CHAPTER SIX

Criterion Four:

Acquisition, Discovery, and Application of Knowledge

A. Introduction

Criterion Statement: 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.

That Michigan State University promotes a life of learning through the acquisition, discovery, and application of knowledge is clearly stated in its foundational policy documents. For example, the Mission Statement reads in part: "Michigan State University is committed to … expanding knowledge as an end in itself as well as on behalf of society." Paragraph 4 of the Preamble of the *Bylaws of the MSU Board of Trustees* provides a broader statement:

> The Trustees interpret this mission as being one requiring the University to … encourage meaningful research and experimentation, both to develop new knowledge and to subject our society to a full and objective study so that it may be made more nearly perfect.

Faculty and staff striving to live a life of learning through the conduct of research and creative activity are the heart of a research extensive university, helping to attract students and prepare them for that life. Thus, the primary focus of the evidence presented in **Core Component 4A** will be MSU research and creative activity, and its promotion at all levels of the organization.

While faculty research demonstrates to students the importance of a life of learning, and student research arms undergraduate students with the skills necessary to begin learning a subject matter in great depth, MSU also believes that students need to engage in a certain breadth of learning as well as depth. **Core Component 4B**, therefore, focuses on the general education requirements at MSU and how, in addition to subject matter expertise, MSU graduates learn how to continue learning in an increasingly complex world. MSU's land grant heritage means that

MSU values practically-minded teaching, learning, research, and outreach that occurs on campus and extends to the state, nation, and the world. This is demonstrated in **Core Component 4C**, which outlines the involvement of MSU in the world and the world in MSU. Finally, it is not enough for MSU to promote a life of learning for its faculty, staff, and students without promoting the responsible acquisition and use of knowledge. **Core Component 4D** outlines the University's policies and practices that "ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly" (HLC/NCA Core Component 4D).

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

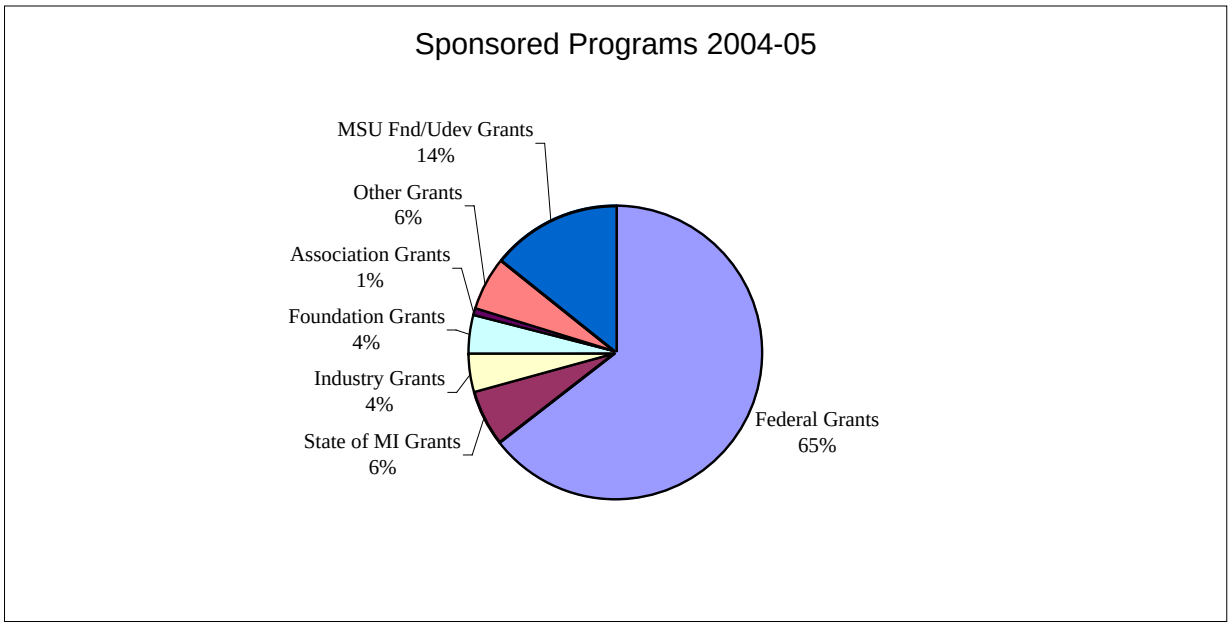
Institutional Perspectives - Overview of Research at MSU

From homogenized milk to two of the world's most effective cancer drugs, from athletic turf that grows indoors to discoveries that help establish the age of the universe, research at MSU has touched the lives of people around the state, the nation, and the world. The excellence and extent of research at MSU and the impact of MSU's research are a direct result of the institutional support for research activities that qualified MSU as one of 62 members of the Association of American Universities (AAU), just as the practical, applied, or transformational nature of much of this research is a result of MSU's 150 year land grant tradition.

Extramural support for research at MSU has grown substantially since the 1995-96 NCA visit, both in scope and international recognition.

- Sponsored research at MSU in 2003-04 reached $303 million, a substantial increase from $186.7 million in 1994-95.
- NSF survey on research expenditures rose from $183 million in 1994-95 to $321 million in 2003-04.
- The number of research proposals submitted in 1994 was 2,594. In 2004, 3,561 research proposals were submitted.

- Research expenditures, as compiled by the National Science Foundation, have grown more than 50 percent over the past five years, totaling more than $343 million in 2002-03.
- Federal awards in FY 2005 increased more than 20 percent over FY 2004 (from $138 million to $166 million).
- In 2002, MSU ranked 36th in total Research and Development, according to the National Science Foundation.



Institutional Perspectives – Policy Support for Research at MSU

MSU's commitment to the research activities of its faculty is clearly stated in the Faculty Handbook.

> The search for new information and understanding is as important to the University as the transmission of existing knowledge and understanding. … Creativity in the arts as well as basic and applied research are faculty activities that are expected and encouraged by the University.

In part this emphasis on research stems from the belief that student participation in faculty research provides a unique and uniquely effective approach to teaching and learning. This, too, is reflected in the University's Mission Statement:

> Research and public service are mutually enriching activities for both faculty and students, and contribute significantly to the high quality of both undergraduate and graduate instructional programs. … Participating with faculty in research and service projects provides students with unique learning opportunities, and consequently improves the quality of both graduate and undergraduate education.

Finally, strategic planning at the University equally emphasizes and supports research activities. University research is a substantial component of the annual planning and review process of every major academic unit. The Council on the Review of Graduate Education and Research (1991) completed a substantial review and affirmed the University's research mission, noting "MSU has the responsibility to combine the highest quality research with the highest quality teaching and application of knowledge for the purposes of human enlightenment and enablement." In addition, the faculty and student committee made recommendations "to increase significantly the quality and quantity of research at MSU and thus to enhance its stature as a public research university."

The University has clear statements on the **academic freedom** of researchers, who "are entitled to full freedom in research and in the publication of the results, subject to the adequate performance of their other academic duties" (Faculty Handbook). Not only do researchers have the freedom to pursue and publish research results, they are rewarded for doing so. Promotion and tenure processes in most departments afford research activities substantial weight in the review of faculty performance. This practice is consistent with University "Appointment, Reappointment, Promotion and Tenure Recommendations" that emphasize the importance of research and creative activities in assessing faculty performance.

Institutional Perspectives – Leadership for the Research Endeavor

The primary administrative office for support of research at the University level is the Office of the Vice President for Research and Graduate Studies (OVPRGS). This office assists faculty in a number of ways:

- It administers the Intramural Research Grants Program and the Strategic Partnership Grants program, which provides larger grants for projects deemed to be strategically significant to the university.
- It provides support and oversight for major centers, analytical facilities, animal care facilities, safety and environmental services.

- Working with the Office of the Provost, it administers certain funds made available from the MSU Foundation to provide startup support for new faculty, matching for external grants, and seed monies for new projects that have the potential to attract funds from outside sponsors.
- It helps identify opportunities for external support of research and creative activities, and proposals an institution may submit.

MSU installed a new Vice President for Research and Graduate Studies in September 2004. Vice President Ian Gray embarked on a series of discussions in order to establish a University strategic research agenda. Details are provided in Chapter Two. For more information, see the "Status of MSU Research" report in the Resource Room.

Like other research extensive universities, MSU maintains substantial infrastructure and administrative support systems to meet a broad range of research-related compliance requirements. In 2004-05, OVPRGS reorganized regulatory compliance functions to support MSU's research enterprise more effectively and to better align the institution with the spectrum of regulatory requirements, as well as to maintain and seek new research-related accreditations such as the Association for the Accreditation of Human Research Protection Programs. All regulatory functions were grouped in a new Office of Regulatory Affairs (ORA), which includes: Animal Care, Human Research Protection, Regulatory Affairs Operations, Export Controls, Environmental and Health Safety, and Campus Sustainability.

Research centers are a common organizing mechanism for researchers seeking to work together on a common problem. Often, research centers facilitate multi- or trans-disciplinary research to address research questions that cannot be adequately answered within traditional academic disciplines. "In many respects, Michigan State University has been a leader in this movement by promoting an environment that encourages collaboration across disciplines" (Review of Research Centers and Institutes at MSU).

The MSU Research Excellence Fund (REF) competition provides up to $750,000 per year for five years for center-based research that has been pre-tested for its potential to achieve sustained peer recognition and extramural support. Following external peer review by the American Association for the Advancement of Science selected national experts, ten REF centers were funded in 2004 (See also the "Summary of REF Center Reports in the Status of MSU Research" in the Resource Room).

Recognizing the important role other research centers play in organizing, facilitating, and producing research at MSU, in 2001 OVPRGS began a review of the 32 research centers that had not already been evaluated as a part of the REF program. Reviews consisted of the development of a strategic plan, an internal review, and an external review. Thus, all research centers at MSU are engaged in a periodic review process, either through the REF funding process or through the OVPRGS research center review.

Both within and outside OVPRGS, a variety of University programs and units provide support for faculty research, including "the Library, … various divisions such as the Computer Laboratory, Office of Radiation, Chemical and Biological Safety, University Laboratory Animal Resources, Instructional Media Center, Broadcasting Services, and various centers and institutes for facilitating multi- and interdisciplinary research projects" (Faculty Handbook). Illustrative examples include the following:

MSU ranked among the top ten best places to work in a poll conducted by The Scientist magazine (Grimwade and Park 17 (10/20/03)).

- Contract & Grant Administration provides assistance to faculty and support staff with the financial and contractual aspects of submitting proposals to external sponsors, and administers awards according to sponsor's and MSU regulations.
- The Office of Intellectual Property (OIP) and the associated Copyright Licensing Office facilitate the commercial development and public use of technologies and copyrightable materials developed by MSU faculty and staff. As with patentable technologies, royalties on licenses of copyrightable works are shared with the product authors under University policy, as stated in the Faculty Handbook.
- MSU's analytical core facilities and the statewide, multi-institutional Core Technology Alliance provide research infrastructure in the following technology areas: genomics, proteomics, mass spectrometry, macromolecular structure determination, advanced microscopy, advanced materials, and nuclear magnetic resonance imaging.
- The MSU Foundation, established in 1973 as an independent non-profit corporation, supports the advancement of MSU by providing grants and funding in support of research, including: Strategic Partnership Grants of $500,000 to over $1 million, Capacity Building Grants ranging from $10,000 to $200,000, and Intramural Research Grants

ranging from $3,000 to $75,000. In 2004, the Foundation awarded $14 million to the University, its faculty, and researchers.

The Michigan Agricultural Experiment Station (MAES) provides funding for four primary colleges (Agriculture and Natural Resources, Veterinary Medicine, Natural Science, and Social Science) that supports faculty and staff research. In addition, MAES provides support for a number of projects throughout the university in colleges other than the four listed above. The MAES annual report (Resource Room) lists all MAES research projects by department as well as by MAES-affiliated faculty members.

MAES contributes to the salaries of 287 faculty (130 FTE). Annual recurring funding is $38M ($5M federal, $33.1M state) with an additional $6M non-recurring. Funds are allocated 79% in salary and fringes with the remainder in operations and project support. MAES funded faculty members generate approximately $40M in external funding annually. All MAES faculty members maintain at least one "umbrella project" as an area of long-term research focus. These projects are peer reviewed before being sent to the Cooperative State Research Extension and Education Services (CSREES) for approval and inclusion in the national Current Research Information System (CRIS). MAES receives funding from CSREES to facilitate Multistate Hatch, McIntire Stennis, and Animal Health projects.

Institutional Perspectives - Research Facilities and Infrastructure

Recent renovations and/or new construction that have increased MSU's research capacity are listed in Chapter Two (a complete list is in the Resource Room). Furthermore, the campus master plan, 2020 Vision, recognizes the importance of future research needs for the development of campus. In fact, the master plan calls for 40-45% of the new 3.6 million gross square feet over the next twenty years to be dedicated to research. This will be in addition to the 18.8% increase in research space from 1994-95 to 2003-04 (Planning Profile). To provide interim relief to immediate laboratory space needs, in 2004 MSU leased more than 16,000 net assignable square feet at nearby MBI International, Inc.

MSU has 2,853,442 square feet of research space and 2,500 acres of experimental research farms (Data Digest 2004).

Unit Perspectives and Accomplishments – Research in the Colleges

Research supports and incentives provided by the University are designed to facilitate faculty research, which in turn influences teaching and student learning and benefits society. Specific examples are available in the NCA Database (search for 4A), at the OVPRGS website, and in the section "MSU Research Jewels" in the Status of MSU Research (Resource Room).

College of Agriculture and Natural Resources

MSU's pioneering advances in agricultural and natural resource research include research in animal and plant biotechnology, control of invasive species and of pathogens, protection of biodiversity, management of urban sprawl, environmental remediation, and the sustainability of agricultural and natural resource systems. The College reaches around the world with a multitude of international projects focused on collaborative research with host country scientists; food security for underdeveloped countries; exchanges of faculty, researchers and students with foreign institutions; short courses and training programs through the Institute of International Agriculture; and the largest study abroad program of any college of agriculture and natural resources in the U.S.

Research in China shows global impact
By Sue Nichols
Globalization is making it a small world, after all, and the costs of this newfound neighborliness are high. Two internationally acclaimed scientists present sweeping evidence that China's challenges – from polluted air and water to making and consuming goods to family life – already are making a big impact on the environment and human well-being in China and other parts of the world, including America and Europe. … Professor Jack Liu, University Distinguished Professor in Fisheries and Wildlife, Rachael Carson Chair, and director of the Center for Systems Integration and Sustainability at MSU, has joined with Pulitzer Prize-winning author Jared Diamond, professor of geography and physiology at UCLA, to write "China's Environment in a Globalizing World – How China and the Rest of the World Affect Each Other" in the June 30 issue of the international science journal Nature.

For the full article, see *MSU News Bulletin* 6/30/05.

College of Arts and Letters

The research foci of the College of Arts and Letters include: (i) the identification, understanding, contextualization, interpretation, and presentation of textual, visual and material production of humankind through history and across cultures; (ii) the history, nature, use, learning, and structure of human language; (iii) the meaning of literacy in language, culture, and the arts; (iv) how individuals find their identities vis-à-vis their humanity, spirituality, the natural world around them, and the groups and societies to which they belong; and (vi) the creative activities of artistic production and performance.

Eli Broad College of Business and School of Management

The faculty of the Eli Broad College of Business conducts research on a wide range of topics in business and management, with support from corporate and government sponsors. The Broad College is particularly successful at creating high impact research. For example, based on a count of publications in top-tier scholarly journals, the *Financial Times* ranked the Broad School in the top 20 among all U.S. business schools.

College of Communication Arts and Sciences

The College of Communication Arts and Sciences is internationally known for five areas of research, among its other specializations: health, risk and environmental communication; information technology; persuasion, compliance gaining and consumer behavior in interpersonal, social, political and commercial contexts and settings; international and national media economics, management and policy; and behavioral and social impacts of traditional and emerging media.

College of Education

Faculty members in the College of Education conduct externally funded research supported by more than $15 million a year. The emphasis in international comparative research is one of the strongest of any U.S. university. A partial list of

- College of Education faculty members have published 22 books of international research in the past ten years. These are featured in an on-line book exhibit.
- The Elementary Education program at MSU has been ranked #1 in the nation by *U.S. News and World Report* for a decade.
- The Secondary Education program at MSU has been ranked #1 in the nation by *U.S. News and World Report* for a decade.

several institutes, centers, and projects include, Center for the Scholarship of Teaching, Center for Curriculum Materials in Science, Center for Teaching and Technology, The Education Policy Center at MSU, Human Energy Research Laboratory, Institute for Research on Teaching & Learning, K - 12 Outreach , Michigan Center for Career & Technical Education, Teachers for a New Era, Youth Sports Institute, US-China Center, and Association for the Study of Higher Education.

College of Engineering

The College of Engineering houses many research centers and laboratories, which vigorously promote the interdisciplinary collaboration of its faculty members. The strength of this research is evident in the 336 active grants totaling over $24 million in research expenditures. Research in Engineering is increasing, with submitted proposals up 22% in the last year and 46% in the last five. In addition, the College is home to seven new research centers and facilities since 2002.

College of Human Medicine

Research is an important component for the College of Human Medicine (CHM). As a community-based medical school, one goal of CHM is to conduct collaborative, multidisciplinary, and multi-community research that takes advantage of CHM's unique distributed campus system. The focus is on both clinical research that can be practically applied as well as critical research in the basic science departments affiliated with CHM on mechanisms underlying human diseases and their integration.

James Madison College

The faculty of James Madison College have a reputation for excellence and dedication to undergraduate education. This is complemented by increasing contributions to scholarship in the areas of international and public affairs.

College of Natural Science

The goals of the College of Natural Science (CNS) are to provide excellent research, teaching, and public service in the biological, physical, and mathematical sciences. The College

strives for research excellence by maintaining traditionally strong departments while developing linkages across disciplines. (For this reason, many CNS affiliated research centers are described elsewhere in this report; see for example, Plant Research Laboratory, Kellogg Biological Station, and Division of Science and Mathematics Education). Many of the research areas in the College that have national and international stature are interdisciplinary and cross-college in nature, including structural biology/quantitative biology and modeling; plant science; ecology; mathematics and science education; and evolutionary biology and behavior. The emerging research areas in the College that are expected to grow to national and international stature include neuroscience and environmental science and policy.

College of Nursing

Research in the College of Nursing (CON) at Michigan State University is community-based and focused on chronic disease, health disparities, and health and systems outcomes. CON faculty and students focus their research on chronic conditions and/or healthy families, in order to improve delivery of health care and scientific knowledge underpinning evidence-based nursing practice. Faculty research and evidence-based nursing practice improve the health status of individuals, families, and communities and inform and support the college mission.

College of Osteopathic Medicine

Medical research is essential to MSUCOM faculty, staff, and students. The college received nearly $7 million last year in outside funding for research on a wide spectrum of medical issues ranging from malaria to the causes of cancer. Increasingly, research is done in conjunction with faculty in the Statewide Campus System hospitals.

Terrie Taylor, D.O., Department of Internal Medicine, earned an international reputation for the excellence of her work in treating cerebral malaria among children in Malawi, Africa. Working six months a year in Malawi and six months on the MSU campus, she was named "Researcher of the Year" by the American College of Osteopathic Internists and also obtained funding in a joint venture with scientists at Johns Hopkins University to establish a medical informatics system to support her clinical and research work.

College of Social Science

The College of Social Science is a community of scholars committed to creating, disseminating, and applying knowledge in the social, behavioral, and economic sciences. Faculty members engage in both disciplinary and interdisciplinary collaborative research to gain in-depth answers to real world problems on local, national, and international levels. Research

> In Fall 2001 the College of Social Science conducted a survey of ongoing international activity. This report found that every unit of the College, represented by over one hundred faculty and students, was engaged in international activity during the year. In 2000-2001 twenty-six new research and training grants for international activity were awarded totaling more than $4,000,000. In the three years 2002, 2003, 2004, College faculty were involved in the award of 93 external grants totaling $18.5 million. In the past two years the College, in cooperation with ISP, has hired, or is in the process of recruiting, 20 faculty members with international foci to their work.

topics include the effects of changes in land use; studies of how emerging societies develop; understanding American attitudes about education, environment, and health care policies; and studying issues of minority groups in the United States.

College of Veterinary Medicine

The College of Veterinary Medicine has strong research programs that include studies in the following general areas: infectious diseases, chronic respiratory diseases, comparative medicine, epidemiology and public health, and food safety and toxicology. Five endowed chairs devote the majority of their time to research studies involving comparative orthopedic disease, pulmonary disease, pathogenesis of bovine mastitis, equine performance, and diseases of swine. The research provides numerous opportunities for professional students, residents, and traditional graduate students to learn the fundamentals of scientific investigation. The college has a number of exchange programs with foreign veterinary schools and collaborative research is encouraged and facilitated by the college.

Unit Perspectives and Accomplishments - Major Interdisciplinary and Non-College Units

Significant inquiry, creativity, and practice occur outside of or across MSU's colleges, in such venues as interdisciplinary centers and non-college research units. Some examples include:

National Superconducting Cyclotron Laboratory

The National Superconducting Cyclotron Laboratory (NSCL) is the leading rare isotope research facility in the United States. NSCL scientists and researchers employ a wide range of tools for conducting advanced research in fundamental nuclear science, nuclear astrophysics, and accelerator physics. Important applications of the research conducted at the NSCL benefit society in numerous areas, including new tools for radiation treatments of cancer patients and the assessment of health risks to astronauts. Funded primarily by the National Science Foundation and MSU, the NSCL operates two superconducting cyclotrons. Scientists at the NSCL work at the forefront of rare isotope research. They make and study atomic nuclei that cannot be found on earth—where they have long decayed into the known, stable or long-lived isotopes.

More than 600 scientists from the US and abroad have come to the NSCL. Partly as a result of the research conducted at NSCL, *U.S. News and World Report* ranks the MSU nuclear physics Ph.D. program as number two in the nation. MSU is also a leading contender for the home of the proposed Rare Isotope Accelerator (RIA), which would enable the next stage in nuclear physics research, and was recommended as the number one priority for major new construction by the Nuclear Science Advisory Committee

Research at NSCL:

Cyclotron brings beams to rest, advances research
By Tom Oswald

"Scientists at MSU have developed a technique that puts the brakes on isotopes that are moving at nearly half the speed of light, or about 90,000 miles per second, giving the researchers the opportunity to study them more closely"

For the rest of the MSU News Bulletin article, click here.

Kellogg Biological Station

Kellogg Biological Station (KBS) is Michigan State University's largest off-campus education complex and one of North America's premier inland field stations. The station is administered jointly through the College of Agriculture and Natural Resources and the College of Natural Science. The 4,065-acre station includes Kellogg Bird Sanctuary, Kellogg Farm, the Kellogg Biological Laboratories, the KBS Conference Center, Extension and Outreach offices and the Lux Arbor Reserve. World renowned for its contributions to ecological science and evolutionary biology, the Station is home to one of the National Science Foundation's Long-

Term Ecological Research sites (LTER), and is committed to science and ecology education, conservation of natural resources, and sustainable agriculture research and demonstration.

Michigan Agricultural Experiment Station (MAES)

MAES encompasses the work of more than 300 scientists in five colleges. These researchers, in laboratories and offices on campus and field research stations around the state, investigate topics that range from forest product development to food safety, new varieties of fruits and vegetables, water quality, livestock production, rural and community development, and the quality of life of Michigan youth and families. Michigan citizens, and through them, people around the world, reap the results of this work in the form of new or improved foods and plants, new production methods, and enriched lifestyles.

MSU-U.S. Department of Energy **Plant Research Laboratory**

The MSU-DOE Plant Research Laboratory (PRL) was established in 1965 with the objective of bringing together a group of experimental plant biologists with complementary but overlapping interests and expertise to foster the development of cooperative research programs on problems that require a broad or multi-disciplinary approach. To provide the stable research funding required to undertake long-term research projects on difficult problems, the U.S. Department of Energy provides a substantial amount of financial support to the PRL on a continuing basis. The 11 regular faculty associated with the PRL have appointments in academic departments of the University and have academic obligations similar to those of other faculty. (For more information on plant research at MSU, see the “Status of MSU Research” in the Resource Room).

Environmental Science & Policy Program (ESPP)

ESPP is composed of nearly 130 faculty from 11 colleges across campus, including faculty renowned worldwide for innovation and leadership in their fields. ESPP helps them connect with each other - sharing ideas, collaborating on projects, and creating new opportunities. This leads to unprecedented integration across fields in environmental research while striving to achieve the common goals of advancing fundamental science and solving practical problems, including: Ecosystems and Human Well-Being, Environment and Human Health, Environmental

Monitoring and Analysis, Climate Change Assessment, Land Use, Risk, Values and Decision Making, Sustainable Agriculture and Food Systems, and Water.

Division of Science and Mathematics Education

The mission of the Division of Science and Mathematics Education (DSME) is to improve mathematics and science learning and teaching at all levels through research and design in instruction, technology-based instructional materials, and professional and faculty development. DSME was founded at Michigan State University in 1989 and is co-administered by the College of Natural Science and the College of Education.

An example of research being applied to societal problems of true consequence may be found in the Connected Mathematics Project (CMP). Funded by two major NSF grants, the CMP middle grades mathematics curriculum has been commercially published and adopted by school districts across the nation. Millions of dollars in royalties deriving from CMP publication have been jointly committed to an endowment by the authors and MSU, for the purpose of continued research in mathematics education.

Families and Communities Together

Families and Communities Together (FACT) is a multidisciplinary coalition that links MSU's researchers and resources with community partners and initiatives. The goal is to support the health and well-being of Michigan's children, families, and communities. FACT funds research that advances scholarship and addresses community needs, including collaborative research projects in the following topic areas:

- Family and Community Vitality
- Families, Communities, and Schools
- Family and Community Health
- Young Children
- Diversity in Families

FACT provides the foundation for the current discussions on a university-wide family research initiative. The goal is to design a family research entity that crosses colleges in order to support a broad range of scholarship in this area.

Julian Samora Research Institute

The Julian Samora Research Institute is committed to the generation, transmission, and application of knowledge to serve the needs of Latino communities in the Midwest. More specifically, the Institute seeks the:

- Generation of a program of research and evaluation to illuminate the social, economic, educational, and political condition of Latino communities;
- Transmission of the research findings to academic institutions, government officials, community leaders and private sector executives, through publications, convening public policy seminars, workshops, and private consultations;
- Provision of technical expertise and support to Latino communities for the purpose of developing policy responses to local problems;
- Development of Hispanic human capital, including leadership development, empowerment, and education.

MATRIX

MATRIX: The Center for Humane, Arts, Letters and Social Sciences Online at Michigan State University seeks to advance critical understanding and promote access to knowledge through world-class research in humanities technology. Humanities technology brings together the humanist's quest for deeper understanding of human nature, thought, expression, and behavior with the tools, methods and applications of computer science, engineering, and information and library sciences. At MSU, MATRIX partners in music, speech and audiology, history, education, international studies, museum studies, and libraries are building new, global, networked resources and services that give life to the metaphor of "matrix" as the multiple intersections and applications of interdisciplinary research.

In 2004-05, MATRIX researchers received $4.3 million in external funding, submitted one patent application, and had 13 publications and presentations.

MATRIX, working in cooperation with the African Studies Center at MSU and in partnership with premiere research institutions in Africa, is pioneering a fully accessible online digital repository that is adopting the emerging best practices of the American digital library community and applying them in an African context.

Health and Risk Communication Center

The Health and Risk Communication Center in the College of Communication Arts and Sciences works to make cutting-edge technology more accessible to underserved populations and supports and seeks funding for interdisciplinary research where health communication plays a crucial role. Health communication encompasses the study and use of communication strategies to inform and influence individual and community decisions that enhance health. It links the domains of communication and health and is increasingly recognized as a necessary element of efforts to improve personal and public health.

National Food Safety and Toxicology Center

The National Food Safety & Toxicology Center is committed to reducing food-related disease globally through research, education, and outreach by fostering collaborations across a full spectrum of relevant disciplines within and beyond the university, and through building partnerships with public health officials, food producers, consumers, and other key stakeholders. The center is located in the College of Veterinary Medicine, and is a focus for multidisciplinary research with 69 faculty members from five colleges, 10 departments, MSU Extension and MSU Agricultural Experiment Station. Disciplines such as microbiology, toxicology, epidemiology, pre-harvest food safety, risk assessment, communication, and social science are part of the center's wide research scope.

Unit Perspectives and Accomplishments – The International Dimension

MSU has a more than 60-year legacy of international engagement that has resulted in more than 200 major research and technical assistance projects around the world. MSU has a strong presence in Africa, Asia and Oceania, Europe, North America and South America. MSU is recognized internationally for its work in numerous arenas, such as basic human needs; education; international trade; sustainable agriculture; plant, animal, and human health and welfare; and the environment. The economic value of international research is substantial. According to the University Contract and Grant Administration office, there were 738 total awards for a total of $150,561,741 from 1997-2003. A total of 111 grantors awarded funding to MSU for international research and projects during this seven-year period. The major grantor was the federal government (87.1%). During this period, twenty-one colleges and units received

awards, with the College of Agriculture & Natural Resources, the Institute of International Agriculture, and the College of Social Science the predominant recipients. MSU receives about $35 million annually (grants plus gifts) in external funding for international research and project work, and more than 225 faculty have done international work funded by external grants in the last five years. Research support activities designed specifically to promote international research at MSU include the following examples.

Office of International Studies in Education

The Office of International Studies in Education supports the international research of faculty through finding and tracking funding opportunities, helping to write proposals and prepare budgets, helping doctoral students find funding for international dissertations, and promoting faculty on its website and at relevant venues throughout the world (since 1990 six College faculty members have been elected to the national board of directors of the main association for international research on education). This office also facilitates and supports professional relationships with institutions and researchers throughout the world.

Institute of International Agriculture

The Institute of International Agriculture (IIA) in the College of Agriculture and Natural Resources (CANR) serves to promote, facilitate, and expedite the international programs of the College. More specifically, it assists all academic and nonacademic units to continue building an international dimension into ongoing programs of teaching, research, and extension. IIA is home to many of MSU's externally-funded international development project activities, engaging faculty and students across many colleges and departments on campus. Examples include conducting collaborative research with host country scientists; providing consultant services to international research organizations, foreign government agencies, and others; serving as guest lecturers; and hosting faculty and researchers from host country institutions. In addition to faculty research, many projects include training components, bringing international students to MSU master's and Ph.D. programs and for short-term non-degree programs.

Institute of International Health

The Institute of International Health (IIH) was established at MSU in January 1987 to marshal university resources to address problems of world health and to serve as a center for information on world health issues. The IIH works with all health-related colleges, as well as with social and agricultural scientists, nutritionists, and a variety of interdisciplinary units, to foster and coordinate research, education, and development at the international level. In addition, the IIH collaborates with more than 36 MSU-affiliated community hospitals throughout the State of Michigan that are used for the clinical training of MSU medical students. These hospitals contribute health experts for IIH's overseas projects and hospital-based training for visiting foreign health professionals.

Office of International Development

The Office of International Development (OID), a unit within International Studies and Programs, has enhanced international research efforts since its inception in January 2000. Its primary focus is to facilitate cross-college collaborative research efforts and develop multi-disciplinary projects. A listing of the more than 80 current international development projects by continent/region is available on the MSU OID web page.

Area Studies Centers

A major portion of the international area research portfolio can be found in Michigan State University's five area studies centers: the African Studies Center (ASC), the Asian Studies Center (ASN), the Center for Latin American And Caribbean Studies (CLACS), the Center for European and Russian/Eurasian Studies (CERS), and the Canadian Studies Centre (CSC). In addition, MSU has two thematic centers with an international focus: the Center for the Advanced Study of International Development (CASID) and Women and International Development (WID). The centers facilitate inter-disciplinary exchange and collaboration among faculty, strengthen curricular offerings in area studies and foreign languages, establish collaborative relationships with universities abroad, undertake outreach to broader U.S. publics, and procure external resources. Four centers are regularly rated by national peer review panels as in the top five in the nation (ASC, CSC, CASID, WID). In addition, ASC and CASID/WID (jointly) have been named Title VI Comprehensive National Resource Centers, for which there is an

expectation of significant faculty research. In 2002-03 alone, ASC-affiliated faculty were awarded almost $15 million in research and development grants on Africa (in fact, more than two-thirds of MSU international research and projects are in Africa). See also Chapter Eight.

In addition to providing a home for international regional research, the area studies centers encourage interdisciplinary, thematic research through The Global Area and Thematic Initiative (GATI). GATI fosters comparative and thematically oriented multi-disciplinary research programs, and undergraduate or graduate training on key transformations in international development. GATI awards require matching department/college funding and provide up to $20,000 per year for one- to three-years. Recipients must seek external funding for future related initiatives. During the five-year period from 1998-99 to 2002-03, 22 project grants and three seed grants valued at more than $280,000 were awarded through GATI. With GATI seed funding, some of these projects have developed to receive significant additional external funding, particularly: (1) the international grades and standards project, which received more than $9 million in funding from USAID and a National Science Foundation training grant of $280,000, and (2) the climate and land use change in East Africa projects, LUCID and CLIP, that received $770,000 in funding from the United Nations Environment Program/Global Environment Facility and $1.8M from the National Science Foundation, respectively.

Developmental Support for New and Established Scholars - Faculty

The focus of evidence presented in support of Core Component 4A has been on research; simply put, MSU is a research extensive university. However, while research at all levels of the University is one of the primary ways in which MSU demonstrates it "values a life of learning," the acquisition, discovery, and application of knowledge occurs in other contexts as well. For example, MSU encourages faculty, administrators, and staff to engage in a life of learning through a myriad of professional development opportunities designed to help each member of the MSU community achieve his/her career and/or professional goals as well as to improve MSU through learning. Examples include faculty sabbaticals, travel support, manuscript completion subventions, publication page charge subventions, and related assistance. Professional development related to effective teaching is discussed in detail in Core Component 3B; professional development related to outreach and engagement is discussed in Chapter Seven.

Professional development that supports a life of learning through research, scholarly leadership, and professional activity in general is discussed below.

Faculty and Organizational Development

The Office of Faculty and Organizational Development (F&OD) supports MSU faculty, academic staff, and administrators in their ongoing quest for excellence in teaching, research, outreach, and leadership. To accomplish this goal, F&OD offers a broad range of seminars and programs, services, and resources in two programmatic strands: Faculty Development and Organizational/Leadership Development. As a part of the Organizational/Leadership Development strand, Michigan State University offers the Executive Leadership Development Program (ELDP), sponsored jointly by Academic Human Resources and Human Resources, to provide opportunities for high quality cross-campus leadership development and dialogue.

Developmental Support for New and Established Scholars – The Graduate School

Research is a significant component of most graduate and professional students' training at MSU and is fundamental to doctoral programs. Support for graduate student research begins with faculty who provide mentoring, training, and often funding through their own research projects and grants. Approximately 1,500 graduate students hold research assistantships with an additional 1,200-1,400 students supported by teaching assistantships. The "Guidelines for Integrity in Research and Creative Activities," the Research Integrity newsletter, "Navigating the Ph.D.: A Writing Workshop" and dissertation support groups form part of the support network. The Graduate Student Rights and Responsibilities section

Of 668 Ph.D. candidates responding to a 2005 survey:

- 67.8% had presented at a national conference
- 51.4% had presented at a regional conference
- 41.4% had presented at an international conference
- 36.1% had completed an on-campus research presentation
- 33.4% had published in a peer reviewed journal
- 21.2% had published in a professional publication (non-reviewed)
- 10.7% had published a book chapter
- 19.1% had reviewed a professional publication
- 10.9% had published a magazine/newspaper article
- 2.2% had edited a book
- 1.5% had written a book

of Spartan Life outlines the policies and protections afforded graduate students as they pursue their research and education.

Developmental Support for New and Established Scholars - Undergraduate Researchers

Among the primary advantages for undergraduate students attending a research extensive university are the opportunities that exist to gain substantial research experience with leading researchers in multiple fields. Through research, undergraduates learn to apply the concepts learned in the classroom as well as gain valuable experience that will prove useful to many in their future professional and/or academic careers. Research also provides the hands-on learning that is increasingly recognized as essential to strong educational practice.

As with graduate students, support for undergraduate student research comes primarily through faculty in the students' major area of study. In fact, many majors allow students to receive course credit for independent courses of research and/or participation on research projects supervised by faculty and/or advanced graduate students. For example, in 2003-04, 282 students were enrolled in Psychology 490 or 491, which are independent study or research courses. As a result, seventy percent of the graduating seniors in Psychology indicated that Psychology provides adequate opportunities to gain research and practice experience.

The Undergraduate Research & Creative Activities web page serves as a clearinghouse for information on research opportunities for undergraduates in various colleges. Academic freedom is supported and defined for undergraduates through the document "Academic Freedom for Students at Michigan State University," available in Spartan Life. Additional support for undergraduate research is available from various programs such as:

- The University Undergraduate Research and Arts Forum provides an opportunity for undergraduate researchers to present their work in the form of a poster or oral presentation, or to showcase their creations.
- Honors College Professorial Assistantships: Each year approximately 100 incoming freshmen are awarded PAs, allowing them to begin to work immediately with a faculty member on research or other scholarly activities.
- The Hughes Undergraduate Research Program (HURSP) is a specialized research program developed at MSU for highly motivated undergraduates who are interested in being trained in modern biochemical and biological techniques. Sponsored by the

Howard Hughes Medical Institute, the program provides undergraduate research training in biology to 15 to 20 new participants each year, with special focus on minorities underrepresented in science.

- McNair/SROP Program: This program encourages first-generation, low-income college juniors and seniors to enter doctoral study.

C. 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.

A university education provides the preparation necessary for the new realities of the global economy by offering students the specialized knowledge of a major degree that is now a prerequisite for employment in many sectors, as well as the liberal learning skills necessary for a life of continued learning and citizenship. As at most higher education institutions, MSU has a general education requirement consisting of integrative studies, writing, and math. Given the increasing importance of knowledge of global and international affairs in everyday life, MSU also seeks to incorporate international components into the "breadth of knowledge and skills and the exercise of intellectual inquiry [that] are integral to its educational programs." The internationalization of general education at MSU occurs in a variety of ways, from a formalized requirement in integrative studies to the opportunities to participate in international learning experiences via study abroad. While not a formal requirement for general education, MSU also strongly encourages undergraduate participation in research, as previously described in Chapter Five. Undergraduate participation in research helps students develop the "skills of intellectual inquiry" that will allow them to continue learning throughout life.

Undergraduate General Education Requirements

The expected learning outcomes and assessment plans for the University's general education requirement for undergraduates are described in Chapter Five. In brief, general education requirements at MSU consist of a writing requirement, a mathematics requirement, and 24 credits of integrative studies. Students must complete at least two writing courses during their

undergraduate career, a Tier I writing course (4 credits) and a Tier II writing course. Depending on a student's proficiency, a student may be required to complete a developmental writing course prior to enrolling in a Tier I writing course (see the WRAC Unit Example for more information). The Tier II writing requirement "involves writing in the student's discipline and is met by completing either: a. one or more 300-400 level Tier II writing courses as specified for the student's academic major and degree program, or b. a cluster of 300-400 level courses that involve writing experiences and that are approved as the Tier II writing requirement for the student's academic major and degree program" (*Academic Programs*). Additional writing courses may be required by a student's college or major degree. For mathematics, a student may complete the requirement by achieving a specified score on a placement examination or passing one of a number of approved mathematics courses (see *Academic Programs* page 48 for the complete requirement). These general writing and mathematics skills provide the basis for continued learning as students advance in their undergraduate career and throughout life. These requirements are currently under review (see Chapter Four).

The academic goals of integrative studies include helping students to:

- Become more familiar with the ways of knowing in the arts and humanities, the biological and physical sciences, and the social sciences.
- Develop a range of intellectual abilities, including critical thinking, logical argument, appropriate uses of evidence and interpretation of varied kinds of information (quantitative, qualitative, text, image)
- Become more knowledgeable about other times, places, and cultures as well as key ideas and issues in human experience
- Learn more about the role of scientific method in developing a more objective understanding of the natural and social worlds
- Appreciate the role of knowledge, and of values and ethics in understanding human behavior and solving social problems
- Recognize the responsibilities and opportunities associated with citizenship in a democratic society and an increasingly interconnected, interdependent world.

Internships for Undergraduates and Graduate Students

Internship experiences range from on-campus internship programs in University Human Resources to full year, full time clinical internships as a culminating requirement for the Ph.D. in clinical psychology. Whatever their form or duration, internships, and other "hands-on" work experiences are designed to include preparation for careers related to the discipline of study. In addition, they often help prepare students for entry into the global, diverse, and technological society they will enter upon graduation. A few examples of internship and other curricular related work experiences are included here. For more examples, search on "internship" in the keyword field of the NCA Database.

Spartan Consulting and Students Consulting for Non-profit Organizations

MBA students and undergraduates in the Eli Broad College of Business have the opportunity to serve as business consultants with Spartan Consulting and Students Consulting for Non-profit Organizations (SCNO), respectively. For ten years, Spartan Consulting has provided consulting services to clients ranging from local small businesses to Fortune 500 companies. The group offers consulting in: business strategy, supply chain management, marketing, financial and accounting, and information systems. In the process, undergraduates and MBA students gain "hands-on" experience in applying what they learn in the classroom to the problems of real businesses in the field.

James Madison College Field Experience Internship

A Madison education focuses on the application of knowledge and analysis to public issues, concerns and events, as well as on theoretical approaches to social science. The faculty believes that a liberal education is incomplete without a chance to test and apply these abilities in professional settings. During the junior or senior year a one semester internship with an agency, organization, business, or legislative office is required. Madison currently sponsors or co-sponsors eight international internship programs, and is developing another seven (see the JMC unit example for more information). In 2003-04, 20% of James Madison College students completed Field Experience credits abroad. In 2004-05, it is likely that this number will rise to 25%.

The college uses a number of tools to assess the learning outcomes resulting from the Field Experience: 1) A sponsor evaluation to provide feedback from internship supervisors, 2) three student evaluations to measure a) the college's role in assisting with the internship placement, b) evaluation of internship organization, and c) value of the internship experience, and, 3) two required papers. All three assessments have resulted in positive feedback. In 2004, over 85% of employers indicated that they consider Madison students exceptional (top 10) or above average. Students indicated that they successfully developed and/or strengthened skills (communication, problem solving/analytical, teamwork, etc.) needed in the workplace.

School of Social Work

Field education for the BSW and MSW programs provides experiential educational opportunities directed toward the development of professional identity, self-understanding, and competent practice. The School of Social Work has formal agreements and linkages with over 800 human service organizations in Michigan. The School maintains contact with the agencies and an interactive feedback loop through field education liaisons who meet with each student in field placement and visit each agency each year to maintain linkages to the School's constituencies and communities. The School's field education office conducts an annual training and orientation session for its affiliated agencies.

Service Learning

Another common educational experience that prepares students for a diverse society and allows them to apply their skills and knowledge in their field to "real world problems" is service learning. For more information on service learning at MSU, see Chapter Five and Chapter Seven.

D. 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.

As the original land grant institution in the United States, Michigan State University has long considered it a part of its mission to provide "useful" curricula to its constituents. In fact, MSU's

current Mission Statement early on notes "as a pioneer land-grant institution, Michigan State University strives to discover practical uses for theoretical knowledge, and to speed the diffusion of information to residents of the state, the nation, and the world," including, of course, conveying practical knowledge to its students. The Mission Statement goes on to say that MSU is "committed … to emphasizing the applications of information" and to doing so in a manner that "reflects the increasing complexity and cultural diversity of society, the world's greater interdependence…" This section will focus on assessment processes designed to ensure the usefulness of curricula across the university as well as selected examples of programs specifically designed to achieve learning outcomes that will prepare students to enter their professional lives in an increasingly complex, diverse, and international context.

Assessment

The University's approach to assessment is discussed in more detail in Chapters Four (Core Component 2C) and Five (Core Component 3A), but it is important to emphasize here the ways in which University assessment ensures the relevancy of the curricula and learning outcomes. Most programs regularly conduct external program reviews, although the University does not require this. Since 2000, 30 graduate programs have implemented a process of external review, and the Graduate School provides technical assistance to the programs as they undertake the process. Moreover, many departments have taken the opportunity of their graduate program review to conduct a review of all of their programs. (For an example, see the notebook of external reviews located in the Resource Room.) Such processes frequently include attention to currency and relevance of programs as they are compared with programs across the nation in their ability to prepare graduate professionals for careers in their chosen discipline. Similarly, external accrediting agencies typically seek to ensure that MSU programs under their review are meeting current standards for the relevant profession. Currently, 31 external agencies accredit programs at MSU.

Another method for assessing the usefulness of the curricula is through outcomes assessment that includes attention to outcomes related to professional skills and competencies. Such outcome goals and assessments are essential to many pre-professional and professional programs, and are encouraged across most academic programs at MSU. Every program is required to have an assessment plan in place. The Director of Assessment assists programs in

developing their assessment plans, including providing advice on appropriate measures for learning outcomes. Such measures include both direct and indirect methods that speak to professional skills and knowledge.

Unit Example: Agricultural Economics
The department's Undergraduate Policy Committee (UPC) meets monthly to review curriculum, program, and policy issues. The UPC is composed of departmental faculty, academic advisors, students, and an Industry Relations Coordinator that works closely with industry to determine/understand the skills and competencies needed from students on internship and full-time positions. During Spring 2004, the UPC reviewed the department's previous mission statements and desired student-learning outcomes for its three undergraduate programs. The UPC determined changes in undergraduate curriculum where required to reflect industry needs. Specifically, seminars have been added to better prepare students on how to make the transition from college to work as well as navigating a career after graduation. In addition, the department is considering adding a required course on sales since approximately half of the students choose this as a career and industry feedback indicates they could use more experience in this area.

The Career Services and Placement office also assists programs in linking program outcomes to workplace readiness skills and knowledge, including skills necessary to work in a diverse society. In addition to working directly with academic programs to develop appropriate outcomes and assessment plans (see Chapter Five), The Career Services Network recently published "12 Essentials for Success: Competencies Employers Seek in College Graduates." The 28-page brochure describes skills employers consistently cite as most critical in hiring selections. It features profiles of alumni, faculty, and students explaining how competencies are applied in the workplace, why they are important, and how they contribute to student success. The guide also offers suggestions on how students can develop these competencies during college. The National Association for Colleges and Employers awarded the publication its 2005 Excellence Award.

Advisory Boards

Many programs utilize advisory boards or groups to ensure their curriculum, outcomes, and learning experiences are current with the professional skills and knowledge needed for success in the field. Advisory boards keep the program connected with the communities that their graduates will enter and often serve as useful resources for other collaborations, such as internship programs, as well. A few examples are included here.

Eli Broad College of Business

With the addition of the new Management and Multicultural Business Program advisory boards, ten alumni boards offer advisory and development support to The Eli Broad College of Business. They include: Accounting & Information Systems External Advisory Board, Broad Executive Forum Board, Capital Campaign Advisory Board, The Eli Broad College of Business Alumni Association Board of Directors, Finance Advisory Board, Lear Corporation Career Services Advisory Council, Center for International Business Education and Research (CIBER) Board, and the advisory boards of The School of Hospitality Business.

College of Natural Science

The College of Natural Science's Dean's Board of Advisors (DBA) consists of "alumni with broad industrial and government experience who come to campus twice each year and provide counsel that is crucial in helping our students prepare for life after academe" (Connections Spring 2005). In 1999, the DBA helped to shape the College's strategic plan for 2005 and last spring the DBA participated in an all-day retreat updating them on progress for the strategic plan and setting goals for 2010. Once the strategic plan for 2010 is drafted, it will be presented to the DBA for their input.

Internationalization

As discussed in more detail in Chapter Eight, MSU is committed to providing every student the opportunity to include a substantial international component in their education. Given this commitment, it is essential that MSU assess the effectiveness of its international education. In addition to the faculty led assessments common to all programs, some recent assessment activities are outlined below.

Area Studies Review

From 2003 to 2005, the Office of International Studies and Programs conducted a review of area studies at MSU. "The review is intended to be mainly prospective in its outcomes. We seek to strengthen area studies at MSU and its relevance to MSU's mission and aspirations – especially to the internationalization of the curriculum (including study abroad) and the University's contribution to area expertise and to global problem solving. This is not a review of

MSU's area studies centers per se, although their role and contribution to area studies at MSU and to MSU's broader internationalization objectives is included." The review included sections on: strengths and challenges of area studies, area studies centers, undergraduate curriculum, study abroad, graduate curriculum, foreign language study, research, outreach, and strategic partnerships. Details of the process and outcomes are available in the Resource Room and in Chapter Eight.

Lessons Learned in Assessing International Learning

Because of MSU's commitment both to international education and to enhancing the culture of assessment, MSU is participating in *Lessons Learned in Assessing International Learning*, a three-year project in which MSU is cooperating with the American Council on Education (ACE) and five other institutions (See Chapter Five for more information).

Review of Study Abroad

MSU made a multi-year institutional commitment to the Study Abroad Impact Assessment (SAIA) project. The program has two primary goals: (1) to measure the impacts of study and learning abroad on students, particularly in terms of the first five of MSU's six goals for study abroad—intellectual growth, including language learning; professional development; personal growth; intercultural growth; and cultural awareness (see the full list of goals in Resource Room); and (2) to define the impact of study abroad on the institution itself—the university, faculty, campus climate (see the sixth MSU study abroad goal)—and, in the longer run, its impact on the local community and host communities.

Four primary types of data have been collected thus far.

1. *Student self-assessment*: students' own assessments of the impact of their experiences. Pre- and post-tests measuring pre-departure expectations and post-sojourn self-assessments on a wide range of variables related to the first five goals of study abroad were administered.
2. *Faculty observation*: Written reflections on what faculty have observed to be the impact of their programs on students. These faculty studies were conducted during the summers of 2002, 2003, 2004, 2005, and spring 2004.

3. *Secondary data analysis*: Using information in the university's central student database, various characteristics of students within a given cohort who studied abroad have been compared with those who have not. To date, we have collected data for five cohorts, 1994 through 1998.
4. *Surveys by other campus units*: Data from relevant surveys conducted by other units within MSU, including a survey of Eli Broad College of Business alumni by Career Services and Placement and surveys of students living in the University's residence halls by the Department of Residence Life, have been incorporated into the project.

Analysis of the assessment data

Preliminary SAIA results provide consistent evidence documenting what most study abroad professionals have long believed. 1) There is consistent evidence that the impact of study abroad programs was positive in each of the areas considered, though perhaps especially in personal growth, intercultural growth, and cultural awareness. Most important may be the way in which study abroad provides an opportunity for synergy among the academic, professional, personal, and intercultural/cultural components of the experience, leading to an overall effect greater than the sum of the individual pieces. 2) Quantitative data from Phase II indicated that the longer the program, the more positive the post-program response. Regardless of program length, however, all the post measures for the areas considered are relatively strong, especially for intercultural and personal growth. Overall, students perceive a significant gain from participation in study abroad, and it is evident that short-term programs provide notable value, though less than longer programs. 3) Those who study abroad graduate with higher GPAs than those who do not. However, we caution against any inference of cause and effect. On average, study abroad participants enroll for more terms before graduating than do non-participants; however, they take less time to graduate. (For example, a student who studies abroad for two summers might be able to graduate after seven academic-year semesters, but would have been in attendance a total of nine semesters.)

<u>Global and Area Studies Major</u>

Coincident with the area studies review, the need for a new internationally-focused undergraduate major that would allow MSU students to concentrate on area studies was

identified. A proposal for the new Global and Area Studies - Social Science major was developed and approved by the College of Social Science, and was approved by the University Curriculum Committee and Academic Council in Fall 2005. This major is grounded in a common foundation of understanding global systems and processes as they are expressed in local places, and it will offer students a choice of two types of concentrations - on world regions and relevant foreign languages, and on global themes. Concentrations will be available in all of the world regions of the existing specializations except for Canada.

For additional programs, majors, and specializations with an emphasis on outcomes that provide undergraduates with the "skills and knowledge they need to function in diverse … global societies"[1] see Chapter Eight.

E. Core Component 4D: The organization provides support to ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly.

As a public institution, the responsible acquisition and application of knowledge is essential in order to maintain the public trust invested in MSU. Thus, MSU provides support for responsible use in every area of its mission. Supportive services, for example, assist students in learning not only how but also why to comply with University guidelines for academic integrity. For more information on academic and supportive services that promote responsible knowledge acquisition and application, see Chapters Five and Seven. This section will demonstrate the policies and procedures in place at MSU designed to ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly.

Academic Responsibility - General

Academic integrity is essential to the responsible acquisition of knowledge. Instructors at every level reinforce this message to their students regularly, and assist them in understanding

[1] The Higher Learning Commission Handbook of Accreditation. Chicago: The Higher Learning Commission, 2003. p. 3.2-15.

how and why to avoid plagiarism and other forms of academic dishonesty. Undergraduate students are governed by the regulation on academic integrity in General Student Regulations.

- **1.00 PROTECTION OF SCHOLARSHIP AND GRADES**
- The principles of truth and honesty are fundamental to the educational process and the academic integrity of the University; therefore, no student shall:
- **1.01** claim or submit the academic work of another as one's own.
- **1.02** procure, provide, accept or use any materials containing questions or answers to any examination or assignment without proper authorization.
- **1.03** complete or attempt to complete any assignment or examination for another individual without proper authorization.
- **1.04** allow any examination or assignment to be completed for oneself, in part or in total, by another without proper authorization.
- **1.05** alter, tamper with, appropriate, destroy or otherwise interfere with the research, resources, or other academic work of another person.
- **1.06** fabricate or falsify data or results.

Additional statements regarding academic integrity and University policy can be found in MSU Ordinances, the All University Policy: Integrity of Scholarship and Grades, and Academic Freedom for Students at Michigan State University. All of these policies, as well as information for instructors and students on how to avoid academic dishonesty, are made available in one place by the Ombudsman. Similar language regarding academic integrity is found in the Graduate Students' Rights and Responsibilities and Medical Students' Rights and Responsibilities documents, Article 2. If an instructor determines a student has cheated, the instructor may impose a penalty of his/her choice, including failure of the entire course. If the instructor fails a student for the course, the instructor must formally notify the student's dean of the incident, who may refer the case to a college hearing board for additional action if appropriate. A student has the right to appeal the penalty through the academic grievance process, as described in Academic Freedom for Students at Michigan State University.

Academic Integrity - Acceptable Use of Technology and Third-Party Copyright

Libraries, Computing and Technology (LCT) disseminates and enforces clear policies on practices involving intellectual property rights. Activities include:

- Academic Computing and Network Services (ACNS) communicates to the university community the legal and ethical requirements and sanctions associated with downloading of music and other proprietary intellectual property. A graduated response system to respond to concerns exists and is enforced.
- MSU Libraries provides regular copyright education in scheduled classes and one-time training sessions. The Libraries also offer information about third-party copyright issues to faculty, staff, and students, and runs a permissions service for online materials.
- Virtual University Design and Technology, the Libraries, and the Intellectual Property Office collaborate to assist faculty and students in understanding and complying with copyright and intellectual property guidelines.

Academic Integrity - Research

The Faculty Handbook states the following in its introduction to policies and procedures governing faculty research:

> The recognized educational objectives of Michigan State University include, as equally important goals, the discovery of new knowledge through fundamental research and the dissemination of existing knowledge. The increasingly complex relationships among universities, government and industry call for more intensive attention to standards of procedure and conduct in government-sponsored research and industry-sponsored research carried on at universities. Standards for sponsored research must be respectful of the purposes, needs and integrity of the universities and the rightful claims of the public interest; thus it is incumbent upon the academic community to be mindful of conflict of interest situations which may arise in these growing involvements of the University.

The Faculty Handbook goes on to lay out policies governing: conflict of interest, copyrightable material, human research protection, laboratory animal care, outside work for pay, patentable copyrightable materials, and allegations of misconduct, among others. For example, the Faculty Handbook contains the following statements applicable to proprietary research:

> The imposition of restriction on publication of research results is incompatible with the basic concept of an educational institution. … No publication, statement, or activity, either on behalf of the University or by an individual in their official capacity, shall endorse any commercial method or device, either directly or by implication.

Research with humans is guided by the Human Research Protection Program (HRPP), which has the following mission statement:

> The Michigan State University (MSU) human research protection program's (HRPP) primary mission is the protection of individuals who are the subjects of research. MSU is committed to follow the ethical standards described in the Belmont Report, and all applicable federal, state and local regulations and university policies and procedures. The HRPP at MSU sets forth the structure, policies and procedures to implement this mission and commitment. The processes of education, review and monitoring described in the HRPP serve to ensure the safe and ethical conduct of research that will protect human subjects in an atmosphere of mutual trust and integrity in the pursuit of knowledge and human benefit.

Human subjects protection is accomplished, in part, through MSU's Institutional Review Boards, the University Committee on Research Involving Human Subjects (UCRIHS) and Community Research Institutional Review Board (CRIRB). "These IRBs have the authority and responsibility to approve, require modifications in, or disapprove all human subject research before it is initiated in order to comply with ethical principles and federal, state and local regulations" (Faculty Handbook). In order to receive UCRIHS approval, "Investigators and their research staff are required to complete an online tutorial on ethical principles, regulations and university policy on human subject research" (Faculty Handbook). The IRB's also conduct various workshops and conferences on procedures and issues for the ethical conduct of research. MSU's human subject protection programs received "Accreditation Pending" status from the Association for the Accreditation of Human Research Protection Programs (AAHRPP). In 2003, MSU used the federal Office for Human Research Protection QA Self-Assessment tool to determine what improvements MSU should make in its program. AAHRPP is reviewing efforts undertaken to bring MSU's programs into full compliance. A comprehensive Human Research Protection Manual that includes policies and procedures for UCRIHS and CRIRB is now available online. The manual, drafted in 2004 as a direct result of the AAHRPP accreditation process, provides unified, detailed information in an easily accessible format for the MSU community. A new policy on exempt research approval has also been drafted and is being applied to all new project applications. Investigators are still required to receive education in the ethical principles of human subject research even if their research projects are exempt.

The OVPRGS and Graduate Dean offer additional trainings through a workshop series entitled "Responsible Conduct of Research." This series is intended to provide specific information about the responsibilities of students, faculty, and research staff in conducting research, interacting with others both within and outside defined research groups, and complying

with policies and regulations of sponsors and the University. It is designed to stimulate local discussions, complement department activities, and reinforce issues raised by the Research Integrity Newsletter in responding to these needs. The series is designed to enable the student to comply with newly enacted and proposed requirements by the National Institutes of Health for formal training in the responsible conduct of research as a requirement for working on research funded by the Public Health Service. Other trainings are available in laboratory safety, animal use and care, and use of hazardous materials.

The Graduate School also published two reports concerning graduate student conduct of research: "Guidelines for Graduate Student Advising and Mentoring Relationships" and "Guidelines for Integrity in Research and Creative Activities" (both are available at the TGS website).

University Intellectual Integrity Officer (UIIO)

> Any case of research misconduct or serious or continuing noncompliance with government regulations pertaining to research and/or university policy can be reported to the MSU University Intellectual Integrity Officer (UIIO) as an allegation of misconduct. These allegations can be presented to the UIIO by the chair of the IRB, any member of the IRB, IRB staff, human subject of the research, or any other individual (Faculty Handbook).

The UIIO is responsible for conducting the proceedings for handling allegations of misconduct as outlined in the Faculty Handbook.

The Kinesiology Department seeks to provide faculty and graduate students with the knowledge to conduct research responsibly and ethically. To reach this goal, the department has implemented the following activities:

- Developed a Research Ethics course (KIN 895) that is taught on a yearly basis
- Developed a policy on collaborative research involving faculty and students
- Held seminars on current procedures for obtaining IRB approvals
- Provided written expectations of graduate students regarding research ethics on the Kinesiology website
- Included questions on knowledge acquisition related to responsible conduct of research as part of the annual review of academic progress for graduate students
- Required all students in KIN 871 to complete UCRIHS Human Subjects training as a course assignment

F. Summary: Strengths and Priorities for Improvement

Michigan State University 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. MSU's scholarly mission pervades all parts of the university from undergraduate and graduate students through faculty and constituencies across the globe. Research and scholarship form the foundation of all that we do. Each college encourages and supports the disciplinary dimensions of scholarship that contribute to the overall problem-solving capabilities of the University in the state, nation, and the world.

Recommendations

MSU should increase efforts to build on and systematically and strategically invest in identified research strengths, e.g., the cross-collegiate research themes: environment science and policy, families and communities, health and life sciences, renewable resources, energy, energy alternatives and advanced automotive, nanotechnology, and risk assessment and design. Furthermore, key current and emerging strengths in colleges should be evaluated and supported.

MSU should expand its commitment to international research and scholarship that mutually reinforces the well-being of Michigan and U.S. society, and the well-being of our global partners.

MSU will continue to increase its external funding in support of research, especially in the life sciences/clinical disciplines, with explicit goals, and to continue to expand NIH funding over the next 10 years. These efforts are consistent with the identification of cross-collegiate research themes that require interdisciplinary participation.