructional objectives. In fact, our most successful initiatives and programs contribute to the achievement of our instructional objectives and more than one of our other distinctive objectives. In some instances, these efforts can generate income to support other areas of the university.
An excellent example of this is our sponsorship of the SAE Clean Snowmobile Challenge since 2003. This is a collegiate engineering design competition that challenges engineering students to re-engineer an existing snowmobile to reduce emissions and noise. During the week-long event, the modified snowmobiles designed, fabricated, and tested by student teams from several US and Canadian universities compete in a variety of events. Not only do we usually have enough snow for the snowmobiles, but we also have the talent and resources to do an excellent job hosting the event. Our faculty and staff enjoy the competition, the snowmobile industry benefits from the work accomplished by the students, our research collaborators interact directly with the student competitors, our students gain valuable professional experience as part of the Michigan Tech Clean Snowmobile Enterprise, and the community benefits from the increase in business late in our winter season. In addition, Michigan Tech uses the opportunity to highlight our facilities and to recruit visiting students to our graduate programs. Hence this one event contributes to the advancement of a number of our strategic objectives.

Our research efforts are strongly connected to educating graduate students. The growth in our research attracts and retains the best faculty, staff, and students (graduate and undergraduate), which strengthens our instructional programs. It also strengthens our collaborative relationships with corporate partners, as faculty and student research results contribute to their technological advancement and knowledge.

Our achievements in Economic Development and Technology Transfer grow the local and state economies, which greatly benefits our most important stakeholders. Local economic development through faculty startup businesses, the MTEC SmartZone, or the transfer of technology to local businesses also creates job opportunities for our students during their studies and upon graduation. The growth in jobs also assists the local community through the use of retrofitted and restored former industrial infrastructure such as a power generation facility, decommissioned hospital, and a former fruit, produce, and groceries warehouse turned utility headquarters.

Achievement of our objectives for Student and Community Enrichment help support the recruitment and retention of a diverse faculty, staff, and student body. They also provide a venue for our students to learn about different cultures and experience, enjoy, and participate in a wide variety of entertainment and cultural offerings, including sporting events, musical, theatrical, and comedic performances. All of these are also open to the community at reasonable prices and help to promote interactions with those not otherwise directly involved with the university and maintain a connection with our alumni.

The programs delivered by Educational Opportunities positively impact the recruitment and retention of students and faculty from under-represented populations and improve the quality of life on our campus and in our community. Within the local community, we impact the breadth of educational experiences for faculty, staff, and students by offering a variety of professional development and educational activities. As a technological university our outreach efforts are particularly important at this time when fewer and fewer students are choosing to study the STEM (Science, Technology, Engineering and Mathematics) fields. Our Summer Youth programs help us recruit a diverse student body and benefit the greater society by introducing students to the STEM disciplines and encouraging them to pursue a degree in these fields at some institution. This is clearly evident in our largest outreach activity, the YES! Expo. Michigan Tech is the lead sponsor of the YES! Expo, which has occurred annually since 2004 and has taken place at the Crisler Arena in Ann Arbor, MI and Ford Field in Detroit, MI. It is a unique collaboration among state agencies, corporations, universities, youth organizations, professional societies, and business development organizations from all parts of Michigan. The
goal is to inspire middle- and high school students to pursue education and careers in science and engineering. In a hands-on setting, corporate exhibitors expose students to exciting science and engineering activities and careers. Universities and community colleges showcase the educational pathways to these careers and demonstrate the excitement of studying science and engineering. Special technology-based displays and exhibits draw students to STEM, and a high-energy live multimedia show is performed several times during the day to highlight exciting technologies and discoveries in STEM.

2.1 Recent improvements in accomplishing other distinctive objectives

The greatest improvement in this category has been a cultural change within the institution to one of embracing the strategic planning process. This was accomplished through a concerted effort by the Executive Team to improve the Michigan Tech Strategic Plan, by clarifying and condensing its focus to three strategic goals, and by continually presenting it as a framework for many discussions in the university community and with our stakeholders. Aspects of the strategic plan are presented and discussed at regularly scheduled Campus Forums hosted by the President, and at all meetings involving the Board of Control. This culture has permeated almost all units of the institution as the university and individual unit strategic plans are discussed on a regular basis.

Another significant improvement in this category was the establishment of the Experience Tech Fee. The fee of $64 is charged to all students each semester and provides them with free access to the Mont Ripley Ski Hill, the Portage Lake Golf Course, the Gates Tennis Center, Department of Visual and Performing Arts performances, hockey games, and participation in intramural sports. Experience Tech was a student-led initiative and was supported by a large majority of the over 3,000 students who completed an online survey. Introduction of the fee, we believed, would: enrich appreciation for diversity and understanding of the arts; increase participation and attendance for Huskies hockey; improve health and wellness of students through increased participation in physical activities; increase engagement of students with the University and their fellow-students; and promote greater student satisfaction and retention. Launched in the Fall 2008 semester, the Experience Tech fee has already been declared a success. Student participation has increased at the golf course, tennis center, and ski hill and student attendance at performing arts events has doubled. The program has enriched the student experience at Michigan Tech. Another unanticipated but significant benefit of the fee is that it has provided a stable and predictable income base for the areas that provide or support these activities. In the case of the performing arts programs, the fee provides a reliable production budget for performance organizations, and as a result accounting has become more transparent as student leaders of the performance organization can now readily track, and be accountable for, their expenditures. A concern that has been raised with the administration and the Board of Control is the requirement that all graduate students also pay the Experience Tech fee. The Graduate Student Council has requested that graduate students should be able to opt out of the program on the grounds that their income is limited, and most are busy researchers, sometimes with additional family obligations who wish to select their own external activities. The Board of Control is reviewing this request.

2.2 Culture and infrastructure for improved performance in accomplishing other distinctive objectives

As a medium size, lean-resourced University in a rural setting, we have a culture of collaboration and effective resource use. As a result, we are constantly striving to be more effective with our resources and leverage one another’s talents and abilities – we adopt a continuous improvement process for enhancing performance and we are always looking for more creative ways to change, eliminate, or add processes to be more responsive to our stakeholders.
Category 3 Understanding Students’ and Other Stakeholders’ Needs

3P1 Identifying the changing needs of student groups; analyzing and selecting a course of action

To determine the changing needs of our current students we use surveys, direct student involvement on committees and advisory boards, one-on-one interactions, and observation. We conduct a student satisfaction survey in the spring semester every year (as discussed in the response to 1R5). It is administered online to our current undergraduate and graduate students. It contains questions on student preferences and specific questions that ask about student needs such as local bus service, health services, the academic calendar, establishment of a University Creed or value statement, and effective communication strategies. In addition to this general survey, several more targeted surveys are used to obtain information on the needs of our students with regard to: the Little Huskies on-campus child care center, new student Orientation programs, judicial affairs, the Career Center, “special needs” students, residence hall living, specific student programs, counseling, and library services.

The needs of current students are communicated by student advisory boards and focus groups in a number of areas including; academic units, the Career Center, the JR Van Pelt/Opie Library, Student Affairs, the Student Development Complex, the Student Commission, residence hall councils, Michigan Tech Student Foundation, Undergraduate Student Government, Graduate Student Council, Student Entertainment Board, and the Memorial Union Board. Through regular presentations by their representatives, or individual questions during the public comment part of the proceedings, students directly voice their needs to the Board of Control. They can also address counseling services, judicial affairs, and various other units through direct contact with Board members, staff, and faculty. Student employees also communicate the needs of the greater student body directly to their on-campus employers.

The needs of our current students are also determined by mechanisms that are external to Michigan Tech. Faculty ensure that they stay current with the needs of industry to constantly review the knowledge and skills needed by employers upon graduation. This can also result in changes of learning support services, such as those provided by the library. Faculty and staff attend professional conferences and consider national trends in curriculum, teaching and learning, and student support service areas to determine the evolving needs of our students.

The Admissions office communicates with prospective students through emails and phone calls to provide them with as much information as possible about the university and the local community. Current students assist with this step of recruitment by participating in phone banks during peak periods. In addition, the office gains information on the needs of prospective students who may choose to enroll at Michigan Tech.

The needs of pre-college students are determined based on the state of Michigan high school graduation requirements. These guide the enriching pre-college programs that we offer to students and K-12 teachers such as the NSF-funded Family Engineering program, a program for Women in Computer Science, and other targeted pre-college initiatives. We also have a strong partnership with the Detroit Area Pre-College Engineering Program (DAPCEP), from which we obtain information on the needs of this student group.

Results of the campus surveys, which measure general student satisfaction and highlight aspects of the student experience, are used to modify or enhance activities and services connected with strategic outcomes and goals. National longitudinal and collaborative studies
(e.g., National Survey of Student Engagement (NSSE), Greek Experience Survey, Profile of the American College Student, and CORE Drug and Alcohol Survey) provide some comparative and benchmark measures to analyze and anticipate the needs of successive student cohorts. This information is available to various departments across the university to analyze and use in targeting and improving their services and programs for appropriate and specific outcomes. In all cases, the analysis is done in alignment with the strategic plan and the available resources.

3P2 Building and maintaining a relationship with students

We build and maintain a relationship with our students by providing timely and relevant information, seeking their input, involving them in the decision-making process, and, to the extent possible, meeting their needs. Students serve on a number of university committees including the Student Commission, recreation advisory boards, administrative level searches, the new student orientation team, and the Michigan Tech Student Foundation. Through this involvement they see that their input is valuable in our decision-making processes and this builds the foundation for a lasting relationship between the students and the institution. Michigan Tech provides the services and products that the students request, or clearly and publicly explains the reason why a service or need can not be met. For example, the Memorial Union Support Fee is intended to substantively improve the Memorial Union Building and the services provided there to students. Excess revenue generated by this fee, beyond supporting the operational costs, is committed to improvements in the building and the services offered. Student input is needed, used, and expressly sought out to inform and direct the management on how these funds should be used. Financial transparency is offered to students wishing to monitor how their funds are spent and wishing to provide feedback by posting student fee spending on the Memorial Union website at http://www.aux.mtu.edu/mub/safprojects.shtml.

Sports and Recreation follows a similar model for receiving student input on the use of the Student Development Complex Support Fee.

Student groups like the Undergraduate Student Government and the Inter-fraternity Council meet with officials from the City of Houghton on a regular basis during the academic year. During these meetings the students present their needs to the city and discuss areas of potential improvement in student-city relations.

Michigan Tech also builds and maintains relationships with students by providing a welcoming and inclusive campus environment. This is achieved in many ways including: faculty and staff attendance at sporting events and student-run entertainment presentations or celebrations, informal sessions with student, faculty, and staff parents whose children are enrolled in the Little Huskies day care center, making an effort to learn students’ names, providing faculty and staff service as advisors to student groups, being open and available to students, and providing on-campus jobs for students to help meet financial needs.

We also build and maintain the relationship with our students by connecting them to our alumni through the “Huskies on the Move” program, which was established based on input from our Alumni Association Board and the Michigan Tech Student Foundation. The goal is to connect our current students with alumni who may be able to provide jobs, co-ops and professional advice as well as assistance with relocation. The program assists students as they move to a new location through a local contact person. It also connects them to the community of alumni and promotes their association with the university after graduation.

3P3 Analyzing the changing needs of key stakeholder groups and selecting courses of action

Personal interaction and dialog is the primary way of identifying and analyzing the changing needs of our key stakeholder groups, and selecting courses of action to address these needs.
Student groups interact directly with the City of Houghton to determine the volunteer services they can provide for certain sectors of the community. The university also interacts directly with local government officials and law enforcement to determine their needs and the means by which the university can meet them. Specific university entities that provide services to the local community, including the JR Van Pelt/Opie Library, Memorial Union Building, Community Programs, Recreation, and the Rozsa Center for the Performing Arts, determine stakeholder needs through the use of surveys, statistics, and personal interactions.

Various prospective and new student programs provide special components for parents and families (including siblings and grandparents) who accompany their students for visits and moving-in. For example, campus visits, tours, an annual Open House, Orientation, and Family Weekend include special academic and student life presentations geared to these stakeholder needs. Families may request to meet with certain advisors, administrators, and staff to discuss specific concerns. Opportunities to share insights and experiences with other families at "roundtables," picnics, and panel discussions are often featured during these programs. Feedback, in the form of surveys and one-on-one conversations, allow for comments on the quality and appropriateness of the programs for particular needs of the families. Relationships with these stakeholders are built and enhanced through various communication efforts such as phone calls, targeted mailings, emails, program websites, and the monitoring and responding to parent concerns on our parent-l listserv. Students may designate "guest access" to family members for viewing their financial status and academic progress; they can also grant permission for discussions between university faculty or staff and their families when needed.

The employers of our graduates are an important set of stakeholders. Michigan Tech has an extensive relationship with over 60 corporations, and new or growing relationships with many others. On a regular basis, members of the Corporate Development staff meet with key corporate representatives in what amounts to an “account manager” system. Staff members listen to and interpret the needs of each company and then facilitate the follow-through on the provision of services. These services include recruitment for hiring, research opportunities, Enterprise or senior design projects, and more. The Career Center has an advisory board that helps determine the changing needs of these stakeholders, who are very willing to voice their opinions openly. External advisory boards, with a significant percentage of corporate representatives, are also used by academic and non-academic units across campus as a mechanism to, where appropriate, incorporate their needs into our curricula, programs, and services for students, faculty, and staff.

The needs of our alumni are determined and analyzed using an advisory board, the Michigan Tech Alumni Association, and by identification of national trends. Alumni Relations conducts regular surveys to determine the needs of our alumni. In addition, direct personal interaction is a valuable method of determining alumni needs. Our student telephone callers have the opportunity to speak to thousands of our alumni annually and our staff from Development and Alumni Relations meet with hundreds of stakeholders face to face on an ongoing basis. Annual events such as Alumni Reunion, Homecoming, Career Fair, regional picnics, and Winter Carnival attract a large number of our alumni and a significant level of personal interaction occurs between our alumni who visit and the entire university community.

As with student needs, survey results are used to modify or enhance activities and services identified with strategic outcomes and goals. Comparative and benchmark measures are available for various departments across the university to analyze and use in targeting and improving their services and programs for appropriate and specific outcomes. In all cases, the analysis is done in accord with the strategic plan and the available resources.
3P4 Building and maintaining relationships with key stakeholders
Michigan Tech builds and maintains relationships with key stakeholders in the same manner that it does with its students by providing timely and relevant information, seeking input, involving them in the decision-making process, and to the extent possible meeting their needs. Our relationships with government officials are built and maintained through networking and personal contacts. Our vice-president for governmental relations, who is also secretary to the Board of Control, stays in regular contact with political figures and initiatives at the local, state, and federal level and engages faculty, staff, and administrators in the dialog as appropriate. Through personal interactions we determine areas that need to be improved or changed and whenever possible enact the necessary changes to meet their needs. We also build and maintain relationships with our stakeholders through personal visits with selected individuals, corporations, and private foundations. The idea is to engage and involve these stakeholders so as to pursue specific outcomes: charitable gifts, research funding, and advocacy on behalf of Michigan Tech. Also, the president sends a quarterly "Insider Letter" to a select list of individuals to share information and perspectives on Michigan Tech's direction and its progress.

The University maintains an open door policy with the City of Houghton which ensures a timely response to issues and emergencies. This is particularly important as the student population at Michigan Tech is actually larger than the population of the City of Houghton, so our students, faculty, and staff have an important impact on the economy and social fabric of the area.

The Keweenaw Business and Community Leaders (KBCL) group was formed to improve the relationship between the community and university. The KBCL meets two to three times per year, with an average attendance of 61 over the past four years, to discuss problems/issues and develop solutions. Members have also met to coordinate efforts to attract dual career partners to the community. The KBCL participates in the Student Expo every fall on campus to showcase local businesses to students. They are also strong supporters of Winter Carnival and other student sponsored activities.

3P5 Determining to target new student and stakeholder groups with educational offerings and services
The decision to target new students or stakeholder groups with our educational offerings and services is made in keeping with our strategic plan. Consideration of the impact that the educational offering or service will make, its ability to advance the objectives of the strategic plan and to build and maintain relationships with our stakeholders, and the resources required are all factored into the decision. Services and educational offerings that have a high impact, are in alignment with the strategic plan, and require a reasonable resource commitment are pursued. In addition, new educational offerings are only established if they build upon our existing strengths and will attract an audience large enough to make the offering financially viable. A particular concern at Michigan Tech is to attract more women as students to the STEM fields in which we have strong offerings. Of course, services or educational offerings that are mandated by law, such as compliance laws, and minorities and disabilities laws, are always pursued regardless of the resource requirements.

3P6 Collecting complaint information from students and stakeholders; selecting and communicating courses of action
The processes discussed in responses to 3P1 and 3P3 are all used to collect complaints or concerns from students and other stakeholder groups. The processes used to analyze, select courses of action, and communicate these actions to our students and stakeholders are different for each process.
A primary venue for the collection of student complaints, analyzing them and selecting courses of action is the Student Commission. This is a university level standing committee that is chaired by the vice president for student affairs. It consists of 32 members that represent the students (undergraduate and graduate), faculty, and staff. Members bring issues to the committee and complaints are solicited by email and through the Commission website. The Commission also examines the results of the student satisfaction survey as a mechanism to identify recurrent complaints or areas of student concern. Complaints or issues that are brought to the Commission are discussed; usually several members are assigned to further investigate each issue and if appropriate propose solutions. The actions taken by the Student Commission are communicated to the university community on their website, and through the weekly student-run newspaper, The Lode.

A well-established process is in place for students that have an academic grievance. Michigan Tech recognizes the need to assure that student grievances about faculty actions are evaluated fairly and equitably and, for this purpose, established the procedures detailed in the Student Handbook available online at http://www.admin.mtu.edu/urel/studenthandbook/academic.html.

The role of the ombudsperson is to provide a fair and effective means of bringing a complaint to an impartial person who has investigative powers. This recourse is to be used only after normal channels have failed. All information is held in strict confidence between the complainant and the ombudsperson, who does not have authority to take disciplinary action, reverse decisions, or circumvent regulations. After hearing complaints, the ombudsperson will recommend action or decide that complaints are unfounded or beyond the ombudsperson’s jurisdiction.

To collect complaints from our alumni, Alumni Relations uses their web "contact us form" and publishes their "alumni@mtu.edu" email address on all materials. Follow-up communication takes place with all alumni who correspond with their office by phone, letter, or email. Survey results are posted on the web and in the Michigan Tech Magazine.

3R1 Determining satisfaction of students and stakeholders; regularly collected and analyzed measures of student and stakeholder satisfaction

To determine the satisfaction of out students we conduct an annual student satisfaction survey and track the results over time. We also keep longitudinal data on retention rates and enrollment yields. These results are compared to past data, benchmark institutions, and national trends. Student satisfaction with specific aspects of the university is determined using a variety of methods. Course and instructor evaluations are conducted in all courses in accordance with university policy. The JR Van Pelt/Opie Library measures student satisfaction by usage, including gate count, 24-hour entrance count, number of searches and full-text downloads, and instructional contacts. A high level of usage for a service is interpreted as a high level of satisfaction. Trends in these statistics over time are identified and they are compared to benchmark institutions.

To determine the satisfaction of our Alumni stakeholder group, we measure their donor participation, percentage of contactable alumni, willingness to share biographical information, alumni reunion attendance, participation in alumni events and in our online community, public social networks, utilization of products and services, alumni volunteer roster, number of Michigan Tech state of Michigan license plates in use, and TechAlum enewsletter circulation. Alumni surveys are conducted approximately every five years, and Alumni Relations contact information is displayed prominently on all correspondence and Web pages, which yields frequent contacts and queries.
Measures of satisfaction related to external stakeholders are capital outlay funding level, government sponsorship, external participation on university advisory boards and committees, research funding, and support of university fund raising initiatives by all private donor categories.

**3R2 Performance results for student satisfaction**

The most fundamental measures of student satisfaction include enrollment yields and student retention rates. Michigan Tech collects these data on an annual basis and the results for the past four years are shown in Figure 3.1. As can be seen there has been a slight increase in retention of first to second year students and a slight decrease in enrollment yields. The decrease in enrollment may be attributed to more aggressive recruitment strategies aimed at increasing the geographic reach and quality of our undergraduate student body.

![Enrollment Yields: All New Undergraduates](#)

<table>
<thead>
<tr>
<th>Year</th>
<th>Retirement Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2005</td>
<td>42.0%</td>
</tr>
<tr>
<td>Fall 2006</td>
<td>39.9%</td>
</tr>
<tr>
<td>Fall 2007</td>
<td>36.7%</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>38.3%</td>
</tr>
</tbody>
</table>

![Student Retention Rates: First to Second Year](#)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention</td>
<td>80.3%</td>
<td>80.7%</td>
<td>82.8%</td>
<td>81.9%</td>
</tr>
</tbody>
</table>

**Figure 3.1:** Undergraduate enrollment yields (left) and retention rates (right).

The student satisfaction survey contains several general questions focused on the overall satisfaction level of our students. The results for these questions are shown in Figure 3.2. These results indicate some room for improvement.

**Undergraduate Student Satisfaction Survey Results**

<table>
<thead>
<tr>
<th>Statement</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are appropriate channels at Michigan Tech for expressing student complaints and concerns</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>The tuition I pay is worth the educational experience I am having at Tech.</td>
<td>2.7</td>
<td>2.9</td>
</tr>
<tr>
<td>At Michigan Tech it is evident that &quot;students come first.&quot;</td>
<td>2.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

**Graduate Student Satisfaction Survey Results**

<table>
<thead>
<tr>
<th>Statement</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are appropriate channels at Michigan Tech for expressing student complaints and concerns</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>The tuition I pay is worth the educational experience I am having at Tech.</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td>At Michigan Tech it is evident that &quot;students come first.&quot;</td>
<td>2.8</td>
<td>2.8</td>
</tr>
</tbody>
</table>

**Figure 3.2:** Results from the annual student satisfaction survey indicating the overall level of undergraduate (left) and graduate (right) student satisfaction. Average responses are shown on a scale of 1 to 4 (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree)
Additional results from the student satisfaction survey are included in the responses to 1R5, 3R3, and 6R2.

Usage statistics for the JR Van Pelt/Opie Library are collected and analyzed on an annual basis. A high level of usage indicates a high degree of satisfaction. Some representative measures are shown in Figure 3.3. All of these indicated increased use of the library facilities and services.

![Library Usage Statistics](image)

**Figure 3.3**: Library usage statistics for 2005 to 2008.

**3R3 Performance results for building relationships with students**

As stated in the response to 3P2, one process used by Michigan Tech to build and maintain relationships with our students by is by seeking their input and involving them in the decision-making process. This is measured using the student satisfaction survey by asking if students feel they have a voice in university decisions. These results are shown in Figure 3.4 with other measures that indicate the senses of belonging and welcome that our students experience. These results indicated that students feel they should have a more significant role in decision making, although they do have a strong sense of belonging to and feel welcome at Michigan Tech.

![Instructional Contacts](image)

**Figure 3.4**: Results from the annual student satisfaction survey indicating the type of relationship the undergraduate (left) and graduate (right) students have with the university. Average responses are shown on a scale of 1 to 4 (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree)
Additional results from the student satisfaction survey are included in the responses to 1R5, 3R, and 6R2.

3R4 Performance results for stakeholder satisfaction

The satisfaction level of our alumni is determined in several ways including the regular collection and analysis of a number of measures based on their interaction with the university. Some of these are shown in Table 3.1.

Table 3.1: Measures of Michigan Tech Alumni Satisfaction

<table>
<thead>
<tr>
<th>Measure</th>
<th>Percentage of all living alumni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contactable</td>
<td>92.7</td>
</tr>
<tr>
<td>Contactable via email</td>
<td>44.0</td>
</tr>
<tr>
<td>Employment information in database</td>
<td>75.8</td>
</tr>
<tr>
<td>Attended an event</td>
<td>8.9</td>
</tr>
<tr>
<td>Made a gift in past two years</td>
<td>22.4</td>
</tr>
<tr>
<td>Volunteered (admissions, career services, chapters, events)</td>
<td>2.2</td>
</tr>
</tbody>
</table>

In addition to these measures, in a survey of alumni conducted in May 2008, the majority described their overall experience as an alumnus/a as good to very good.

One of our key stakeholders, the state of Michigan, has been a strong financial supporter even during extraordinarily difficult economic times. During the past 10 years the state has provided some $44 million for $60 million worth of capital outlay projects, which include the Center for Integrated Learning and the Great Lakes Research Center facility. Our plans call for another $40 million in state capital outlay funding in the next 5 years. The specific projects for which state support is requested are determined after input from the university stakeholders and then a process ensues whereby the university president and his executive team make certain that the requests are consistent with the university strategic plan and campus master plan as well as meshing those requests with the priorities of the state. Also, over the past four years the State of Michigan has funded about $6 million dollars of research at Michigan Tech.

3R5 Performance results for building relationships with key stakeholders

One measure of our success in building relationships with key stakeholders is their continued participation with Michigan Tech. An example of this is the partnerships with our Youth Programs. We currently have 46 partners that provide 60% of the funding for participation within Youth Programs (see the response to 2R2 for details). The majority of our partners have been with us for 10 or more years.

Parents are another key stakeholder group and a measure of their relationship with the university is the financial support they provide above and beyond the educational costs for their student. Donations to the Parents Fund, which is used to support a variety of student activities, has increased since the inception of the fund, as shown in Figure 3.5.
Figure 3.5: Donations to the Parents Fund for the past four years.

Comparison of results for understanding students’ and stakeholders’ needs with other organizations

Our primary comparison for method for understanding students’ needs is using the IPEDS data on retention rates. Figure 3.6 shows the results of these comparisons and indicated that we are performing well in Michigan but can improve compared to the institutions chosen for comparison at the national level.

Figure 3.6: Comparison of retention rates at Michigan Tech to those of other Michigan institutions (left) and national public and private institutions (right). Source: IPEDS 2006-07.

We do not have direct numerical comparisons for the satisfaction of our alumni. However, our development consultant from Bentz Whaley Flessner, who helped conduct our Alumni Attitudinal survey in 2005, said that our survey response rate of 29.3% was better than typical results and that our alumni are much more positive and loyal to our university than he, “would expect from any academic institution, and especially from a public state university.”
3I1 Recent improvements in understanding students’ and stakeholders’ needs

With regard to our students, we now use StudentVoice, a consultant firm engaged in higher education assessment, to assist with data collection and analysis of student characteristics and responses relative to services and programs across the university. We are also participating in the National Student Clearing House and are using this to determine which universities successfully recruit students who are admitted to Michigan Tech but reject our offer of admission.

To improve the processes used to build relationships with our key stakeholders a few changes and enhancements have recently been made. Alumni Relations has modified their surveys to include standard questions from the CASE (Council for Advancement and Support of Education) national survey to facilitate external comparisons. They are also increasing (current) student participation on boards, committees, and at events. Luncheons for scholarship recipients are arranged to provide them with encouragement and the opportunity to send thank-you notes to their scholarship donors. Participation has been increasing steadily since the inception of this program. Also, to gather more satisfaction information on our pre-college programs, the Educational Opportunity and Outreach Office has expanded their survey to gather input from parents in addition to the student participants.

3I2 Culture and infrastructure for improved performance in understanding students’ and stakeholders’ needs

Michigan Tech is a residential campus in a small community and this promotes a sense of community among our students, faculty, and staff. This and the networks of informal relationships that exist on campus help us to communicate and express our ideas. We encourage innovation, creativity, and collaboration not only in our academic programs but in all the things that we do, which helps us to select processes to improve.

We have experienced a high response rate to surveys, as indicated in several places in this document. This gives us confidence in the results. We can therefore conclude that our survey results are accurate reflections of the desires of our students and stakeholders as we work to improve processes and set targets for improvement.
Category 4 Valuing People

4P1 Identifying the credentials, skills, and values required by faculty, staff, and administrators

In general, the specific credentials, skills, and values required for faculty, staff, and administrators are identified through past practice, benchmarking, and experience with the position or a similar position. The processes are different for faculty, staff, and administrative positions.

The process of identifying the credentials, skills, and values required for faculty is performed in alignment with the strategic plan of the department or school, which includes both instructional and non-instructional objectives. The skills required are those which will result in a faculty who are able to achieve the strategic objectives. The faculty members in the academic unit make this determination.

Identification of the skills, credentials, and values required for staff is done in a variety of ways depending on the level and location (unit, department, or office) of the position. Managers in each area know the credentials required for a particular position based on their experience. Job and/or position descriptions, which include required education and/or experience and other skills and abilities, are developed by supervisors and colleagues with assistance from the Human Resources staff, who also provide guidance for each position and recommend the level and classification/compensation (or range thereof) that is appropriate.

4P2 Hiring processes that ensure employees possess the required credentials, skills, and values

All candidates for a position are evaluated against the credentials, skills, and values determined for the position to which they are applying. The paper application, including a completed resume or curriculum vitae and for some positions a transcript or copy of a diploma, is used to evaluate the candidate’s credentials and skills. References provided by the candidate and chosen by the search committee are used to evaluate the skills and values of the candidate. The interview and campus visit is the final method used to evaluate the skills and values of the candidate. Candidates are typically interviewed by more than one individual because a diversity of perspectives enables a more thorough evaluation. A portion of the on-campus interview may include an evaluation process to ensure they have the required skills and abilities or the presentation of a seminar to the campus community after which input from the audience is solicited typically through an online survey. These comments are considered by the search committee during their deliberations. At the present time background checks are performed only if required for the position.

Our hiring processes are in full compliance with all state and federal laws, and we maintain the necessary documentation to demonstrate to our auditors that every applicant was given full and fair consideration, that every hiring decision was business based, and all hires meet the requirements for the position. As evidence of this, Michigan Tech completed an extensive Office of Federal Contract Compliance Program (OFCCP) audit, which started in August, 2007 and ended in December, 2008. No violations or citations were submitted. A complete review of our records and practices for hiring faculty was conducted as part of the audit. Our current plans to revise, upgrade and, where possible, standardize our processes should only further contribute to the compliance requirements. In compliance with the federal mandate to have an Affirmative Action Program, we track the outcomes of our hiring processes, keep pace with trends, and identify the practices that are most beneficial for Michigan Tech.
4P3 Recruiting, hiring, and retaining employees
A wide variety of methods are used to recruit employees. We advertise positions in numerous venues including: local and regional newspapers, professional publications, web-based employment listings, electronic email lists, and publications targeted at professionals who are women and minorities. We also use personal contacts at meetings and through our professional associations and within the local community to recruit qualified employees. Searches for senior administrative positions may employ an outside search firm to develop a pool of applicants. In all searches (except those for represented staff), efforts are made to obtain a diverse pool of candidates appropriate for the position.

Faculty, non-represented staff, and administrators are hired using similar processes, with a few exceptions that are discussed below. The process begins with the formation of a search committee with membership appropriate to the position. The search committee evaluates the candidates based on the paper application, which may include a curriculum vitae, references (letters or phone calls), and possibly an interview at a conference or on the phone. A short list of candidates, approved by the supervisor, is identified for on-campus interviews. The itinerary for the on-campus interview is developed as appropriate for the level of the position. After the on-campus visit, the search committee, with input from stakeholders, develops a list of candidates that are recommended for hire. These candidates may or may not be ranked depending on the charge given to the committee and the outcome of the committee deliberations. The list of qualified candidates is forwarded to the supervisor, unless he or she is a member of the search committee, for a final decision. The Affirmative Programs Office performs checks at various stages of the hiring process to ensure that all applicants are given full consideration and are evaluated fairly.

The hiring processes (procedures) for academic administrators are specified by the University Senate and/or by academic unit charters, which are approved by the University Senate, provost, and president, and placed on file in the University library. Another variation on the general hiring process occurs for some staff positions as Human Resources pre-screens the candidates and only those who have the required credentials and meet the minimum requirements of the advertisement are forwarded to the search committee. The hiring process for represented staff is subject to the contract terms relevant to the position for which they are applying.

Our primary method of retention is to meet the needs of our employees. This is often accomplished through compensation; salary and benefits. We celebrate and recognize the achievements of our faculty, staff, and administrators through internal and external publications, internal awards, nominations for external awards, and endowed faculty positions. Academic units mentor faculty through formal and informal means including the assignment of individual mentors, encouragement of collaborative research, annual reviews, and through the established tenure and promotion process. The university provides on site child care facilities, and opportunities for educational and professional growth. We also have a Dual Career Assistance Program that is intended to aid in the recruitment and retention of dual career partners.

4P4 Orienting all employees to Michigan Tech’s history, mission, and values
While some units at Michigan Tech orient their employees to our history, mission, and values, this is currently not a university-wide activity and is a future opportunity for improvement.

4P5 Planning for changes in personnel
Planning for changes in personnel varies widely across the institution, but two university-wide programs assist units in this endeavor. The first is the Retirement Supplemental Voluntary Program (RSVP) that facilitates the voluntary retirement of eligible employees. While
employees are not constrained to retire at any particular age, arrangements for retirement are a natural part of an employee's personal and professional planning. This program provides information and, in some cases, incentives, that should make retirement planning easier. RSVP encourages continued participation by retirees in the university community and is available to all university employees.

The second is the Strategic Faculty Hiring Initiative (SFHI), which is being used to redefine graduate and undergraduate education through our interdisciplinary programs. SFHI will enhance these efforts through the creation of ten "growth" faculty positions each year for a total of 10 years. In each year the initiative focuses on a theme or themes, which were Sustainability in 2007-08 and Computational Discovery and Innovation in 2008-09. Forthcoming interdisciplinary themes are being identified through far-reaching discussions both inside and outside the university community.

4P6 Designing work processes and activities to contribute to organizational productivity and employee satisfaction

A number of our work processes and activities are being redesigned to achieve organizational productivity and employee satisfaction using a method for continuous process improvement known as Lean. We have hired a consultant to help us learn the "Lean" approach. During monthly campus visits that started in May 2008, with the assistance of our consultant, we have rolled out Lean teams across various campus units. The team members have learned Lean thinking and have been introduced to tools that can be used to make improvements comprised of shortening timelines and stabilizing processes by including the employees closest to the work. While eleven formal Kaizen teams have been established in the past twelve months, many more informal teams have been formed at the natural work group level to improve processes within campus units. These teams use the Lean thinking and problem-solving approach to remove waste and reduce anything "non-value- add" from the customer’s perspective, which shortens and stabilizes processes. The employees participating on Lean teams and in natural work groups that have adopted Lean thinking have demonstrated more on-the-job employee satisfaction, and their excitement is spreading throughout the campus.

4P7 Ensuring the ethical practices of all employees

Michigan Tech has established policies and procedures on a number of areas that involve the ethical conduct of our employees. Policies contained in the Board of Control Policy Manual that address ethical practice include: conflict of interest, sex discrimination/sexual harassment, discrimination and harassment, disruption of university activities, use of federal funds, and a loyalty oath. The Tenured/Tenure-Track Faculty Handbook includes policies and procedures on: conflict of interest/effort, discrimination, harassment, academic integrity and honesty, scientific misconduct, grievance policy, affirmative action, and Office of the Ombuds. The Faculty Handbook also contains a statement on professional ethics that addresses responsibilities to students, staff, colleagues, and the institution. The University Senate has a number of policies under the conduct umbrella that include: conflict of interest; consensual relationships; discrimination and harassment; misconduct – research, scholarly, creative endeavors; Office of Ombuds; and threatening, harassing, and violent behavior.

The efforts undertaken to ensure that the established policies on ethical conduct are followed fall into the general categories of educational, procedural, and enforcement/accountability. Various educational opportunities are available, some of which are mandatory, to provide information to faculty, staff, administrators, and student employees on the ethical responsibilities associated with their professional activities. An example is responsible conduct of research training for faculty members as well as graduate research assistants. This is conducted at on-
campus orientations and using Collaborative Institutional Training Initiative (CITI) online training. Procedural efforts include required conflict of interest disclosure as part of the grant submission process, annual consulting disclosure statements, and the use of internal review boards such as Human Subjects Committee (IRB), Institutional Animal Care and Use Committee (IACUC), and Recombinant DNA (IBC).

Enforcement of ethical practices and the processes by which ethical conduct is governed is the responsibility of the entire Michigan Tech community. The Human Resources department investigates any allegations relating to a negative work environment, and the Affirmative Programs Office investigates allegations of discrimination attributed to unequal treatment under the ADA or on grounds of race, ethnic origin, creed, or sexual orientation. Faculty members who wish to appeal decisions related to renewal, promotion, or tenure can do so through the Committee on Academic Tenure, Promotion, and Renewal if they believe there is evidence of a procedural error in the processing of their case. General faculty grievances go through a layered process beginning with informal discussions between the parties, and then through a departmental, and university-wide committee process.

The Office of the Ombuds is another means of ensuring adherence to the established policies. At Michigan Tech it provides informal, impartial, and confidential dispute resolution services for members of the academic community. The Ombuds Office provides services to help individuals resolve their concerns fairly and informally. Informal conflict resolution services are intended to be employed prior to resorting to entering more formal grievance procedures. The Ombuds Office operates independently as a supplement to existing administrative or formal grievance procedures and has no formal decision-making authority. The ombuds officer serves at the request of the president and periodically makes policy and procedural recommendations to the president based on his/her experiences.

Michigan Tech has installed a phone- and Internet-based system called EthicsPoint, which allows anyone at the University to report on activities they believe to be unethical, unsafe, or illegal. Employees and students are first encouraged to bring concerns to their supervisors or someone in a position of authority, but if someone is uncomfortable doing this they can file a report via the EthicsPoint Reporting System. This system allows the individual to remain anonymous if they so choose. Initially, reports are passed on to members of the Finance and Audit Subcommittee of the Board of Control, the internal auditor, and the university's attorney. However, if a report implicates any of these people, that person will not receive a report. All are encouraged to report any serious behaviors that they believe affect the workplace environment. Criminal behavior, safety violations, financial malfeasance, substance abuse, and threats of violence are examples. Those who submit a report are encouraged to regularly check the website for progress on their report. The university community is assured that no retaliation will be taken against anyone for reporting or inquiring in good faith about potential misconduct.

The university has recently established an Institutional Compliance and Ethics Office, which will be discussed in response to 4I1.

4P8 Determining training needs and aligning them with short- and long-term organizational plans to strengthen programs and services

The determination of our training needs is transitioning from a reactionary to a proactive framework with units at various points along this transition. Michigan Tech recognizes this is a future opportunity for improvement.
4P9 Training and development of faculty, staff, and administrators to fully and effectively contribute throughout career

The training and development of faculty, staff, and administrators to contribute fully and effectively throughout their careers and the reinforcement of this training does not currently occur in a systematic and comprehensive manner in all units. Michigan Tech recognizes this is a future opportunity for improvement.

4P10 Designing and using personnel evaluation systems; aligning these systems with organizational objectives for programs and services

The promotion and tenure process is used to evaluate faculty and provide them with feedback on their performance until they achieve the rank of professor. University Senate policy dictates the general processes associated with tenure, promotion, and reappointment. The design of the process at this level must be conducted as stated in the policy. The review of faculty in accordance with the Senate policy on tenure, promotion, and reappointment begins in each academic unit, which designs the evaluation process in alignment with its strategic objectives and Board of Control and University Policy. This process is documented in the unit charter that is approved by the president. Annual faculty reviews may also be conducted as a part of the annual salary adjustment process.

The university does not require annual reviews of professional staff, and annual reviews of represented staff are done in accordance with contract language.

4P11 Designing employee recognition, reward, and compensation systems to align with objectives for programs and services

The process used to design our faculty recognition, reward, and compensation systems to align with our objectives varies among the academic units. The design of a recognition system for staff was based on best practices at other institutions of higher education. This is a recognized future opportunity for improvement.

4P12 Determining key issues related to the motivation of faculty, staff, and administrators

The primary means for determining key issues related to the motivation of faculty and staff is by conducting a climate survey. The last university-wide climate survey was administered in the fall of 2005. The results were reviewed by a Climate Study Steering Committee, which had broad university representation, and with the assistance of two external advisors from the Center for Research on Teaching and Learning at the University of Michigan and the Corporate Advisory Board for Institutional Diversity. The analysis took some time, but a list of recommendations was submitted to the president in October 2007 for consideration. In response the president accelerated development of the Little Huskies Child Care center, opened in late fall of 2007, and implemented a number of suggestions emerging from the report. A second Climate Survey will be conducted in 2010, and it will become a standard instrument for gathering periodic feedback from faculty and staff.

4P13 Providing for and evaluating employee satisfaction, health, safety, and well being

Michigan Tech provides for the satisfaction, health and safety, and well being of its employees by providing an atmosphere of cooperation and fostering a sense of community among all employees, practicing an open door policy that promotes the free expression of needs and ideas, and maintaining a safe work environment.

We provide a safe work environment for our faculty, staff, and students through the processes (described in the response to 6P3) that design, maintain, and communicate our occupational safety and security programs. In addition, the Early Intervention Team, which is a cross-
campus committee assesses and tracks troubled students on a case-by-case basis. All of these efforts work in cooperation with the Department of Public Safety as the organization with primary responsibility for maintaining a safe and secure environment. Their goal is to facilitate the academic mission by providing an environment in which all members of the campus community can safely study, work, and live. The Department of Public Safety is staffed by trained, certified State of Michigan Police Officers with full law enforcement authority (including the power of arrest) throughout Houghton County. The Department is staffed and operates 24 hours per day, seven days per week. Michigan Tech also provides the Safety First Alert Communication System, which is discussed in response to 6I1.

To provide for the health and well being of our employees, Michigan Tech offers a comprehensive health benefits package that provides 100% coverage for a yearly wellness visit. A supplement to this is the TechFit program, which provides $150 annually for each eligible employee (and $85 for one dependant) who takes part in a variety of wellness activities. This benefit can be used at many local providers. To increase awareness and encourage well being, a comprehensive health fair for the campus community is held every other year to help achieve health and wellness-related goals that will enhance academic, professional, and personal development. “Lunch and Learns” are scheduled throughout the year and cover a larger variety of topics and issues related to health and well being.

These and other programs are designed with assistance from the TechCommunity Wellness Committee, whose mission is to encourage and empower members of the University community to live healthier lives. They strive to create a healthy environment, to reduce health risks, and enhance quality of life through educational programs, activities, and outreach events.

The satisfaction of our employees is evaluated using the results of our climate survey and through an assessment of productivity. Employee health and well being are evaluated using our annual safety report and by monitoring the use of our health related benefits and attendance at health and well being related programs. The annual Campus Security Report includes the Michigan Tech Crime Awareness Report containing three year crime statistics, the University’s Sexual Misconduct Policy and the Drug and Alcohol Policy. The Crime Awareness Report and the Alcohol and Drug Policy are provided to all members of the University community in compliance with federal law and are used to evaluate the safety of our campus. In addition, to ensure transparency and awareness, a weekly crime report is published on the Public Safety website and in the weekly student newspaper, the Michigan Tech Lode.

4R1 Regularly collected and analyzed measures of valuing people

Michigan Tech is committed to conducting regular climate surveys to measure the satisfaction of its faculty and staff in terms of work environment in general, as well as specific aspects such as the availability of training. Employees, particularly faculty, are encouraged to participate in an exit interview to determine the reasons for a departure and to identify areas for improvement that will increase retention rates. We maintain comparative data on compensation (salary and benefits) for faculty, staff, and administrators. The number of internal donors to the annual Campus Campaign is also used as a measure of employee satisfaction.

The health, safety, and well being of our employees is measured by a list of the first report of an injury, injury cases involving medical care, days away from work, days of restricted work, or certain occupational illnesses, summary of the circumstances leading to the injury/illnesses and lost/restricted days for each, total number of lost days, and total number of days of restricted work activity, number of employees that use TechFit, and annual health benefit costs in terms of total amount, and frequency distribution.
4R2 Performance results of valuing people
A comprehensive climate survey was administered to all employees in 2005. A response rate greater than 40% was obtained for each subgroup: hourly staff (143 responses), faculty (260 responses), and professional staff (287 responses). Average response values between one and five (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) to a number of statements/questions and written comments were collected and analyzed. Selected results pertaining to valuing people are shown in Table 4.1 and Figures 4.1 and 4.2. In general, these results indicate that people are satisfied with their overall experience at Michigan Tech.

Table 4.1: Average Responses to Selected Climate Survey Questions

<table>
<thead>
<tr>
<th>Hourly Staff Questions</th>
<th>Response Average</th>
<th>Faculty Questions</th>
<th>Response Average</th>
<th>Professional Staff Questions</th>
<th>Response Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>My supervisor encourages my career growth and development</td>
<td>3.6</td>
<td>I am satisfied with my overall experience here at Michigan Tech</td>
<td>3.4</td>
<td>I am satisfied with my overall experience here at Michigan Tech</td>
<td>3.8</td>
</tr>
<tr>
<td>I receive the training/professional development I need to succeed at my job</td>
<td>3.3</td>
<td>I feel supported by the institution in pursuing my professional goals</td>
<td>3.1</td>
<td>I feel supported by the institution in pursuing my professional goals</td>
<td>3.3</td>
</tr>
<tr>
<td>Overall, I am satisfied with my job</td>
<td>3.8</td>
<td>I am/was satisfied with the evaluation, tenure, and promotion process here at Michigan Tech</td>
<td>3.0</td>
<td>I am/was satisfied with the evaluation, tenure, and promotion process here at Michigan Tech</td>
<td>2.8</td>
</tr>
<tr>
<td>I have been given opportunities to participate in education and/or training</td>
<td>3.6</td>
<td>I feel supported by my department in pursuing my academic interests and goals here at Michigan Tech</td>
<td>3.4</td>
<td>I feel supported by my department in pursuing my academic interests and goals here at Michigan Tech</td>
<td>2.8</td>
</tr>
<tr>
<td>It is difficult for some people in my area/department to adjust their work schedules to care for children or other family members</td>
<td>2.7</td>
<td>It is difficult for some faculty in my department to adjust their work schedules to care of children or other family members</td>
<td>3.0</td>
<td>It is difficult for some people in my department to adjust their work schedules to care for children or other family members</td>
<td>2.7</td>
</tr>
<tr>
<td>In the last year, I have seriously considered leaving Michigan Tech in order to achieve better balance between work and personal life</td>
<td>2.1</td>
<td>In the last year, I have seriously considered leaving Michigan Tech in order to achieve better balance between work and personal life</td>
<td>2.7</td>
<td>In the last year, I have seriously considered leaving Michigan Tech in order to achieve better balance between work and personal life</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Figure 4.1: Histogram of responses from hourly staff, faculty, and professional staff to a question about work/life balance from the 2005 climate survey.
Michigan Tech collects data on lost work due to injuries as specified by OSHA and MIOSHA. Table 4.2 contains these data for the most recent four year period. It should be mentioned that 1500 employees is a small sample size, and therefore a significant improvement in safety is difficult to ascertain from these data. Additional measures are being developed to illustrate the improvement in safety across that institution.

Table 4.2: Injury Data per 100 FTE

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost Work Cases</td>
<td>0.58</td>
<td>0.77</td>
<td>0.81</td>
<td>0.44</td>
</tr>
<tr>
<td>Restricted or Transfer Cases</td>
<td>0.11</td>
<td>0.18</td>
<td>0.23</td>
<td>0.17</td>
</tr>
<tr>
<td>OSHA Recordable Cases</td>
<td>1.7</td>
<td>1.8</td>
<td>2.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Total Lost Days</td>
<td>8.0</td>
<td>17.3</td>
<td>27.6</td>
<td>10.6</td>
</tr>
<tr>
<td>Total Restricted or Transfer Days</td>
<td>10.1</td>
<td>29.4</td>
<td>25.0</td>
<td>6.8</td>
</tr>
</tbody>
</table>

4R3 Evidence of productivity and effectiveness of faculty, staff, and administrators in helping Michigan Tech achieve our goals

Michigan Tech tracks several measures of the productivity and effectiveness of our faculty, staff, and administrators toward the achievement of our goals. We track undergraduate and graduate enrollment, number of degrees awarded, placement rates for our graduates, national rankings, the number of our faculty who are fellows in professional societies, incoming freshman ACT scores, external research funding, number of new sponsored program awards per year, and endowment value. Most of these results are presented in other categories.

4R4 Comparison of results for valuing people with other organizations

The Compensation Strategy Task Force compared the Fringe Benefit Rates and Compensation Packages for Michigan Tech to those from two institutions in the state of Michigan and seven others in the United States. Comparative data on compensation for faculty, staff, and administrators was obtained from the following sources:
• The College and University Professional Association for Human Resources 2007 08 National Faculty Salary Survey by Discipline and Rank in Four Year Colleges and Universities
• The College and University Professional Association for Human Resources 2007 08 Administrative Compensation Survey
• The American Association of University Professors Annual Surveys of Faculty Salaries and Total Compensation, 2000 07
• The Oklahoma State Faculty Salary Survey for 2006 07

As a result of this study, a redesign of our compensation structure was performed to align it with peer institutions.

## 411 Recent improvements for valuing people

A number of significant improvements have been made in this category including the establishment of a dual career assistance program, on-site child care in a new facility, an emergency notification system, a director of institutional compliance and ethics, development of an Institutional Conflict of Interest Policy, enhancement of our safety training programs, and the receipt of an NSF ADVANCE grant designed in part to implement a number of recommendations from an AQIP Action Project entitled, “Improving the Diversity of the Faculty.”

Michigan Tech recognizes the importance of supporting dual career partners in attracting and retaining faculty and staff and therefore established the Dual Career Assistance Program in 2007. The Program supports dual career hiring within available resources and in cases that are supportive of the university's mission and strategic goals. Also in support of dual careers, Michigan Tech opened the Little Huskies Child Development Center in the fall of 2007. It is housed in a newly constructed 4400 square foot dedicated facility, and is licensed for 44 children with a maximum of 8 infants, 16 toddlers, and 20 pre-school age children. It is conveniently close to the Student Development Center, where both exercise facilities and a Portage Health Care Clinic are located.

Another recent improvement in valuing people is the establishment and naming of a director of institutional compliance and ethics. According to Michigan Tech, compliance refers to the myriad of rules, regulations, and requirements that the university must comply with in areas ranging from safety, research, and human resources to privacy, finance, and conflict of interest. As part of the Institutional Compliance and Ethics Office, an Institutional Compliance and Ethics Council assists and advises the director.

Michigan Tech has made improvements in the health and safety of its employees by improving the safety culture across campus, both at the employee level and, more importantly, all the way up the management line to the president.

A number of improvements resulted from the work completed by an Action Project Team that undertook the task of recommending processes that will improve the diversity of the faculty. The team recommended that Michigan Tech institute regular, compulsory briefings near or at the beginning of each academic year for the key figures involved in faculty search, recruitment, and hiring. In response, the provost developed a series of dean and chair workshops. The first of these took place in August 2008. A Deans and Chairs Toolkit, which is a web based repository of procedures, policies, forms, and other resources of particular interest to deans and chairs, has also been developed. The committee also recommended that attention be paid to the design and content of advertisements, methods of increasing the diversity of the applicant
pool, guidelines for chairing a search committee to ensure all applicants receive an equitable review, and guidelines for conducting on-campus interviews.

The work done by this AQIP Action Project team formed the basis of a proposal that was submitted to the National Science Foundation’s ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers program. The proposal entitled, “ADVANCE: Changing the Face of Michigan Tech,” was funded by NSF as part of the Partnerships for Adaptation, Implementation, and Dissemination (PAID) Awards. The grant started on September 1, 2008 and involves numerous faculty, staff, and administrators from across campus. The funds will help support improvements in the faculty recruitment and retention process.

The Action Project Team also recommended that the university implement several other modifications to its operations to encourage faculty diversity. These recommendations were extensive and included improving the Michigan Tech homepage, developing a website for pre-interview candidates, and information packets for interviewees are either currently ongoing (homepage) or were used as part of our Strategic Faculty Hiring Initiative (SFHI), which is the hiring of a cluster of 10 faculty with a particular interdisciplinary research theme each year for 10 consecutive years. The theme of “Sustainability” in 2007-08 resulted in the hiring of 7 additional faculty and it is anticipated that the 2008-09 theme of “Computational Discovery and Innovation” will enable the hiring of 10 additional faculty. In addition to the improvements made in hiring practices, hiring 100 more faculty will improve the research capacity of the university and the work-life balance and teaching/scholarship balance possible for existing members of faculty.

4I2 Culture and infrastructure for improved performance results for valuing people

We have not fully considered the influence that our culture and infrastructure have on the selection of processes to improve and the setting of performance results in valuing people. However, we do recognize a change in our culture that is impacting our decisions in this area. The demographics of our faculty and staff are changing as the average age is decreasing. In addition, a larger percentage of our faculty, staff, and students are part of a dual career couple and as such have different needs and are expecting Michigan Tech to respond to those needs. This is having an impact on our planning and actions as discussed in response to 4I1.
Category 5 Leading and Communicating

5P1 Definition and review of mission and values
Michigan Tech’s mission was specified by the state of Michigan at its founding in 1885. In 2000, the university community developed a mission statement, vision, and set of guiding principles for the institution. A Strategic Planning Group, comprised of representatives from across campus, submitted these for comment to the faculty, staff, and students of Michigan Tech and its stakeholders, including industrial advisory board members, a National Advisory Board, and alumni. Following a period of public comment and revision, the mission statement, vision, and guiding principles were approved by the Board of Control. These statements, together with the accompanying Michigan Tech Plan were reviewed on an annual basis until 2003.

This mission statement, vision, guiding principles, and the Michigan Tech Plan (strategic plan) were reviewed and revised in 2006, and are currently under review (spring, 2009). The 2006 review was initiated by the Executive Team with input from the Deans and the Board of Control. The resulting mission statement, vision, and more concise strategic plan were released for public comment to the university community and our stakeholders before final approval by the Board of Control. There was no change to the vision but minor changes were made to the mission statement, and the guiding principles were removed from the 2006 document.

Periodic review of the mission statement, vision, and the Michigan Tech Plan is initiated by the Executive Team through the Deans’ Council, which is chaired by the provost. This review takes place every three years starting in the spring semester. The outcome of the review conducted by Deans’ Council is forwarded to the Executive Team and is then communicated to the faculty and staff through the normal academic and non-academic administrative meeting structure, the University Senate, and Staff Council. The review is also communicated to students through Undergraduate Student Government and Graduate Student Council and key stakeholders through the Alumni Association Board of Directors and external advisory boards. The resulting mission, vision, and plan are then posted on the Michigan Tech website for comment. Changes are implemented based on all comments and the final mission, vision, and Michigan Tech Plan are approved by the Board of Control and posted on the strategic plan webpage.

5P2 Setting directions in alignment with mission, vision, values, and commitment to high performance
The Executive Team sets directions through implementation of the Michigan Tech Plan, which contains a set of strategies through which the University will realize its vision and achieve its mission. All university-wide initiatives are expected to advance the goals of the strategic plan as measured by the metrics contained on the online “Dashboard,” which is discussed further in the response to 8R2.

In addition, each unit has a mission statement that reflects its role in the university, a vision, and a strategic plan to achieve that vision. All of these are designed to be in alignment, to the extent that is practical, with Michigan Tech’s mission, vision, and strategic plan. Each unit sets long- and short-term strategies to achieve its strategic plan. These strategic plans are developed by the personnel in the unit and communicated to the next higher level in the organization.

5P3 Accounting for the needs and expectations of current and potential students and key stakeholder groups
Current students and key stakeholders are involved in the development and review of the Michigan Tech Plan, and therefore their needs and expectations are taken into account in part
through those processes. We also rely on our current students to provide input on the needs and expectations of future students.

For any initiative that has a significant impact on students, they are involved directly in the decision-making process; particularly in the areas of Student Affairs, Housing, and Recreation. This is accomplished in a variety of ways including surveys of students, student participation on committees, through the Student Commission, the Undergraduate Student Government, and the Graduate Student Council. In some units, any proposal that impacts students must include the student perspective on the direction of the project. A recent example of this was the need to seek student endorsement of the proposal to construct a new residence hall. Student input on the initiative was obtained using the residence survey that was sent to all students.

A similar process is used with stakeholders by using our Alumni Association Board of Directors and a variety of corporate advisory boards. Key stakeholders and alumni also sit on a number of university standing committees that either set direction or provide input to the process. Some examples are the various academic departmental external advisory boards, the college and school advisory boards, the Corporate Advisory Board for Institutional Diversity, the Presidential Council of Alumnae, Keweenaw Business and Community Leaders, and Campaign Committee.

The academic units set directions with input from stakeholders such as professional accreditation agencies (ABET, AACSB, and SAF), regular meetings with external advisory boards, and through input from corporate partners in research. A number of units also perform exit interviews with graduating seniors as part of their regular assessment activities.

**5P4 Seeking future opportunities while enhancing a strong focus on students and learning**

Opportunities are evaluated with a focus on students and their education, as that is our primary purpose. An excellent example of this is our collaborative relationship with the Michigan Tech Enterprise SmartZone. The SmartZone program was created by the state of Michigan through legislation that facilitates the capture of certain taxes for use by designated SmartZones to foster the creation of high-tech jobs, and the Michigan Economic Development Corporation administers the program. All the SmartZones are linked to the technology transfer efforts of state-supported universities, in this case Michigan Technological University. The Michigan Tech Enterprise Corporation (MTEC) is a private, non-profit corporation that was set up to manage the SmartZone. While MTEC and the SmartZone incorporate Michigan Tech’s name to identify the affiliation, MTEC is an independent corporation and is not financially supported by the university. MTEC is accomplishing its mission by offering programs and services that encourage entrepreneurial development and that help ensure the success of start-ups and small companies. These programs and services include the following activities: incubators, business development programs, business services, and student programs. The student programs are entrepreneurial internships and co-op opportunities that provide real-world experiences for our students and inexpensive quality assistance to the entrepreneur.

A similar approach is followed in seeking other future opportunities. These include growing research through the support of undergraduate students in summer (SURF program) and year-round support of graduate students, supplementing our existing or adding new programs of study in keeping with our current strengths in science, engineering, and technology (Honors Institute, Pavlis International Experiences, Peace Corps Masters Degree programs, and International Senior Design), and building our endowment, which has a significant focus on generating scholarship support for undergraduate and graduate students.
5P5 Making decisions using teams, task forces, groups and committees
A wide variety of decision-making processes are used throughout the university depending on the scope of the decision, its impact, and the personnel or unit making the decision. Representative committees or task forces are used to make recommendations for courses of action or changes that will impact a broad constituency inside and external to the university. Recent examples include: search committees, Student Commission, Compensation Task Force, AQIP Action Project teams, Climate Study Committee, Graduate Tuition and Stipend Review Committee, Tuition and Financial Aid Advisory Team, Benefits Liaison Group, Kaizen teams, the Early Intervention Team, and both internal and community-based committees on Dual Career issues in the region. Temporary committees or task forces are established to achieve a particular task or objective. Typically, their recommendations are made to the individual who formed the committee or task force and provided the committee or task force with its charge. These recommendations, most often formalized in a report, are reviewed, posted for public review, and implemented by the appropriate individual, unit, or standing committee.

Permanent or standing committees are essential to the proper functioning of the institution. Standing committees in the academic and non-academic units are used for communication and to perform various administrative functions. Standing committees often implement the recommendations made by temporary committees or task forces as well as make recommendations to the unit or individual to whom they report. Typically, they would implement their own recommendations after approval from the unit or individual to whom they report.

In the University Senate decision making is accomplished using a traditional process. Ideas from constituents (academic departments and professional staff areas) are brought to the Senate in the form of a proposal or recommendation, which has to be approved by the Senate members. The suggestion is discussed in committee and depending on the topic, possibly debated by the entire Senate. If the proposal is approved by the Senate, it is sent to the Administration for approval and, if necessary, to the Board of Control.

5P6 Use of data, information, and performance results in decision making
Data and performance results are used to varying degrees in the decision-making processes across campus. Business units at Michigan Tech use their performance data such as sales or net revenue as well as benchmark data from competitors in their decision-making process. Some service units measure customer satisfaction through surveys and also track the number of customers served and number of repeat customers. These data in addition to benchmark data from similar service providers (either other higher educational organizations or organizations outside of higher education), are used to guide their decisions. Lean, as discussed in the responses to 4P6 and 5I1, is also data based and has lead to the tracking of performance metrics in several areas that have not previously used this method to assess the efficiency and effectiveness of their processes.

Academic units use assessment results to make decisions on curriculum or program improvements, enrollment data to propose new programs, and also use research funding levels to determine the research expertise required of faculty hires.

5P7 Communication between and among levels and units
General information and important happenings are chronicled in our magazines and in both print and online newsletters. Tech Today is a daily email newsletter with a target audience of faculty and staff. Periodicals include the Michigan Tech Magazine that is targeted at alumni, the campus community and potential donors, and the Research magazine, targeted at other institutions as well as alumni. A student-run weekly newspaper, the Lode, has a primarily
student audience, but is also read by many of the faculty and staff. A growing number of academic units publish annual reports and periodic newsletters. While these are primarily for external audiences, they also serve as internal communications.

Most of our communication occurs through meetings; Board of Control, Executive Team, Deans’ Council, Academic Forum, meetings of the Academic Deans and Chairs, department and college/school level, Michigan Tech Fund Board of Trustees, Alumni Association, University Senate, Staff Council, Student Commission, various advisory boards, Presidential Council of Alumnae, and Campus Forums. A formal committee structure exists within the academic and non-academic portions of the institution that is used to communicate information both horizontally and vertically amongst the units. Board of Control meetings are open to the university and local community and are covered by the local media; University Senate meetings are televised.

A fair amount of our communication also occurs through our website, an internal electronic bulletin board called EDS (electronic display system, with screens connected across campus), email, the Information Wall at the J.R. Van Pelt/Opie Library, and by informal one-on-one interactions that occur frequently, between all levels, due to the informal and friendly culture that exists within the university and local community.

5P8 Communication of mission, vision, and values by leadership
Our leaders communicate a shared mission, vision, and values through various publications (refer to the response to 5P7), the actions of the Executive Team, at Campus Forums, and meetings of the University Senate, Staff Council and Board of Control during which we discuss the university strategic plan and our progress in achieving our goals. Departments hold annual retreats that focus on the mission and goals for each unit and their support of the university strategic plan reinforces the shared mission, vision, and values. Actions, such as the hires that are made and promotion and tenure decisions, effectively communicate mission and values. Enforcement of and education in policies on academic and research integrity also serves to reinforce our commitment to a shared set of values or guiding principles.

5P9 Development of leadership abilities, and communication of knowledge, skills, and best practices
Various professional development opportunities are available on campus, and individuals also attend off campus professional events for leadership training and to interact with colleagues at other institutions. Membership in national professional organizations also plays a role in the leadership development of our staff, faculty, and administrators.

Some units engage in formal mentorship of faculty and staff and others have a culture of informal mentoring relationships. To develop faculty, annual reviews, which are also part of tenure and promotion documentation, are conducted. Each unit has a committee that performs the annual review, and the committee provides advice to the department chair or school dean.

Leadership knowledge, skills, and best practices are shared throughout our organization using the existing administrative committee structure supplemented by workshops and seminars.

5P10 Leadership succession
The Board of Control is responsible for succession at the presidential level. They review and evaluate the president with input from the campus community, which is solicited by the University Senate on a yearly basis through a well-developed, externally conducted, online questionnaire.
Search procedures were established by the University Senate to hire academic deans, vice presidents, and the president; these involve the entire university community. Search committees for these and leadership positions in non-academic units have broad representation from across campus. The interview process always includes forums that are open to the campus community, after which the search committee seeks input from those in attendance. Searches for leadership positions that are not governed by University Senate policies and procedures typically involve a member external to the hiring unit. The Executive Team has approved an annual review process that they undergo, and are examining how similar processes could be used to guide professional development for the faculty and staff who report to them. There is no internal leadership succession plan across all units in the university and is recognized as a future opportunity for improvement.

5R1 Regularly collected and analyzed performance measures of Leading and Communicating
We conduct regular evaluations of the president, academic deans, and department chairs. The regular collection and analysis of additional performance measures is recognized as a future opportunity for improvement.

5R2 Results for Leading and Communicating
An annual evaluation of the president is conducted by the University Senate during the spring semester. The evaluation includes questions asking for comments and scaled responses. The faculty response rates were 13% and 27.3% for 2007 and 2008, respectively, and the staff response rates were 10% and 25.8% for 2007 and 2008, respectively. The results for rating the president’s overall performance on a scale of one to five, with five being the highest, are shown in Figure 5.1.

![Figure 5.1: Average ratings of the president's performance (1 = Poor, 2 = Fair, 3 = Average, 4 = Above Average, 5 = Outstanding) from annual evaluation.](image)

Results from the evaluation of the president’s performance over the past year on more specific responsibilities are also obtained. Respondents are asked to evaluate the president’s performance on a scale of one to four, with four being the highest. The results for 2007 and 2008 are shown in Figure 5.2. The University Senate communicates these results to the university community and the Board of Control, which uses them in their annual evaluation of the president.

Regular evaluations of the academic deans and department chairs are also conducted. The schedule for these varies with the term of appointment but ranges from three to four years. Results of these evaluations are typically not shared with the entire university community but within the unit performing the evaluation and the immediate supervisor of the subject of the
evaluation. Consideration will be given to regular collection and analysis of these data as an opportunity for improvement.

**Evaluation of the President**

<table>
<thead>
<tr>
<th>Statement</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>The president maintains an effective senior management team.</td>
<td>2.71</td>
<td>2.92</td>
</tr>
<tr>
<td>The president provided effective leadership in addressing compensation issues, working conditions, and career opportunities for faculty and staff.</td>
<td>2.92</td>
<td>3.09</td>
</tr>
<tr>
<td>The president clearly communicates university priorities and policies.</td>
<td>2.76</td>
<td>2.76</td>
</tr>
<tr>
<td>The president invites and incorporates input on university priorities from faculty, staff, and students.</td>
<td>2.48</td>
<td>2.88</td>
</tr>
</tbody>
</table>

**Figure 5.2:** Average of scaled responses (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree) indicating agreement with statements about the president’s performance from annual evaluation.

5R3 Comparison of results for leading and communicating with other higher education organizations

We do not currently compare our results for leading and communicating with those from other organizations, but recognize this as a future opportunity for improvement.

5I1 Recent improvements for leading and communicating

The recent implementation of Kaizen teams, as part of an effort called Lean, in the non-academic units provides a structured mechanism to make decisions and communicate to those involved as to how and why the decision was made and what it is. In a growing number of non-academic units, these teams are being used to make decisions on the improvement of processes and therefore daily operation. Problem processes or areas are identified, and the Kaizen team breaks down the process and reconstructs it to improve the process or service (as discussed in the response to 4P6).

In 2007 we developed and instituted a series entitled Tech-Talks that brings together faculty and staff to share information and interact with each other on specific topics. The series began with Tech-Talks Research to bring faculty and staff together to briefly present their research. The goals included the development of collaborative research projects and definition of future themes for the university-wide Strategic Faculty Hiring Initiative (SFHI). A second series entitled Tech-Talks AQIP, presented the results and recommendations of three completed AQIP action projects (Improving Faculty Diversity, Learning Space Enhancement, and Comprehensive University Space Inventory Process) and the administrative response to the recommendations followed by open discussion. The series is very popular and has improved communication and collaboration across campus.

5I2 Culture and infrastructure for improved performance results

We have not considered the influence that our culture and infrastructure have on the selection of processes to improve and the setting of performance results in leading and communicating.
Category 6 Supporting Institutional Operations

**6P1 Identifying support service needs of student and other key stakeholders**

A number of processes are used to identify the support service needs of our students and other key stakeholders (business and industry, parents/families, alumni, and the local community). The primary ones use personal interactions with and surveys of our students and key stakeholders. Students may be included on search committees for professional staff, and always are for positions that interact directly with students and offer student support services. In addition to giving students input to the hiring decision, this facilitates the inclusion of student needs into position descriptions. Numerous advisory groups involve students as well as community members, faculty, and staff. Suggestion boxes and online surveys are also used to determine the needs of our students. A number of units that employ students solicit feedback directly from them to identify the needs of the larger student body. We also track state, regional, national, and international trends in a variety of areas.

Specific examples of these general processes include using customer service evaluations at the Student Development Center where exercise and sports facilities are located. These not only solicit feedback from customers about performance but also inquire about their current needs. The JR Van Pelt/Opie Library reviews everyday activities to determine student needs and receives feedback from a stakeholder group called “Friends of the Library.” Facilities Management collects feedback, sometimes in the form of complaints, from various other departments to determine the infrastructure and service needs of the campus community. A survey of faculty and staff was conducted on the topic of grade submission, which received a good response rate with helpful comments focused on changing the process.

As a benchmarking exercise, the Accounting Department meets every six months and discusses the processes taking place in other universities in and around Michigan. A specific example from this unit is the tuition refund process with a focus on a quicker return to the student. This is not only important to the student but to another of our stakeholder groups, their parents/families. Parents and families are also surveyed following Orientation week to determine their needs and preferences for this annual activity. One of our other key stakeholder groups, business and industry, are served by our Career Center. We ask companies about their experience at our career days, which are held twice a year on campus, using a survey. They are queried about the things that went well and the areas that need improvement. Business and industry needs are also canvassed via corporate members who serve on our external advisory boards, through well-developed relationships between faculty conducting research and corporations, regular lunches of the Keweenaw Business and Community Leaders hosted by the president, and through the efforts of our corporate fundraising division in the Advancement Office.

Alumni Relations provides a number of services to our alumni and conducts surveys to determine their needs. Input on alumni needs is also obtained from the Alumni Association Board of Directors, which meets at least twice annually. Faculty, staff, and administrators attend these dinners and converse informally with alumni and their Board, in order to ensure the university is in touch with their needs and benefits from their suggestions. An example of our success with informal communications is from a recent query of a group of Michigan alumni. We learned of their interest in career change information and advice, as well as networking opportunities for career change purposes. We are now planning two sessions in downstate
locations and inviting all alumni in those areas. The program will include a professional speaker on career change, plus "how-to" sessions.

**6P2 Identifying administrative support service needs of faculty, staff, and administrators**

A number of the processes that are used to identify the support service needs of our students and other key stakeholders are also used with faculty, staff, and administrators. These include direct personal interactions, online surveys, and suggestion boxes. In addition, support service needs are identified using specialized oversight groups, departmental liaisons, and an advisory committee structure. Department liaisons are used by units such as the JR Van Pelt/Opie Library, Campus Bookstore, Purchasing, Information Technology, Facilities Management for their recycling program, and Occupational Safety and Health Services.

The faculty liaisons to the JR Van Pelt/Opie Library provide information on book purchases. The Campus Bookstore has contact liaisons in each academic unit to ensure they are aware of needs associated with instructional resources. Departmental liaisons for the Purchasing Department assist by minimizing delays in the process of purchasing equipment.

In addition to using departmental liaisons, the JR Van Pelt/Opie Library identifies the administrative support needs of faculty, staff, and administrators by tacking the inquiries received on their online helpdesk. Requests and questions are tracked and needs are identified based on the query frequency. This is a recent addition to the capacity of the library to be responsive to customers, and it has been found to be an excellent method of collecting information.

The Vice President for Research Office established a Research Advisory Council to provide a communication vehicle and serve as a forum between the Michigan Tech research community and the vice president for research, Sponsored Programs, Sponsored Programs Accounting, and the Graduate School, focusing on operational research practices and administrative issues. The Research Advisory Council is charged with the following:

- to improve communication within the campus research community regarding research practices and administrative issues;
- to provide a feedback mechanism from the research community to the research administrative offices;
- to provide an avenue for the research community to present concerns to the research administrative units; and
- to provide an informal linkage between the Research Office and the Graduate School that focuses on research-related views and concerns.

The Chief Information Officer (CIO) has an advisory structure that gathers input from all key campus constituents. The Technology Leadership Council is comprised of faculty and staff members and provides critical input (that exceeds simple “advice”) on key decisions such as new resource requests and allocations. The CIO also chairs six committees addressing important topics, and meets regularly with system administration staff, faculty, department chairs, and executives across campus to gather input and requirements. The Banner Users Group and Cross Functional teams regularly give Information Technology (IT) input on their needs related to information systems. Each administrative department has a liaison to the administrative IT support group and needs are communicated in both directions.
Designing, maintaining, and communicating key support processes that contribute to everyone’s safety

The design process for our occupational safety programs begins with a thorough hazard analysis performed as a collaborative effort involving the university department where the work is to take place and Michigan Tech’s Occupational Safety and Health Services (OSHS) Department. This review includes all federal, state, and local regulations pertaining to the proposed job hazards. If work involves equipment, the operating guidelines provided by the manufacturer are consulted to ensure that we are adhering to all recommended safety procedures. If the job task involves chemicals, we consult the Materials Safety Data Sheets provided by the chemical manufacturer to identify safe handling procedures, reactivity, engineering and work practice control options, and personal protective equipment requirements. Once all this information has been reviewed we craft our standard operating procedures (SOPs) for specific tasks and processes on campus.

Michigan Tech maintains our safety program through on-going training and routine reviews of our SOPs. Michigan Tech requires safety refresher training for all hazardous job tasks on an annual basis. We collect accident report information and improve our safety procedures to reduce risks associated with work where incidents take place.

Michigan Tech communicates its occupational safety programs through employee training and through OSHS resources. Every department is required to identify hazardous jobs tasks that exist within their programs and notify OSHS of their training and safety review needs. OSHS works closely with all university departments to facilitate occupational safety training on 74 topics. OSHS helps identify outside contractors to facilitate safety training as necessary. In addition to safety training, OSHS also maintains on-line safety resources including the university safety manual, incident reporting forms, and hazardous waste disposal request forms. OSHS staff are available to help departments answer safety questions or perform health monitoring for noise or air-borne contaminants.

Michigan Tech has developed security programs to protect our students, faculty, and staff from a crisis on campus. Our plans have evolved over the last few years in response to disasters that have affected other campuses. Michigan Tech went through a Hazard Assessment Program sponsored by the US Department of Homeland Security to help us identify potential hazards, rank them in order of severity, and provide us with funding priorities for prevention and mitigation projects. Our Crisis Response Team (CRT) developed response plans to the hazards identified in the assessment. Michigan Tech’s Public Safety Department provides the daily security systems necessary to maintain routine security for our daily operations.

Our emergency response plan is maintained through testing our response systems with tabletop scenarios and drills. By rehearsing our response activities we are able to identify areas of weakness in our preparations and obtain increasing levels of response skill proficiency. Michigan Tech works closely with our mutual aid partners in the community to ensure that our plans are adequate for emergencies that could involve the campus.

Effective communication during a crisis event has been demonstrated by institutions where crisis have occurred to be a critical element in an effective response effort. Michigan Tech’s response plans have been communicated through the distribution of “Safety First” posters and flip-charts and through presentations by CRT members. These messages outline how students, faculty, and staff should respond in case of an emergency. Beyond the general response guidelines, the CRT communicated our emergency response plans to our Executive Team so the university leadership understands our response systems, how they will function during a crisis, and who is responsible for implementing our plans. Michigan Tech has a system in place.
for broadcasting emergency messages to every member of our campus community via email, text messages, and phone messages.

**6P4 Managing key student, administrative, and organizational support service processes, ensuring they address intended needs**

The basic management structure we use to deliver our key student, administrative, and organizational support services is to utilize and leverage technology to the extent possible and to balance it with personal attention. On a daily basis we strive for a higher service ethic with an emphasis on customer and user service. Regularly scheduled, in many cases weekly, staff meetings are venues to discuss areas for improvement and determine effective solutions that can be implemented quickly. We have an open door policy at Michigan Tech, which enables people to be open with each other and to speak directly to the upper administration, if necessary, to expedite serious matters.

The blending of technology with personal interaction occurs in Dining Services, where the student managers and custodial staff members submit electronic reports at the end of their shifts. These reports monitor the feelings and responses of our customers and communicate feedback on services. Logs are created that enable an immediate response to a problem. This is an extremely effective process and is a significant improvement over written logs. This also empowers people to deal directly with problems.

The JR Van Pelt/Opie Library has an online process to request materials or books, including interlibrary loan materials. Upon receiving a request, the library responds with information on the availability of the material and when it can be delivered either by campus mail or electronically. At any time in the request process, an individual can contact a librarian for assistance using phone, email, or instant messaging to ask for assistance or provide feedback on the process.

Emphasizing the importance of the personal touch, some of our IT technical support groups, at the request of their customers, are answering phone calls for assistance rather than requiring that they be submitted by email. Since the support staff are involved with changes in processes, it was agreed that the direct contact with individuals was an effective way to ensure their needs are being met. Web-based tools, often wikis, are used on the back end to document the issues, problems, and solutions. These wikis are periodically examined by the IT staff to ensure that the information they contain is accurate.

**6P5 Documenting support processes to encourage knowledge sharing, innovation, and empowerment**

At the University level support processes are documented through our policies and procedures. At the unit level a variety of informal processes are in place, most of which are web based, including Tech Today, wikis, and email. Support processes are also communicated through liaisons, the established administrative committee structure, and workshops. At this point few of these are intended to encourage innovation and empowerment. Michigan Tech recognizes this as a future opportunity for improvement.

**6R1 Regularly collected and analyzed performance measures of support service processes**

Information Technology and unit-based computer support service providers track complaint emails using a ticketing system, and store the information in a database for reference. They also collect measures of service satisfaction.

The Accounting Department measures data related to e-commerce, including a monthly report of electronic fund transfers percentage to our stakeholders. The JR Van Pelt/Opie Library
monitors journal usage, circulation of books, and use of group and individual study spaces. Career Services collects survey data from the companies that attend the Career Fair. Occupational Safety and Health Services tracks the number of employees that have received safety training and the number of students, staff, faculty, and administrators that have signed up for the Safety First Alert System. Dining Services collects and analyzes secret shopper reports in each of its units. They also conduct monthly meetings of their Residential Dining Student Advisory Group to collect and measure student input and satisfaction.

Measures of student satisfaction are collected on the following student services using an annual student satisfaction survey: safety, class scheduling and registration, financial aid information and services, hours of operation for non-academic offices that provide services to students, overall service and support provided to students, library resources, Memorial Union Building services, the Student Development Complex (SDC), improvements to the SDC Multipurpose Room and the JR Van Pelt/Opie Library, and health services.

6R2 Performance results for student support service processes
As discussed in the response to 1R5, Michigan Tech conducts a student satisfaction survey in the spring semester of every year. Several of the questions ask students about support services that are provided by the university. The results shown in Figures 6.1 to 6.3 illustrate the undergraduate and graduate student assessment of a number of support services. Students expressed their satisfaction by indicated a level of agreement with a statement, rating their level of satisfaction with or quality of a service. All responses are the average values of those responding on a scale of one to four, with four being the highest. These results indicate that our students feel that the level of support service they receive is above average.

<table>
<thead>
<tr>
<th>Undergraduate Student Satisfaction Survey Results</th>
<th>Graduate Student Satisfaction Survey Results</th>
</tr>
</thead>
</table>

Please rate your level of agreement with the following statement

- **Student service office hours are convenient**
  - Undergraduate: 3.0
  - Graduate: 3.1

- **I feel safe on campus**
  - Undergraduate: 3.8
  - Graduate: 3.6

**Figure 6.1:** Average of scaled responses (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree) for undergraduate (left) and graduate (right) students from the annual student satisfaction survey.

In 2007, students were asked to comment on the changes in some facilities across campus. The responses to the question “Over the course of the past two years, Michigan Tech has worked to make changes in facilities across campus. Which of the following changes do you feel has had the greatest impact?” are shown in Figure 6.4.

These results are used by the units providing services to students to facilitate continuous improvement and to target opportunities for improvement. The qualitative results and the written comments are reviewed by the Student Commission to target projects they can undertake for improvement.


**Figure 6.2:** Average of scaled responses (1 = Very Dissatisfied, 2 = Somewhat Dissatisfied, 3 = Somewhat Satisfied, 4 = Very Satisfied) for undergraduate (left) and graduate (right) students from the annual student satisfaction survey.

**Figure 6.3:** Average of scaled responses (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent) for undergraduate (left) and graduate (right) students from the annual student satisfaction survey.

**Figure 6.4:** Student rating of facility upgrades to the SDC Multipurpose Room (exercise facility) and the JR Van Pelt/Opie Library.
6R3 Performance results for administrative support service processes
To determine improvement in eCommerce activity, Accounting tracks the number of transactions that occur by direct deposit rather than through a written check. The results since FY2007 are shown in Figure 6.5 and indicate a continual increase in eCommerce activity for employees, students, and vendors.

![eCommerce Activity](image)

**Figure 6.5:** Percentage of transactions taking place through direct deposit by subgroup; employee reimbursement, students, and vendors.

6R4 Using information and results to improve services
A problem or issue is given high priority if it is raised by several individuals or is a matter of safety or security. It is targeted for improvement based on an analysis of return on investment and its alignment with the strategic plan. More systematic processes need to be developed to achieve this, and Michigan Tech recognizes this as a future opportunity for improvement.

6R5 Comparison of results with other higher education organizations
We currently compare some of our results with other higher education organizations, but as our measurement of these processes improves we will develop additional relevant comparison cohorts.

6I1 Recent improvements
Recent improvements that have been made in the areas of supporting organization operations include the creation of the Chief Information Officer position (details in response to 8I1), development of ASPIRE (discussed in the response to 7I1), a new email and calendaring system, online grade submission, a new interlibrary loan process, a new system of librarian liaisons to departments to replace the faculty liaison system, online reservation system for student study rooms in the JR Van Pelt/Opie Library, transition to online from paper surveys, the use of Student Voice for the annual student satisfaction survey, a more user-focused IT business process model, flow charts of processes to facilitate identification of redundancies and areas for improvement, and alignment of the support service needs of online learners with on-campus students.

One of the most significant of these improvements, electronic grade submission, was implemented via Blackboard grade books and an in-house-written interface tool. A quantitative
assessment was done during the trial period in which grades were submitted both electronically and manually in a large number of Physics sections. The results clearly demonstrated that the electronic process led to significantly fewer errors. During the first semester in which electronic grade submission became mandatory (spring of 2008), the number of missing grades was substantially lower than with the manual process.

In fall 2008 email and calendar support for all faculty, staff, and students was outsourced. This resulted in reduced costs, more time for IT staff to work on mission-critical projects that involved programming and other higher-level technical operations, and a common calendar shared by all faculty, staff, and students. This has proven very useful for students in particular as they now can view the calendars of faculty and staff and can propose meetings with them that match with participants’ availability. Also, it was possible to eliminate email storage limits upon implementation of the new system. This attribute was in direct response to student requests for unlimited storage.

Michigan Tech now provides the Safety First Alert Communication System for use by all current students, faculty, and staff. The Safety First Alert Communication System provides a communication service for the delivery of time-sensitive messages to multiple recipients through multiple communication devices; it can also process the recipients’ responses to those messages. The Safety First Alert service can:

- Deliver a recorded message to up to three phone numbers
- Send an email to a Michigan Tech email address
- Send a text message to a mobile device

Embracing the concepts of lean and using Kaizen groups is helping us focus on daily processes and their efficiency. The use of these concepts is being rolled out across Michigan Tech and started with the support service units of Dining Services, Sponsored Programs, and Human Resources. As of May 2008, there were numerous Kaizen teams across campus. Michigan Tech’s goal is to have all non-academic units using Kaizen groups within the next two years.

**Culture and infrastructure for improved performance results**

Since we are a smaller institution, the informal network helps us to select specific processes to improve and set targets for improved performance. The fact that our culture is team-oriented rather than individualistic helps us solicit feedback from different departments and provides a variety of different perspectives. The adoption of a user-centered approach supports a culture that facilitates the selection of processes. Embracing the strategic planning process has made a major difference in the way we approach goals and set processes to achieve them. (See 8I1 for more details.)
Category 7 Measuring Effectiveness

7P1 Selection, management, and distribution of data and performance information to support instructional and non-instructional programs and services

The selection of data and performance information to support our instructional and non-instructional programs and services is carried out by the unit offering the program or service. The selection process typically includes reviewing currently available data, reviewing the comparable data used by other units at Michigan Tech, and benchmarking other institutions and organizations offering the same or similar programs and services to determine the data to use.

We collect information and data in a variety of ways including through internal reports and from state, local, and national databases and reports. This collection may be conducted at the unit or university level depending on the use for the data. In some cases, the process for gathering the data is mandated by government policies, board standards, accreditation bodies, or reporting agency guidelines. Once collected, the data are checked for accuracy by analyzing charts and reports and looking for any inconsistency or unexpected trends. In this case clarity of language is extremely important so that people know exactly what the data represent. We use a number of tools to manage our data including Banner, the Compendium, ASPIRE (developed through and AQIP Action Project), TechTracS, Activity Insight, and the data warehouse. Collections of data are managed by Institutional Analysis, Sponsored Programs, the auxiliary operations/units, the academic units, Facilities Management, and Student Affairs.

Data are distributed in web based, electronic, and hard copy formats. Widely used data are published in the Compendium on an annual basis, which is primarily accessed on the web but also has a limited print circulation. Most of our data management tools are also used to distribute data to appropriate user groups. Electronic data distribution by email occurs to a list of subscribers as data are generated or updated.

7P2 Selection, management, and distribution of data and performance information to support planning and improvement efforts

The processes used to select, manage, and distribute data and performance information fall into two general categories depending on the level of the planning or improvement effort being supported. If the effort is at the unit level, the processes presented in response to 7P1 are used. However, if the planning and improvement effort is at the university level, the selection, management, and distribution of the data in support of the effort occurs using a slightly different set of processes.

The selection of data to support overall university planning and improvement efforts is the responsibility of the Board of Control with input from the Executive Team and the Deans’ Council. The Deans’ Council seeks input from the faculty, staff, and the Academic Forum and then works with the Executive Team to make a recommendation to the Board of Control. The Michigan Tech Dashboard is used to measure progress on the University strategic plan, and is available on the Michigan Tech website (see the response to 8R2 for more details). It is periodically updated as new data become available and in some cases automatically through direct linkages to existing databases.

As members of the Voluntary System of Accountability (VSA) we post consistent data addressing a number of aspects of university performance. This site is hosted by VSA, and we provide annual updates or add new information as it becomes available.
7P3 Determination of department and unit needs related to the collection, storage, and accessibility of data and performance information

Department and unit needs are determined through the use of a cross-functional team of those who use the data and the people who collect and manage the data. In addition to this formal structure, informal requests from data users result in the collection and at times the permanent inclusion of some data in our data warehouse. The collection, storage, and accessibility of data are sometimes driven by the database manager, as is the case with Banner.

7P4 Analysis of data and information regarding overall organizational performance

Overall performance of the organization is assessed by progress on the objectives in the strategic plan, and is determined using the Michigan Tech Dashboard. Goals for each of the four university-wide metrics (as presented in the response to 8R3) are displayed along with longitudinal data. This provides for a clear analysis of the university’s overall performance and progress.

In addition to the four university-wide metrics, other measures are analyzed by the Board of Control, the Executive Team, task forces, other standing committees, AQIP Action Project teams, and individual units. Analyses are reported to the university community through reports or other documentation and are shared with the next higher level, as appropriate. Data and their analyses are also shared through publications such as the Research and Alumni Magazines and annual reports, at Campus Forums delivered by the president, through the campus-wide Tech-Talks AQIP sessions, and at Board of Control meetings. Of course, federal and state laws are followed with regard to the publication of data, statistics, and their subsequent analysis.

7P5 Determination of needs and priorities for comparative data and information

Our needs and priorities for comparative data and information are determined by the Executive Team and the Board of Control using federal and state guidelines as appropriate. Our peers and organizations to which we belong can also influence or determine our needs and priorities for comparative data and information, as well as the criteria and methods for selecting sources of comparative data and information. Societal concerns, such as campus safety, can also play a role in the comparative data that we use.

A stringent criterion for data source selection is a common reporting standard for all institutions that contribute to the database.

7P6 Alignment of department and unit analysis of data and information with organizational goals

The university-wide process used to ensure department and unit analysis of data and information aligns with our organizational goals for instruction and non-instructional programs is to provide a common source for data. The Compendium is produced annually by Institutional Analysis and contains data such as enrollment, retention rates, degrees awarded, faculty and staff headcounts, student to faculty ratios, and credit hours generated. Sponsored Programs maintains data on research expenditures, proposal generation, and research awards.

7P7 Timeliness, accuracy, reliability, and security of information systems and related processes

Reporting/Accountability policies and the desire to satisfy our internal and external customers ensure the timely collection and distribution of data. Accuracy is ensured by using regularly scheduled edit checks, control audits, script checks, regular external audits, and internal audits. Financial data are subject to regular external audits and control total matching. Student data are subjected to regular audits and manual checks. Internal Audit conducts random, unannounced audits of all key information systems, databases, and changes to them. Our distributed databases are maintained in very secure locations, with access given to a
limited number of people. Edit checks are performed to ensure no data have been tampered with or changed. We also verify results from different databases to check for consistency. At the university level we have a full-time Information Security officer who manages a firewall, an intrusion-detection and prevention system, and other security systems. Log files are checked daily for suspicious activities. There are also many automated systems on the network that report suspicious activities.

**7R1 Measures of the performance and effectiveness of systems for information and knowledge management**

With respect to performance measures, we constantly monitor the availability of the network, data center, and all key database applications. If there are issues, staff members are notified immediately through automated systems. We monitor network performance and database performance, especially during key times such as student online registration periods. With respect to network performance, we maintain and publicize historical data on the web. We use a commercial application (Nagios) and custom applications for service monitoring. For example, a software robot logs in, sends an email message, waits for a reply, and tracks the time in between. This is a very reliable indicator of system performance. System status notifications are tracked on a public website.

We have a Banner Users Group and a “Cross Functional” advisory administrative team that regularly give us feedback on database performance and suggested application enhancements. We do not have a formal system for collecting and prioritizing suggested application enhancements.

At this time, we have not developed a system for measuring the effectiveness of our information and knowledge management system. However, we use many electronic tools, such as our trouble ticketing system, which could be ‘mined’ for data that would be useful for evaluating the effectiveness of our systems. This is recognized as a future opportunity for improvement.

**7R2 Evidence that systems for Measuring Effectiveness meet the needs in accomplishing mission and vision**

At this time, the primary goal of our measuring systems is to aid us in responding proactively, or at least promptly, to problems with our systems and to anticipate and plan for upgrades needed to avoid unacceptable system performance. We do not maintain historical statistics on uptime for any of our systems nor do we have a formal system for evaluating the effectiveness of our monitoring system (i.e. we do not have a formal system for tracking when our monitoring system did not tell us something that we would have liked to know).

We have done one user satisfaction survey in the past two years, but we have not yet implemented a regular system of querying our users to determine whether their needs are being met. This is a future opportunity for improvement.

**7R3 Comparison of results of measuring effectiveness with other higher education organizations**

We do not currently compare our results with other higher education organizations, but as our measurement of these processes improves we will develop a relevant comparison cohort.

**7I1 Recent improvements for measuring effectiveness**

Two substantial improvements have been made in this category during the last year. First, in response to concerns about inconsistent and inaccurate data on space and research activities, an AQIP Action Project entitled, “Comprehensive University Space Inventory Process,” was completed. It resulted in the development of a space database application. The custom-written, web-based application allows data custodians and accounting personnel to access, update, and easily maintain most of the key space data in an authoritative database. The tool, which has
been dubbed ASPIRE (Accounting for Space, People, Indexes, Research and Equipment), is a simple web-based interface that allows users not only to interrogate and analyze the space data, but also to easily update it. The tool uses only authoritative databases and links to engineering drawings and floor maps. The system allows information custodians in all departments to enter data on space, occupants, research and scholarly activities occurring in the spaces, and equipment resources or hazards that may be present (e.g. eyewash and first air stations, flammable liquid storage, etc.). The database also tracks research account indices assigned to particular rooms. This enhances our accountability to NSF and other research agencies, and provides a tool for the optimal assignment of space in general, and research space in particular. This system is far easier to use than the old systems, and reduced many inaccuracies and contradictions by forming one authoritative database that everyone can access, instead of the previous 13-14 stand-alone space inventories. It is a simple web-based interface to a secure database.

In support of this tool, facilities re-assigned one of their engineers to have primary responsibility for upgrading, maintaining, and distributing engineering drawings and other space data. This individual has the primary responsibility of maintaining and updating the Engineering drawings and space data (e.g. when walls are moved or services added), and is also responsible for communicating with other campus personnel regarding space and drawings issues.

In addition, procedures have been developed to coordinate and dynamically update data in different databases for consistency, and to identify errors and inconsistencies in data. In cases where important space data resides in different locations, developing “cross-walk” tables better coordinates the data. Exception reports can also be generated that alert people to inconsistent or incomplete data. Cross-walk tables and exception reports have been developed, and continue to be developed and refined. The Action Project team also completed work on the following: online training resources, new exception reports, updates and enhancements to ASPIRE based on user feedback, linking ImageNow scanned documents to ASPIRE, and updates, corrections, and consistency checks between Facilities CAD drawings and Banner. This has resulted in improved accuracy and efficiency of university operations, and will help to ensure that the university remains in compliance with federal and state requirements.

Second, as discussed in the response to 611, electronic grade submission was implemented via Blackboard grade books and a home-written interface tool. A quantitative assessment was done during the trial period in which grades were submitted electronically and manually in a large number of Physics sections, and the results clearly demonstrated that the electronic process was more accurate. During the first mandatory semester in Spring 2008, the number of missing grades was substantially lower than recorded in previous years using the manual process. 1,595 of 1,610 sections successfully submitted grades electronically. The high success rate was a result of thorough training of the support staff in each department, who helped faculty with the submission process and who were given an electronic tool to track which of their faculty still owed grades. A survey was conducted of all instructors after the grade submission process. One third of the instructors responded, with the following distribution of answers to the question “After completing the process, how do you feel about submitting grades next Fall and beyond?”

- Looking forward to it, it’s empowering: 28%
- It won’t be too bad: 47%
- It’s too complex – make it simpler: 11%
- Please give me back my bubble sheets: 10%
So, 75% of the faculty members were pleased with the process, but around 20% were very unsatisfied and wanted it to be simpler. In the spirit of continuous improvement, and to satisfy the 20%, Michigan Tech purchased the “Faculty Self Serve” module of Banner. This will allow faculty to enter their grades into a simple website. Those who prefer Blackboard will be able to continue to use it. The “easier” process will be used for the first time in Spring 2009.

Finally, as also discussed in the response to 6I1, the e-mail and calendar functions for all faculty, staff and students were outsourced. This resulted in reduced costs, more time for IT staff to work on mission-critical projects, and created a common calendar shared by all faculty, staff, and students.

Other recent improvements in this category include:

- Implementation of a document imaging process, which eliminates paper and the storage and security issues that come with it. This also makes the process more transparent and the data easily accessible.
- Improvements to the Michigan Tech Dashboard that make data related to planning and improvement efforts easily accessible to the campus community.
- Implementation of Activity Insight from Digital Measures to facilitate the tracking of faculty productivity and the construction of different reports that are suitable for submission with, for example, NSF proposals, promotion and tenure packages, or the generation of full curriculum vitae as required. The system is such that the data need be entered only once, and different customized reports can be generated.
- Implementation of web-based interfaces for enrollment data and the Compendium, which makes it easier for the campus community to generate reports and perform data analysis.
- The creation of a new committee that includes staff from Information Technology Services and Security (ITSS), Internal Audit, and Risk Management to address issues on campus dealing with the securing of private information. An outcome of this committee was the creation of a new position in IT dedicated to information security and compliance. The new hire will work with the director of institutional compliance and ethics and Internal Audit to find the best ways to train campus information workers; review department business processes, data storage and disposal methods; and monitor compliance with key legislative and regulatory rules.
- Institutional Analysis circulates all official data summaries to the Executive Team before submission to ensure appropriate and correct information is included.

The processes for identifying improvements and measuring performance in these areas are not especially systematic or quantitative, except for the network security and performance. In most cases changes were made in response to informal feedback or committee feedback, although the ASPIRE project was supported by an Action Project, and most of these initiatives were driven to a greater or lesser degree by the need to improve the efficiency and accuracy of our accountability processes or of our institutional services.

7I2 Culture and infrastructure for improved performance results for measuring effectiveness

As a technological university, we understand the importance of data, and intend to use data effectively to guide decision-making toward fulfillment of our strategic plan. Therefore we place a high value on accurate and consistent data so processes that deal with those two issues are high on the list for improvement. This culture is reinforced through our two primary (external) program accreditation bodies, ABET and AACSB, both of which place a high value on assessment
Category 8 Planning Continuous Improvement

8P1 Key planning processes
The current Michigan Tech Plan was approved by the Board of Control in April, 2006. This plan was developed through a review of a previous plan that had been in place for six years, and that had been updated twice; last in February, 2003. The review was initiated by the Executive Team and included input from the entire University through the Deans’ Council and Academic Forum. A draft plan was submitted to the community, including our stakeholders, for comment before a final version was placed before the Board of Control for approval in February, 2006. A review of the current plan was initiated in Fall 2008; this will result in not only an updated Michigan Tech Plan, but also, in response to the AQIP process, a well-defined process for regular review and revision of the plan and modifications to our mission and vision.

Units at Michigan Tech plan continuous improvement using different processes with their own sets of action plans and strategies, which are aligned with the university strategic plan. The result is a fairly decentralized process but one that is unified by the university’s strategic plan.

In most units the planning process begins with unit personnel (faculty and staff in academic units and staff in non-academic units) attending meetings or retreats, most often on an annual basis, but for some units planning meetings are conducted more frequently. The planning meetings typically involve a review of the unit and the university strategic plans, goals, and action plans. Unit level plans are developed in alignment with the university strategic plan and communicated to the next level, and formal or informal feedback is returned to the unit level. The unit strategic plans, goals, and action plans are then used by committees, who are responsible for executing the administrative duties in the unit, to set their agendas for the upcoming year.

The development of goals and action plans to achieve a unit strategic plan must consider the available resources. Since resource allocation or generation can sometimes lag behind the planning process, more than one budget scenario is often developed. This necessitates the prioritization of initiatives at the unit level.

8P2 Selection of short- and long-term strategies
Long-term strategies are selected in alignment with the mission and vision of the university or unit to enable achievement of the strategic plan and in consideration of budget limitations. One aspect of determining long-range strategies at the institutional level involves monitoring and assessing external conditions and trends. For example, admissions strategies are informed by demographic projections. Campus master planning is, in part, driven by an assessment of the needs and desires of faculty and students including new types of housing. Long-term strategies at the unit level are often adopted after their successful implementation, as measured against established goals, as short-term strategies.

Unit performance is a primary consideration in the selection of short- versus long-term strategies. Longer-term strategies are typically developed by units that are making progress toward achieving their strategic objectives, while units that are not making progress focus on shorter-term strategies with clear targets for acceptable performance.

The criteria used to select short-term strategies are determined by each unit based on their mission and current level of performance toward their strategic goals. Student and stakeholder
input also plays a role in the selection of short-term strategies, but primarily as a factor in the prioritization of the short-term strategies.

Short-term plans can be disrupted due to budget and resource limitations, if stakeholders force a change. Examples include new federal regulations, state of Michigan budget and legislative priorities, and immediate problems/opportunities that emerge at the unit level.

Conflicting expectations of key stakeholder groups have been rarely encountered, but if they do occur, personal communication at an appropriate level is the method used to overcome the differences. This is discussed in more detail in the response to 8I1.

A more common, although still somewhat rare, source of conflict occurs amongst the members of an academic unit of the university. Recently two academic units used an external facilitator to assist in the reduction of internal conflict, and to bring proponents towards a shared vision of the future of the unit. Part of the exercise involved interviews with members of the group as well as outside colleagues, and the development of an improvement plan, that included revisiting the relationship and potential contribution of the unit to the university strategic plan. In a similar vein, external reviews have been carried out to guide improvement of some support areas where there were concerns about service and effectiveness.

3P3 Developing key action plans to support organizational strategies
The development of key action plans to support our organizational strategies is accomplished through the use of university-wide task forces and committees. These are charged by the president or a vice-president to address a major institutional issue. AQIP Action Project teams are also used in this capacity but their charge typically is developed by a group of faculty and staff and supported by the upper administration.

3P4 Coordination and alignment of planning processes, organizational strategies, and action plans
Some alignment is achieved through regular staff meetings, peer to peer relationships, the administrative structure, and the feedback that is received by each unit during the planning process. However, this is not done consistently in all areas of the university.

The university budgeting process acts as a method to align organizational strategies and action plans and is continually becoming more proactive in this effort.

3P5 Defining objectives, selecting strategies, and setting performance targets and objectives for organizational strategies and action plans
The selection of measures is a balancing act that attempts to identify simple, easy to obtain, yet meaningful metrics that, in combination, provide an indication of the state of the institution and progress toward achievement of the strategic plan. At different stages in institutional development, different suites of indicators may be appropriate. Likewise, maturation and adjustment of strategic goals requires periodic evaluation of the indicators being used.

In 2007, the Executive Team and the Deans began with the strategic plan, and entered extensive discussions to determine a means of monitoring and assessing progress toward achieving the goals of the Michigan Tech Plan. The process included review of the metrics used by US News and World Report in their annual rankings of universities, as well as indicators used by groups such as the Association of University Technology Managers in their annual survey of university technology transfer activities. Reviews of metrics used by other universities to assess their strategic activities were also undertaken.
Some metrics were given extensive consideration but were eliminated late in the process. Ultimately, some were considered more as driving variables that should be considered in the budgeting process and in program development, and less as an indicator of progress toward institutional strategic goals. Outward-looking metrics were preferred over more inward looking metrics.

Metric selection is a subjective process that was initially undertaken jointly by the Executive Team and the Deans, and subsequently presented to the campus community for evaluation, comment, and suggestion. This process continued for several months, and in the end resulted in four “Dashboard Metrics:” Incoming Student ACT Score, Number of PhDs Awarded, Sponsored Programs New Awards, and Endowment Value. Each of these is explained in detail in response to 8R2.

Most unit level performance targets are set by the unit in alignment with the university targets and external benchmarks.

**8P6 Linking strategies and action plans, considering levels of current resources and future needs**

Short-term strategies are usually selected based on existing resources and the ability to accomplish these goals with present personnel as well as the potential impact of the initiative. Short-term strategies are prioritized based on performance measures determined by the unit. Existing resources may be realigned if a short-term strategy must be pursued due to external stakeholder requirements.

Longer term initiatives that require additional resources are brought from the units up to their representative on the Budget Team. Each unit has annual discussions about the most important resources they are seeking to meet their goals. These requests, along with the justification for the additional resources, are communicated to the next level where they are reviewed and prioritized. This process is continued until the request reaches the Budget Team, which makes the final decision on resource allocation based on the strategic plan and unit performance.

**8P7 Assessing and addressing risk in the planning process**

On a university level, the Board of Control regularly considers risk in the planning process with the Executive Team. The university applies risks of fortuitous loss to the risk management process, which include a systematic and continuous identification of loss exposures, the analysis of these exposures in terms of frequency and severity probabilities, the application of sound risk control procedures, and the financing of risk consistent with university financial resources.

Financial risk is of course a primary area of oversight by the Board of Control and its Finance Subcommittee. The Budget Team and the Executive Team discuss and evaluate the financial implications of various planning options before bringing recommendations to the Board of Control.

With regard to physical risk and safety, the university volunteered to undergo an assessment by the Michigan Occupational Health and Safety Administration (MIOSHA) in the fall of 2008, of operations in a number of academic and non-academic areas, to ensuring risk-averse working conditions for faculty and staff, and of course a safe environment for our students.

Formal risk assessment guides decisions in, for example, the Energy Management unit in Facilities, which uses the following criteria:
- Potential to cause bodily harm or death
- Potential to cause extensive property damage
- Potential to affect reliability of providing heat and power
- Potential effect on efficiency
- Sensitivity of variable analysis
- Potential for adverse public relations

8P8 Ensuring faculty, staff, and administrators have the capability to address changing requirements

There is no systematic plan or process at the university level to ensure that faculty, staff, and administrators have the capability to address changing requirements. Therefore it becomes the responsibility of each unit leader to achieve this objective. A variety of professional development opportunities are available on campus throughout the year but there is no central coordination. Opportunities to develop academic leaders have not been a high priority until recently, with few opportunities for individuals inclined in this direction to gain experience. The provost has recommended the adoption of succession planning and professional development for faculty interested in administration to address this situation; the vice president for research is considering secondment of a part-time assistant vice president, and some promising female administrators have been sent to the Bryn-Mawr and HERS programs. This is a future opportunity for improvement.

8R1 Regularly collected and analyzed performance measures of the effectiveness of planning processes and systems

The only direct performance measures of the effectiveness of our planning processes and systems that are regularly collected and analyzed are survey responses to the annual evaluation of the president, which is conducted by the University Senate. The following questions related to strategic planning are included in the evaluation:

- Have you read the university's strategic plan?
- Do you feel you had input into the university's strategic plan?
- Does the university's strategic plan influence your daily work decisions?

A review of the university strategic plan was initiated in Fall 2008, and some additional performance measures are being collected and will be analyzed. As our planning processes mature, we will continue to collect and analyze additional direct measure of performance.

Several indirect measures of the effectiveness of our planning processes are collected and analyzed on a continual basis. These focus on the progress being made on the strategic objectives. Some of these are presented in the responses to 8R2.

8R2 Performance results for accomplishing organizational strategies and action plans

As discussed in the response to 8P5, Michigan Tech tracks four key metrics to measure progress on the University Strategic Plan. The Michigan Tech Dashboard (http://www.admin.mtu.edu/urel/dashboard/) publically displays the university level metrics as well as unit level metrics. These are updated on a regular basis that is appropriate to the specific metric.

Incoming Student Average ACT Score: The Incoming Student Average ACT Score is calculated in the fall term once the first year students are enrolled. It is simply the numeric average of the ACT scores of the new first year students; transfer students and international students are not included.
Figure 8.1 shows these scores for the past four years and overall indicates a slight increase over this time period.

**Figure 8.1:** Incoming student average ACT composite, math, and English scores for the fall of 2005 to the fall of 2008.

Incoming student average ACT scores are also tracked by unit; school, college, and department. Figure 8.2 shows these scores for one school and one college.

**Figure 8.2:** Incoming student average ACT composite, math, and English scores for the fall of 2007 and fall of 2008 for College of Engineering (left) and School of Business and Economics (right).

**Number of PhD Degrees Awarded:** The number of PhD graduates is reported annually, but changes after every semester. It is simply the numerical count of those completing the requirements for and being awarded the PhD.

The results shown in Figure 8.3 indicate an increase in PhD awards over the last four years at the university and within the individual units that grant PhD degrees; College of Engineering, College of Sciences and Arts, and the School of Forest Resources and Environmental Sciences.
**Figure 8.3:** Number of PhD degrees awarded by Michigan Tech (left) and for each PhD degree granting unit (right) for the past four academic years.

**Sponsored Programs New Awards:** Sponsored Program Awards is the value of the new contracts and grants received by the university in a given year from external sponsors. This includes indirect costs to be recovered from sponsors. Since 2005, Sponsored Program Awards has also included research-related gifts and corporate gifts. This also includes funding received for instructional and other public-service projects. Research projects, though, have historically received about 90% of the Sponsored Program Awards.

The results in Figure 8.4 show the increase in sponsored programs awards from 2003-04 to 2006-07 for the entire university and for the colleges and schools that had more than a million dollars in new awards in a given year. A large number of units that receive awards are not reflected in the New Awards by Unit graphic and therefore the numbers per year for the graphics in Figure 8.4 should not be equal.

**Figure 8.4:** Sponsored programs new awards (in millions) for Michigan Tech (left) and for the colleges and schools having more than a million dollars in new awards in a given year (right) for a four year period.
**Endowment Value:** The Endowment Value is the current financial value of the institutional endowment held and managed by the Michigan Tech Fund. It is not the total assets of the Fund, but only the portion of those held as endowment. The annual value is the value on the last day of the fiscal year (June 30).

Figure 8.5 displays the increase in the endowment from 2004-05 to 2007-08 for the entire university and for the colleges and schools that had more than a million dollars in endowment value in a given year.

The Michigan Tech Dashboard also includes values of these four metrics for each department in the College of Engineering and College of Sciences and Arts. Values of these metrics of non-academic units are also reported if appropriate. The Dashboard also contains additional Initiative Metrics on diversity and online learning and Operations Metrics on enrollment, finance, faculty, and US News & World Report variables.

**Figure 8.5:** Endowment value (in millions) for Michigan Tech (left) and for the colleges and schools having more than a million dollars in endowment in a given year (right) for a four year period.

---

**8R3 Targets for the performance of strategies and action plans**

The current 2012 Targets for the Four Michigan Tech Dashboard Metrics are

- Incoming Student Average ACT Composite Score of **26**
- Number of PhDs Awarded of **69**
- Sponsored Programs New Awards of **$76.7M**
- Endowment Value of **$200M**

There values were determined based on targets set by the colleges and schools and will be revisited during the current review of the strategic plan.

**8R4 Comparison of results with other higher educational organizations**

Since Michigan Tech does not have a single peer or aspirant group for the entire institution, the comparison of results at the dashboard metric level is a challenge. Therefore state and national comparisons are made as appropriate at the university level, and more focused comparisons are made at the unit level.

Of the four university level metrics, state and national comparisons of Incoming Student ACT Composite scores are performed. The results of these comparisons are shown in Figure 8.6.
Michigan Tech has a higher average ACT Composite score for incoming students than does the state of Michigan or the Nation.

Each unit may compare their dashboard metrics to those of peer or aspirant programs in the state and across the country. For example, the College of Engineering considers other engineering programs based on the number of PhD and BS degrees awarded in the strategic planning process. The comparison is limited to programs ranked in the top 50 based on PhD production or the top 20 based on BS production. These comparisons are shown in Tables 8.1 and 8.2. These results assist in the setting of college goals on the number of tenured/tenure track faculty and the balance between graduate and undergraduate students.

![ACT Composite Comparison Results](image)

**Figure 8.6:** Comparison of Michigan Tech incoming student average ACT composite scores to those for all institutions in Michigan and the Nation. **Source:** ACT News [http://www.act.org/news/data.html](http://www.act.org/news/data.html)

### Table 8.1: College of Engineering Comparison Metrics: PhD Degrees Granted

<table>
<thead>
<tr>
<th>Institutional Rank by PhD Degrees Awarded</th>
<th>Faculty Tenured/ Tenure Track</th>
<th>Degrees Awarded in 2007</th>
<th>BS</th>
<th>MS</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>104</td>
<td>238</td>
<td>68</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>104</td>
<td>321</td>
<td>203</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>159</td>
<td>547</td>
<td>214</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>105</td>
<td>313</td>
<td>81</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>94</td>
<td>212</td>
<td>100</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>129</td>
<td>521</td>
<td>284</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>106</td>
<td>252</td>
<td>95</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>198</td>
<td>451</td>
<td>181</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>120</td>
<td>363</td>
<td>263</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>131</td>
<td>323</td>
<td>386</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>105</td>
<td>471</td>
<td>173</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td><strong>Michigan Tech</strong></td>
<td><strong>116</strong></td>
<td><strong>548</strong></td>
<td>98</td>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** ASEE, 2007

### Table 8.2: College of Engineering Comparison Metrics: BS Degrees Granted

<table>
<thead>
<tr>
<th>Institutional Rank by BS Degrees Awarded</th>
<th>Faculty Tenured/ Tenure Track</th>
<th>Degrees Awarded in 2007</th>
<th>BS</th>
<th>MS</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>151</td>
<td>889</td>
<td>144</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>288</td>
<td>851</td>
<td>532</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>220</td>
<td>845</td>
<td>151</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>241</td>
<td>839</td>
<td>280</td>
<td>223</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>253</td>
<td>795</td>
<td>266</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>238</td>
<td>777</td>
<td>338</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>179</td>
<td>777</td>
<td>241</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>243</td>
<td>714</td>
<td>579</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>205</td>
<td>702</td>
<td>331</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>190</td>
<td>694</td>
<td>336</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>142</td>
<td>685</td>
<td>126</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td><strong>Michigan Tech</strong></td>
<td><strong>116</strong></td>
<td><strong>548</strong></td>
<td>98</td>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** ASEE, 2007
**R5 Measurement and evaluation of planning processes and systems**

The results for the direct measurement of the effectiveness of our planning processes and systems are shown in Figure 8.7. The 366 (27.3% return rate) responses to the survey questions, which are included in the annual evaluation of the president, show that the majority of faculty and staff have read the university strategic plan but not as many felt they had input to the plan.

![Strategic Plan Survey Results](image)

**Figure 8.7:** Measurement of the effectiveness of the strategic planning process taken from the 2008 evaluation of the president.

**Recent improvements**

The greatest improvement in this category has been a cultural change within the institution to one of embracing the strategic planning process. This was accomplished through a concerted effort by the Executive Team to improve the Michigan Tech Plan, by clarifying its focus to three goals, and by continually incorporating its tenets in presentations made to the university community and our other stakeholders. Aspects of the strategic plan are presented and discussed at the Campus Forums hosted by the president and at all meetings involving the Board of Control. They are also incorporated into presentations to Industrial Advisory Boards, meetings with Alumni groups, the President’s Council of Alumnae, politicians and representatives of stakeholders in the town and surrounding region. This culture has permeated almost all units of the institution as the university and individual unit strategic plans are discussed on a regular basis.

We have extended our efforts to change the culture with respect to recognizing the importance of strategic planning of all our efforts to our stakeholders, particularly alumni. This was accomplished through a series of White Paper events hosted by the president and attended by key leaders at Michigan Tech and within our alumni community. This series of events focused...
on explaining the goals for the silent phase of our capital campaign, and explaining to alumni, who are predominately graduates of our undergraduate programs in engineering, business, and science, why research and graduate study are becoming an increasingly important aspect of Michigan Tech’s future. At the same time, we reiterated our ongoing commitment to excellence in undergraduate education, supported by outstanding opportunities for practical and experiential learning. The White Paper events also provided an effective method of addressing the differing expectations of our alumni.

As a result of this change in culture, a number of other improvements have been realized. The increased emphasis on planning has resulted in the creation of committees and positions that focus on strategic planning. These include the Chief Information Officer who has direct responsibility for planning continuous improvement for our information technology infrastructure, services, and personnel. Another example is the establishment of the Energy Advisory Group in October 2008. It is charged with developing a blueprint for Michigan Tech’s energy future that is consistent with the university’s strategic plan and commitment to renewable energy that will address the issues of sustainability, energy security, carbon neutrality, use of renewable resources, energy conservation, cost reduction, budget stability, and environmental stewardship. The Energy Advisory Group is working in conjunction with the AQIP Carbon Neutral Action Project team and the new Sustainability Enterprise Coordinator (appointed in January 2009), who have been involved in identifying and modeling Michigan Tech’s carbon footprint.

Other recent improvements include the development of computer-based tools that facilitate the collection, tracking, and distribution of data used to plan and measure continuous improvement. The Michigan Tech Dashboard displays the four university-wide metrics that measure progress toward our mission and vision as well as metrics for operations, initiatives, and units that are used to measure progress on specific strategies and action plans. Another web-based tool, the ASPIRE database, is used to track data related to space, resources and room attributes. It is used to make strategic decisions on the use of space, and is discussed in detail in the response to 611.

8I2 Culture and infrastructure for improved performance results
The small size of the institution and the local community enables discussions and broad representation in support of sound planning and problem solving. The high technological focus of the institution means that our faculty, staff, and administrators are comfortable with quantitative measures and therefore are willing to set targets for improved performance.
Category 9 Building Collaborative Relationships

**9P1 Creating, prioritizing, and building relationships with the organizations from which we receive students**

A universal but decentralized process is used to create, build, and prioritize relationships between Michigan Tech and external educational institutions, businesses, and other organizations. The creation process starts with the identification of an entity with which we would like to explore the possibility of forming a collaborative relationship. From this point, the creation of the collaborative relationship starts with one-on-one contact between an interested, or impassioned, individual at Michigan Tech and a like-minded person at the other organization. These relationships build by introducing the collaborator to many levels and facets of Michigan Tech to encourage involvement in more than one aspect of the University. In all situations, a value-added philosophy is employed so that both collaborators receive a high rate of return on their investment. These collaborations continue to build if both sides listen to the needs of the other, and meet or exceed expectations. In all instances, Michigan Tech seeks input on improvements to the collaborative effort. Collaborative relationships are prioritized based on the level of engagement with the various aspects of the university, the alignment of the relationship with the strategic plan, and the return that the university receives as a result of the collaborative effort. Simply put, Michigan Tech places high priority on multi-dimensional partnerships that advance our strategic goals.

In the case of educational organizations (high schools, community colleges and partner universities) from which we receive our students, the identification comes from a member of our faculty, our Educational Opportunity Office, a department chair, examination of national trends (recruitment of members of under-represented groups in STEM), or schools with a high percentage of academically disadvantaged, first generation, or low income students. Our recruiters in the field work with high school guidance counselors to identify students to recruit into our programs. As a public institution, we interact with most of the high schools and community colleges in Michigan, which have students who are prepared to enter our programs. We also receive invitations to college fairs, and as appropriate we attend these to increase awareness of our programs.

In all cases, an individual at the educational organization is identified and the one-on-one contact begins to create the relationship. A visit to campus continues the creation process and a track record of student success at Michigan Tech contributes to building the relationship, as trust develops between the two institutions. Feedback is solicited from the educational organization and the students from that organization to improve the collaboration and add value to the experience for all involved. In addition, value-added elements are incorporated into the relationship. This has been done by benchmarking successful programs at Michigan Tech and expanding or adapting them for use at the high school or community college level (e.g. High School Enterprise programs where high school students are engaged in a program that parallels our industry supported experiences for undergraduates). Prioritization of these collaborations is based on the number and success of the students from that institution that attend Michigan Tech and the diversity (ethnic, racial, geographic, major, gender, etc.) that the students bring to the campus.

Building a relationship with local schools is also very important. One way this is accomplished is that students from surrounding schools and beyond come to Michigan Tech for a summer experience or to participate in various event and activities at the Rozsa Center for the Performing Arts. If they have a good experience, they may consider attending Michigan Tech in
the future. Thus this can be a long term recruitment strategy in addition to a means for building a relationship with the local community.

At this point much of our graduate student recruitment is traditional, based on the receipt of applications that may be stimulated by familiarity with a particular professor’s work or the program. More recently, the Graduate School has been strategically recruiting students from smaller STEM focused institutions that have limited graduate program options for their students. Examples of these are Rose-Hulman Institute of Technology and the Milwaukee School of Engineering. Michigan Tech’s graduate programs are a good fit for students graduating from these institutions, and our relationship with these universities results in a source of quality graduate students.

To further enhance the relationships with the institution from which we receive graduate students, the Graduate School is entering into educational agreements to add value to the relationship. An example is the agreement with Northland College that will allow Northland students to use certain senior level courses towards a graduate degree at Michigan Tech. The goal of this agreement is to create a pipeline for students into our graduate programs and to allow students to condense the time to obtaining a master's degree. This agreement is being used as a template to open discussions with other universities that potentially could assist us in achieving our strategic goals.

The Graduate School also actively seeks out governmental agencies from around the world that have educational needs in the STEM fields. When countries are identified, Michigan Tech works with governmental agencies to recruit top students for our graduate programs. Examples of countries where Michigan Tech has created an educational relationship are Thailand and Mexico. Both of these countries have identified strategic educational areas of need and are willing to fund their top students to attend institutions like Michigan Tech to gain the required knowledge. Michigan Tech receives top students with funding that help us to achieve our strategic goals and the foreign governmental agencies are able to attain their educational needs.

**Category 9 Creating, prioritizing, and building relationships with organizations that depend on our students and graduates**

Most of the relationships between employers/companies and the university are initiated with input from members of the faculty. Most faculty, through networking, have developed strong bonds with individuals in industry either through conferences, publications, as former graduate or academic advisors, or through research activities. Potential employers of our students are also identified through input from current students and our alumni, exchange of ideas with career services at other institutions, and by examination of national trends. In all these cases, one-on-one contact begins to create the collaborative relationship. In the case of potential employers identified by our current students, an individual from Career Services will make the initial contact; alternatively, where corporate or foundation financing of enterprise and senior design projects is being sought, the Corporate Development or Foundation Development units of the Office of Development are involved.

Our relationships with employers are built by listening and responding to their needs, and engaging them in several aspects of the University including: sponsorship of senior design projects, the Enterprise program or other student focused programs or activities; establishment of co-op and internship opportunities; participation in research with faculty and graduate students and through our Career Center Partners Program; and service on external advisory boards or other committees. This provides a value added to both the University and the
employer as it assists Michigan Tech to achieve its strategic goals and exposes students to potential employers during their studies. It also allows the employers to provide input on the skills and abilities that they would like their future employees, our graduates, to possess. Maintaining a healthy relationship is also a key to building the collaboration. If we are not providing what the companies want, they will definitely engage with other institutions.

Employer relationships are prioritized based on student preference and level of engagement across the University. An example of this is our collaboration with the employers that are in the SmartZone. These companies provide local employment opportunities for students. (See response to 5P4 for details.) Michigan Tech uses our relationship and involvement in the SmartZone to build and reinforce our relationships with companies.

At the present time few of our graduates, either at the undergraduate or graduate level, seek employment in educational organizations. Therefore current relationships with other educational organizations that employ our graduates exist primarily at the level of individual faculty or staff members at Michigan Tech and the other educational organization. As we continue to increase the number of PhD graduates and a larger percentage of them desire an academic career, these individual relationships may develop into institutional-level collaborations.

**9P3 Creating, prioritizing, and building relationships with organizations that provide services to students**

The same basic process that was discussed in 9P1 is used with the select few organizations that provide services to our students. The creation of a relationship with an organization begins with personal contact and is built by adding value to the collaboration for Michigan Tech and the service provider.

One of the primary services that is provided to our students from outside of Michigan Tech is entertainment. In this case we start by conducting a survey to determine student preferences. Then one-on-one contact with the entertainment provider is established, and we determine how we can provide maximum service to the artists, above the remuneration to perform for us. For instance, we offer them the services of our sound engineers and studio for their use at a very reasonable cost. This benefits the entertainer and also the students, who get hands-on experience, and the audience, who experiences an excellent performance. In this case building the collaboration is based on Michigan Tech being good at what we do, and therefore creating the desire for the performer to return.

**9P4 Creating, prioritizing, and building relationships with organizations that provide material and services**

Many of the vendors that provide materials and services to us are those that have long-standing relationships with the university. Relationships with new vendors are created with input from across campus often by departments making direct contact with the organization depending on the needs and the area of expertise. Creation of a new relationship may also be initiated by the vendor. We build these relationships by dealing with our vendors in a professional manner. One simple way to accomplish this is by timely payment of all bills. We prioritize based on an evaluation of the level of service provided by the vendor and the perceived level of trustworthiness that they exhibit. Our top vendors are willing to work with us on challenging issues. An example of this is the vendor that assists us in running our job fairs. Even though costs have risen considerably over the past few years, due to the cordial relationship we maintain with them, we are always able to work out a mutually acceptable solution.

In most years, Michigan Tech receives more than $1 million in gifts-in-kind from business and industry. These gifts range from test vehicles to computer software and hardware to research
testing equipment. Often such gifts are prompted and facilitated by individual faculty or members of the Corporate Development staff. Any company donating a significant in-kind gift will have a staff member assigned to it so that there is a single, consistent point of contact. That staff member seeks to enhance the relationship with company representatives and make them aware of the full range of benefits available through a partnership with Michigan Tech. Priority attention is given to those firms with the greatest giving potential over time, and with the strongest match of its interests with Michigan Tech’s capabilities.

9P5 Creating, prioritizing, and building relationships with educational organizations, external agencies, consortia partners, and the general community

Again, the same basic process described in response to 9P1 is used to create, prioritize, and build relationships with the education associations, external agencies, consortia partners, and the general community with which we interact. In all instances our focus is on a value-added relationship for both collaborators. To the extent possible, we include members of educational associations, external agencies, consortia partners and the general community in our planning and decision-making processes. For example, the CEO of the MTEC SmartZone is invited to participate on university committees. This builds the relationship with the university but also with individual members of the institution. In turn, faculty, staff, and administrators at Michigan Tech fully participate in the education associations, external agencies, consortia partners and the general community to the extent possible. For example, faculty and staff are members of the Keweenaw Economic Development Alliance (KEDA), MTEC Board of Directors, participate as reviewers for the Accreditation Board for Engineering and Technology (ABET), and serve on such bodies as the local hospital boards, Michigan Land Trust organization, and US Park Service committees.

9P6 Ensuring partnership relationships meet the varying needs of those involved

We ensure that our partnership relationships are meeting the varying needs of those involved by maintaining an ongoing dialogue with our collaborators and responding to their needs and concerns. We seek out and listen to feedback, primarily in an informal and often one-on-one basis, from all collaborators. It is our experience that our corporate partners are very forthcoming if their needs are not being met. For instance, companies will let the Career Center know if they were unable to recruit a Michigan Tech graduate.

Most of our industrial partners are represented on one or more of our external advisory boards. Each board typically meets twice during each academic year for one to two days. During this time they interact with various groups on campus including students, staff, faculty, and members of the administration. These meetings are specifically designed to receive feedback directly from our partners and to discuss the actions that can be taken to meet their changing needs. Additionally, in keeping with the value add to both partners, we seek their assistance and advice in achieving our strategic initiatives.

We also schedule visits to get feedback from companies about our students, and to listen to their needs. The Enterprise program has a formal feedback process, which includes surveys that are conducted with companies about their experiences with our students. The Career Center surveys corporations when they come to the university; they are asked to evaluate students on campus and after the students complete internships or co-ops at their companies.

9P7 Creating and building relationships between and among units within Michigan Tech

We do not have a formal process to build relationships between and among our departments. Most of those that exist were started through one-on-one contacts. This is an area that is improving, but we need to have more interaction among the different units.
Since Fall of 2007, we have been running a series of informal sessions during which faculty and staff engaged in research briefly present particular interdisciplinary areas; the series is called Tech-Talks Research and is held approximately once a month. The goals and objectives of this series are discussed in the response to 5I1, but a key objective is to bring together people who may be located in different academic or research units, but who share a common area of research interest.

Assuring integration and communication across the existing relationships is achieved through ad-hoc mechanisms rather than through an established university-wide process. However, the number of faculty that are involved in the research institutes and centers has made an improvement in this process. We do recognize that more communication can promote a more opportunistic environment, and therefore this will be considered as an opportunity for improvement.

9R1 Regularly collected and analyzed measure of building collaborative relationships
A wide variety of measures of building collaborative relationships are collected and analyzed by several units at Michigan Tech. The Vice President for Research Office and the Office of Technology and Economic Development maintain a list of companies sponsoring senior design and Enterprise projects, the number of these who are repeat sponsors, and the annual funding levels for these programs. We also gather survey responses from Enterprise and senior design sponsors that indicate their satisfaction with the project outcome. The level of external funding to support collaborative relationships and research funding from our collaborators are also maintained on a continual basis. The number of corporations involved in more than one aspect of the University is also tracked.

The SmartZone generates regular reports that include the number of spinoffs, business incubators, students employed by SmartZone companies and the level of investment in the SmartZone. The Career Center tracks the number of students working in their field after graduation, the number of co-ops and internships, and the number of companies that recruit our students. They also collect survey results from Universum and from students on the annual student satisfaction survey. Enrollment Services tracks the number of transfers from community colleges and the enrollment from high schools with which we have established collaborative relationships. The Rozsa Center for the Performing Arts, which offers a majority of the entertainment options, maintains data on the number of ticket sales as well as the demographic range of the sales. They also track the number of student participants from local grade schools, high schools engaged with Rozsa, return entertainers, and requests to perform.

To measure the effectiveness of the Tech-Talks Research series, data on the number of sessions, participants, and presenters is collected. Other measures include the number of proposals generated for future SFHIs, and the number of collaborative externally sponsored proposals generated as a result of attendance at a Tech-Talks Research session.

9R2 Performance results for building collaborative relationships
To date, four companies have "graduated" from the SmartZone by moving out of the incubator space and into a permanent location in the local community. The number of companies in the SmartZone and the number of students they have employed for the past four years is shown in Figure 9.1. It is clear that the SmartZone is contributing to development of the local economy and providing professional employment opportunities for Michigan Tech students.
Figure 9.1: Number of companies in the SmartZone and the number of students employed by those companies from 2006 to 2009.

The Career Center maintains results on the number of companies that recruit on campus as a measure of our collaborative relationships. These results are shown in Figure 9.2. As can be seen the number of companies recruiting on campus increased steadily over the four year time period. Another measure of the success of our collaborative relationships with industry and those who recruit our graduates is the number of co-op positions for our students. These results are displayed in Figure 9.3 and show a slight increase.

Figure 9.2: Number of companies recruiting on campus from 2005 through 2008.

Figure 9.3: Number of student with co-op assignments from 2005 through 2008.

Michigan Tech has a number of established collaborative relationships with individual high schools and school systems. These include those involved in programs such as Bioathlon, Engineering Olympics, high school Enterprise, Gear-Up, dual enrollment, and a few select schools with which we have consistent working relationships. A measure of the success of these efforts is the number of students who apply, are accepted, and subsequently enroll at Michigan Tech. Results are shown in Figure 9.4 and indicate that admissions have risen slightly while enrollments have remained flat.

The Rozsa Center for the Performing Arts also has established collaborative relationships with local schools. Every year approximately 7000 local grade school students participate in programs and events held at the Center. In addition 5 high schools and the homeschooling group are collaborative partners and attend cultural events on a regular basis.
The collaborative relationships that the Rozsa has established with entertainers are critical to their success in offering cultural and entertainment events. Over the past five years there have been approximately 15 return entertainers and 100 requests from individuals and 1500 from agencies to perform at the Rozsa. This is an indication of the success of these collaborative relationships.

The results shown in Figure 2.2 in response to 2R2 depicting the effectiveness of our research institutes and centers is an indication of the effectiveness of our internal collaborations.

9R3 Comparison of results for building collaborative relationships

We do not currently compare our results with other higher educational organizations, but as our measurement of these processes improves, we will develop a relevant comparison cohort.

9I1 Recent improvements in building collaborative relationships

One step that was recently added to our interaction with external collaborators is to extend an explicit “thank you.” This not only expresses our appreciation but, more importantly, provides an opportunity to begin future interactions, which helps to builds the relationship.

Corporate Development staff and functions have been assimilated into Advancement, and staffing has been increased. These actions have enabled us to better coordinate corporate contacts and maximize the tangible returns from these relationships. This, plus the integration of all fundraising and external relations/public relations functions, has also allowed for the communication of consistent marketing and promotional messages about Michigan Tech.

The establishment of the Tech-Talks series (as discussed in the response to 5I1) has improved the process for creating internal collaborations, particularly for research efforts.

9I2 Culture and infrastructure for improved performance results in building collaborative relationships

We are a small campus community within a small town community with Michigan Tech at its center. This results in a closeness of co-workers and a desire to see the university succeed and grow. Our co-workers are also our neighbors and friends, and a significant number of our faculty and staff members have been here for a while and know each other well, which helps with communication within and across units. There are few if any formalities that need to be completed to interact with someone. This encourages people to cooperate on all matters including selecting processes to improve and setting targets for improved performance. We have open and thoughtful management chains that facilitate conversation. The deans and
chairs are easily approachable and people can talk freely. This promotes a culture in which informal conversations occur on a regular basis, which promotes idea generation on process improvement.

In addition, the quality of our students, faculty, and staff and the quality of our education assists in setting targets for improved performance results in creating and building relationships. Our alumni view their experience at Michigan Tech as unique and many continue to interact with the institution long after their graduation, again with the goal of continuous improvement. Many of our alumni serve on our numerous advisory boards, which promotes a culture of seeking advice on processes to improve.
Index to Accreditation Criteria

Index to the location of evidence relating to the Commission’s *Criteria for Accreditation* found in Michigan Technological University’s *Systems Portfolio*

Criterion One – Mission and Integrity. The organization operates with integrity to ensure the fulfillment of its mission through structures and processes that involve the board, administration, faculty, and staff.

Core Component 1a. The organization’s mission documents are clear and articulate publicly the organization’s commitments.
- Each unit has a mission statement that reflects its role in the university, a vision, and a strategic plan to achieve that vision. [5P2]
- Michigan Tech tracks four key metrics to measure progress on the University Strategic Plan using the Michigan Tech Dashboard ([http://www.admin.mtu.edu/urel/dashboard/](http://www.admin.mtu.edu/urel/dashboard/)). [8R2]
- A cultural change within the institution to one of embracing the strategic planning process was accomplished through a concerted effort by the Executive Team. [8I1]

Core Component 1b. In its mission documents, the organization recognizes the diversity of its learners, other constituencies, and the greater society it serves.
- The Michigan Tech Plan recognizes the diversity of our learners and other constituents and clearly states our commitment to society ([http://www.mtu.edu/stratplan/](http://www.mtu.edu/stratplan/)). [Overview The Michigan Tech Plan]
- Review of the Michigan Tech plan includes the entire university community and our constituents. [5P1]
- We have extended our efforts to change the culture with respect to recognizing the importance of strategic planning of all our efforts to our stakeholders, particularly alumni. [8I1]
- The Michigan Tech Dashboard includes values of the four primary metrics for each school/department and additional Initiative Metrics on diversity and online learning and Operations Metrics on enrollment, finance, faculty, and US News & World Report variables. [8R2]

Core Component 1c. Understanding of and support for the mission pervade the organization.
- An evaluation of the alignment of a proposed course or degree program with our strategic plan and capacity to offer the course with available resources in light of the revenue it may generate is performed. [1P3]
- The measures that are collected and analyzed regularly are specific to each major non-instructional objective and each unit that contributes to the achievement of an objective. The measure used for a unit must be in alignment with the mission of the unit. [2R1]
- Our research efforts are strongly connected to educating graduate students. Growth in our research attracts and retains the best faculty, staff, and students (graduate and
undergraduate), which strengthens our instructional programs; all of which contribute to the achievement of our mission. [2R4]

- Each unit may compare their dashboard metrics to those of peer or aspirant programs in the state and across the country. [8R4]

**Core component 1d. The organization’s governance and administrative structures promote effective leadership and support collaborative process that enable the organization to fulfill its mission.**

- A wide variety of decision-making processes are used throughout the university. Representative committees or task forces are used to make recommendations for courses of action or changes that will impact a broad constituency inside and external to the university. [5P5]

- Recently two academic units used an external facilitator to assist in the reduction of internal conflict, and to bring proponents towards a shared vision of the future of the unit. [8P2]

- The level of interdisciplinary research that is being conducted at Michigan Tech through our research institutes and centers has been increasing. [2R2, Figure 2.2]

- We developed and instituted a series entitled Tech-Talks that brings together faculty and staff to share information and interact with each other on specific topics. [5I1]

**Core component 1e. The organization upholds and protects its integrity.**

- Michigan Tech completed an extensive Office of Federal Contract Compliance Program (OFCCP) audit. No violations or citations were submitted. [4P2]

- Responsible conduct of research training for faculty members and graduate research assistants is conducted at on-campus orientations and using CITI online training. Michigan Tech has installed a phone- and Internet-based system called EthicsPoint. [4P7]

- We established the Institutional Compliance and Ethics Office, named a director of institutional compliance and ethics, and formed an Institutional Compliance and Ethics Council to assist and advise the director. [4I1]

- ASPIRE is used to interrogate and analyze space data, which enhances our accountability to NSF and other research agencies. [7I1]

- The creation of a new committee that includes staff from Information Technology Services and Security (ITSS), Internal Audit, and Risk Management addresses issues dealing with the securing of private information. A new position in IT is dedicated to information security and compliance. [7I1]

---

**Criterion Two – Preparing for the Future. The organization’s allocation of resources and its processes for evaluation and planning demonstrate its capacity to fulfill its mission, improve the quality of its education, and respond to future challenges and opportunities.**

**Core Component 2a. The organization realistically prepares for a future shaped by multiple societal and economic trends.**

- The Campus Master Plan addresses plans over the next 50 years. [Overview O6]

- As a technological university our outreach efforts are particularly important at this time when fewer and fewer students are choosing to study the STEM fields. Our Summer Youth programs offer learning opportunities to numerous youth each summer and also expose these pre-college students to the Michigan Tech campus and our academic programs. [2R2]
These programs and the YES! Expo help us recruit a diverse student body and benefit the greater society by introducing students to the STEM disciplines and encouraging them to pursue a degree in these fields at some institution. [2P4]

• Our Strategic Faculty Hiring Initiative has the goal of hiring clusters of 10 faculty with a particular interdisciplinary research theme each year for 10 consecutive years. [4I1]

• The Chief Information Officer has direct responsibility for planning continuous improvement for our information technology infrastructure, services, and personnel, and the Energy Advisory Group considers our energy future. [8I1]

Core component 2b. The organization’s resource base supports its educational programs and its plans for maintaining and strengthening their quality in the future.

• We have a balance revenue portfolio between state appropriation, tuition and fees, grants and contracts, and auxiliary and other revenues. [Overview Michigan Technological University]

• Michigan Tech receives more than $1 million in gifts-in-kind from business and industry. These gifts range from test vehicles to computer software and hardware to research testing equipment. [9P4]

• The programs that achieve our other distinctive objectives are primarily self supporting. [2R2]

• Opportunities are evaluated with a focus on students and their education, including our collaborative relationship with the MTEC SmartZone. The student programs are entrepreneurial internships and co-op opportunities that provide real-world experiences for our students and inexpensive quality assistance to the entrepreneur. [5P4]

Core component 2c. The organization’s ongoing evaluation and assessment processes provide reliable evidence of institutional effectiveness that clearly informs strategies for continuous improvement.

• We offer programs accredited by ABET, AACSB, SAF, NAACLS, and the Michigan Board of Education, and certified by ACS. These external organizations perform evaluations and some require program assessment and continuous improvement. [Overview O1]

• Michigan Tech went through a Hazard Assessment Program sponsored by the US Department of Homeland Security. [6P3]

• The Compensation Strategy Task Force compared the Fringe Benefit Rates and Compensation Packages for Michigan Tech to other institutions. As a result of this study, a redesign of our compensation structure was performed to align it with peer institutions. [4R4]

• Michigan Tech completed an extensive OFCCP audit, which included a complete review of our records and practices for hiring faculty. [4P2] As a result of this and other efforts, we received an NSF grant to help support improvements in faculty recruitment and retention process. [4I1]

Core component 2d. All levels of planning align with the organization’s mission, thereby enhancing its capacity to fulfill that mission.

• All of our key non-instructional processes are designed in alignment with our strategic plan and are intended not only to achieve their particular goals and outcomes but also to support achievement of our instructional objectives. [2P1]

• The specific projects for which state support is requested are determined after input from the university stakeholders and then a process ensues whereby the university president and
his executive team make certain that the requests are consistent with the university strategic plan and campus master plan as well as meshing those requests with the priorities of the state. [3R4]

• The majority of faculty and staff who completed the annual evaluation of the president have read the university strategic plan. [8R5, Figure 8.7]

• A cultural change within the institution to one of embracing the strategic planning process was accomplished through a concerted effort by the Executive Team. [8I1]

• Common or shared developmental outcomes for undergraduate students were recently established by Student Affairs utilizing Michigan Tech’s mission, vision, and guiding principles as a starting point. [1I1]

Criterion Three – Student Learning and Effective Teaching. The organization provides evidence of student learning and teaching effectiveness that demonstrates it is fulfilling its educational mission.

Core component 3a. The organization’s goals for student learning outcomes are clearly stated for each educational program and make effective assessment possible.

• Michigan Tech’s goals for student learning and shaping an academic climate are clearly stated in our strategic plan (http://www.mtu.edu/stratplan/). [Overview O1]

• All course syllabi must contain instructor identification, course identification (including pre and co-requisite courses and course learning objectives), course requirements, grading scheme, schedule, course policies, university policies, and rules. [1I1]

• Assessment of the General Education curriculum is conducted annually. [1R2, Figure 1.3 and 1.4].

• The College of Engineering conducts a student self assessment based on the ABET learning outcomes. [1R3, Table 1.3]

Core component 3b. The organization values and supports effective teaching.

• The Center for Teaching, Learning, and Faculty Development provides an orientation program and workshops during the academic year for faculty and graduate students with teaching responsibilities. [1P9]

• University Senate policy states that teaching must be assessed through additional means (besides the standardized student teaching evaluations), and in support of tenure, promotion, and renewal recommendations, other forms of evidence of teaching proficiency, such as a teaching portfolio or feedback from colleagues who have attended classes, is required. [1P11]

• The university provides a climate for curricular innovation through the recognition of such efforts in the faculty and staff reward and recognition process. Examples of successful curricular innovations include the initially NSF funded Enterprise Program, Sustainable Futures IGERT [1P4], and the High School Enterprise [9P1].

• The Center for Teaching, Learning, and Faculty Development administers the SPEAK Test for international graduate students who will be GTAs. They must meet the established criteria before being placed in the classroom. [1P6]
Core component 3c. The organization creates effective learning environments.

- The ExSEL Program is designed to promote student success. Michigan Tech operates eight learning centers, organized by discipline, to help students succeed. [1P8]
- The majority of our undergraduate programs are designed with the flexibility to allow a variety of curricular experiences such as Honors Institute, research opportunities for undergraduates, Enterprise, co-ops with industry, and international experiences. [1P4]
- A process to facilitate the upgrading of our classrooms and thereby improve our course delivery system was designed through the recently completed Classroom and Facilities Upgrade Plan (or Learning Space Enhancement) AQIP Action Project. [1I1]
- The SmartZone is contributing to the development of the local economy and providing professional employment opportunities for Michigan Tech students. [9R2, Figure 9.1]

Core component 3d. The organization’s learning resources support student learning and effective teaching.

- Michigan Tech is a participation in iTunes U, a service that enables faculty to deliver pre-recorded audio/video course content using Apple's iTunes software. [1P12]
- The student satisfaction survey indicates that in general students are satisfied with the learning support processes provided by Michigan Tech. [1R5, Figures 1.7 and 1.8]
- Usage statistics for the JR Van Pelt/Opie Library collected and analyzed on an annual basis indicate a high level of usage and therefore a high degree of satisfaction. [3R2]
- The Center for Teaching, Learning, and Faculty Development administers the SPEAK Test [1P6], provides an orientation program to all new personnel with teaching responsibilities, offers workshops on a variety of topics [1P9], as well as “Lunch and Learn” sessions for the university community. [1P11]

Criterion Four – Acquisition, Discovery, and Application of Knowledge. The organization promotes a life of learning for its faculty, administration, staff, and students by fostering and supporting inquiry, creativity, practice, and social responsibility in ways consistent with its mission.

Core Component 4a. The organization demonstrates, through the actions of its board, administrators, students, faculty, and staff, that it values a life of learning.

- Faculty, staff, and administrators provide public service through membership on numerous external boards and organizations. [9P5]
- Michigan Tech communicates its occupational safety programs through on-going employee training. [6P3]
- The results of the National Survey of Student Engagement indicated the level to which students felt their institution emphasized involvement in campus events, and Michigan Tech compares favorably to our comparison groups. [2R3]
- We introduced the Experience Tech in part to enrich appreciation for diversity, understanding of the arts, and to improve health and wellness. Student participation has increased at the golf course, tennis center, and ski hill and student attendance at performing arts events has doubled. It is anticipated the participation in these types of events will continue after graduation and contribute to life-long learning experiences. [2I1]
Core Component 4b. The organization demonstrates that acquisition of a breadth of knowledge and skills and the exercise of intellectual inquiry are integral to its educational programs.

• The Michigan Tech Plan states that we will deliver a distinctive and rigorous discovery-based learning experience grounded in science, engineering, technology, sustainability, and the business of innovation, and provide dynamic experiential learning that integrates instruction, research, and innovation in undergraduate and graduate programs. [Overview O1]

• The General Education curriculum requires courses in the humanities, arts, and social sciences and sciences, technology, engineering, and mathematics. [1P1]

• Assessment of the General Education curriculum is performed regularly and in general the students agree that their participation in the course has improved their abilities with respect to the stated learning objectives. [1R2, Figure 1.3 and 1.4]

• Research, Scholarship, Innovation, and Creative Work at Michigan Tech is integrally connected to the education of graduate students (and a growing number of our undergraduate students). [Overview O2] Resources that support this effort have increased. [2R2, Figures 2.3 and 2.4]

Core Component 4c. The organization assesses the usefulness of its curricula to students who will live and work in a global, diverse, and technological society.

• We offer programs accredited by ABET, AACSB, SAF, NAACLS, and the Michigan Board of Education, and certified by ACS. These external organizations perform evaluations and some require program assessment and continuous improvement. [Overview O1]

• The result of an attitudinal survey taken by students and the assessment of student portfolios indicate that students have obtained the skills and abilities expressed in the General Education learning outcomes. [1R2, Figures 1.3 and 1.4]

• Our stakeholders express their satisfaction with students by recruiting them to work in their companies or to pursue additional education in their graduate programs. The number of companies that participate in on-campus recruitment efforts continues to increase [9R2], and the placement of our graduates remains consistently high. [1R4]

• Michigan Tech compares the placement rate of its graduates to several institutions in Michigan and across the United States. The demand for our graduates is consistently high. [1R6]

Core component 4d. The organization provides support to ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly.

• The academic integrity policy and procedures in support of the policy are available at http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html.

• Responsible conduct of research training for faculty members and graduate research assistants is conducted at on-campus orientations and using CITI online training. Michigan Tech has installed a phone- and Internet-based system called EthicsPoint. [4P7]

• We established the Institutional Compliance and Ethics Office, named a director of institutional compliance and ethics, and formed an Institutional Compliance and Ethics Council to assist and advise the director. [4I1]

• The creation of a new committee that includes staff from Information Technology Services and Security (ITSS), Internal Audit, and Risk Management addresses issues dealing with
the securing of private information. A new position in IT is dedicated to information security and compliance. [7I1]

Criterion Five – Engagement and Service. As called for by its mission, the organization identifies its constituencies and serves them in ways both value.

Core Component 5a. The organization learns from the constituencies it serves and analyzes its capacity to serve their needs and expectations.
- The Memorial Union Support Fee is intended to substantively improve the Memorial Union Building and the services provided there to students. Student input is needed, used, and expressly sought out to inform and direct the management of these funds. [3P2]
- Email and calendar support for all faculty, staff, and students was outsourced, which eliminated email storage limits in direct response to student requests. [6I1]
- Any proposal that impacts students must include the student perspective on the direction of the project, and thus student endorsement of the proposal to construct a new residence hall was necessary. [5P3]
- In response to the last climate survey of faculty, staff and students, the president accelerated development of the Little Huskies Child Care Center. [4P12]

Core Component 5b. The organization has the capacity and the commitment to engage with its identified constituencies and communities.
- The Vice President for Research Office established a Research Advisory Council to provide a communication vehicle and serve as a forum between the Michigan Tech research community and the vice president for research, Sponsored Programs, Sponsored Programs Accounting, and the Graduate School, focusing on operational research practices and administrative issues. [6P2]
- Michigan Tech has an extensive relationship with over 60 corporations, and new or growing relationships with many others. On a regular basis, members of the Corporate Development staff meet with key corporate representatives in what amounts to an “account manager” system. [3P3]
- To further enhance the relationships with the institution from which we receive graduate students, the Graduate School is entering into educational agreements to add value to the relationship. [9P1]
- Michigan Tech sponsors the SAE Clean Snowmobile Challenge, which engages many of our constituents and the local community. [2R4]

Core Component 5c. The organization demonstrates its responsiveness to those constituencies that depend on it for service.
- Michigan Tech provides the Safety First Alert Communication System for use by all current students, faculty, and staff. [6I1]
- The MS in Electrical Power Systems Engineering and the “Advanced Propulsion for Hybrid Vehicles” course are educational offerings made in response to requests from our constituents. [1P3]
- Our Michigan alumni expressed their interest in career change information and advice, as well as networking opportunities for career change purposes. In response we are planning two sessions on career change. [6P1]
• In response to the last climate survey of faculty, staff and students, the president accelerated development of the Little Huskies Child Care Center. [4P12]

**Core Component 5d. Internal and external constituencies value the services the organization provides.**

• Usage statistics for the JR Van Pelt/Opie Library collected and analyzed on an annual basis indicate a high level of usage and therefore a high degree of satisfaction. [3R2]

• Every year approximately 7000 local grade school students participate in programs and events held at the Rozsa Center for the Performing Arts. [9R2]

• Results for the student satisfaction survey illustrate the undergraduate and graduate student assessment of a number of support services. [6R2, Figure 6.3]

• The level of interdisciplinary research that is being conducted at Michigan Tech through our research institutes and centers has been increasing. [2R2, Figure 2.2]

• Our stakeholders express their satisfaction with our students by recruiting them to work in their companies or to pursue additional education in their graduate programs. The number of companies that participate in on-campus recruitment efforts continues to increase [9R2], and the placement of our graduates remains consistently high. [1R4, 1R6]
Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.