

Western Upper Peninsula Center for Science, Mathematics and Environmental Education 2007-2008 Annual Report

The Western Upper Peninsula Center for Science, Mathematics and Environmental Education provides services to 19 school districts and their communities in Baraga, Keweenaw, Houghton, Ontonagon, and Gogebic counties. The Center strives to develop scientifically literate and environmentally committed citizens, scientists, and community leaders for the 21st century by providing innovative and quality programming for students, teachers and the community.

Overview of the Year's Accomplishments

Lake Superior Stewardship Initiative (LSSI): The major goal of this two-year initiative was to prepare K–12 students to become knowledgeable citizens, concerned about the Great Lakes, and actively engaged in stewardship activities that will contribute to the recovery, restoration, and future protection of the Great Lakes and their watersheds. The initiative provided sustained professional development for teachers, mini-grants to schools, assistance with stewardship projects, and facilitation of school-community collaborations and public forums. The Lake Superior Stewardship Initiative (LSSI) is one of four funded hubs that comprise the Great Lakes Stewardship Initiative (GLSI). For more information, visit lakesuperiorstewardship.org

Family Math and Science Night Program: Family Nights were conducted at elementary schools or school forests in the Western UP Center service area. Elementary students and their parents participated in two 40-minute inquiry-based activities led by Michigan Tech students. Elementary students solved problems, conducted experiments, and tackled engineering challenges created by Michigan Tech students. For more information see page 6.

Great Lakes Education Program: The goal of this program was to develop an understanding of the ecology, management, and potential threats to the health of the Great Lakes amongst middle/high school students, teachers, and community members. There were three components to this program: hands-on limnological investigations aboard Michigan Tech's research vessel (R/V) Agassiz for students, teachers, and community members; a Lake Superior Educators Handbook containing lessons for middle/high school students and community members for use aboard educational vessels, as well as pre- and post-field trip delivery in classrooms; and a 5-day *Great Lakes Watershed Investigation Teacher Institute* in summer 2008 for Michigan teachers. This Institute included activities aboard the R/V Agassiz and use of the Michigan Environmental Education Curriculum on Water Quality.

TiViTz Program: This program provided elementary and middle school teachers a fun way to build the basic math and problem solving skills of their students. Space TiViTz games were distributed to teachers through a workshop in the fall. Teachers used the games in their school to build students' math skills. School tournaments were held to prepare for the Upper Peninsula Space TiViTz tournament. Dr. Kathryn Clark, Chief Scientist of Human Space Flight for NASA and Vice President at TiViTz, was the Chief of the tournament. The top two places holders from each grade participated in the State Space TiViTz tournament at the Kalamazoo Air Zoo. This program was made possible by funding from Michigan Space Grant, Convergence Foundation and Docere Inc. For more information on TiViTz, visit www.tivitz.com.

Michigan Mathematics Program Improvement (MMPI): The MMPI project provided math and special educators with instructional strategies and diagnostic tools to improve the achievement of special education and at-risk students on the mathematics MEAP. This project addressed a need for effective mathematics interventions for the special education students to insure that districts meet adequate yearly progress. The instructional strategies focus on building connections among three types of representations—symbolic, verbal, and concrete/manipulative, which are essential to developing mathematical understanding.

Organization of the Report

The Strategic Plan identifies six service areas: Leadership, Professional Development, Student Services, Curriculum Support, Community Involvement, and Resource Clearinghouse. This report will focus on Professional Development and Student Services for the entire service area. In addition, there will be narrative targeting work done with underachieving schools in the area.

REGION-WIDE PROFESSIONAL DEVELOPMENT

Goal: For educators who participate in Center Professional Development to reflect best instructional practices in their own settings.

Who participated?

Professional development opportunities were provided for classroom teachers, classroom support staff, administrators, parents/community members, and others involved in K-12 education. The chart and summary descriptions show who participated.

Table 1: Participants Receiving Professional Development

Participants	# of Individ.	Total Hours	Reported Gender		Position					
			M	F	Admin	Math Tchr	Sci Tchr	Tech	Comb Subj	Other or Unknown*
Pre-School	2	15	0	2	0	0	0	0	2	0
Elementary	76	1016	7	69	2	0	2	0	69	3
Middle/Jr. High	20	400	7	13	1	3	13	0	0	3
High School	72	1674	40	32	1	14	42	0	3	12
K-12 Mixed Levels	42	903	15	27	5	4	15	1	6	11
Other	63	1416	17	42	1	0	24	0	0	38
Total	275	5424	86	185	10	21	96	1	80	67

* Other includes persons who work across levels, are not teachers or administrators, or did not indicate position.

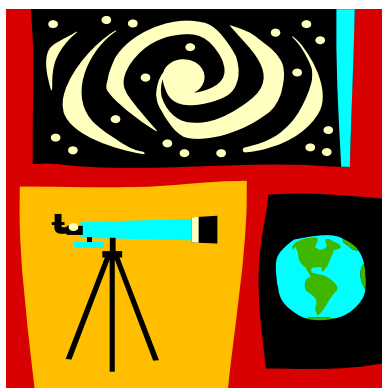
**Gender was not reported by all participants.

Professional development was delivered in many ways, depending upon the identified needs. Two primary formats included: (1) **Single events**, lasting for a portion of one day to several consecutive days, focused on a particular topic, skill, or issue; and (2) **Series**, which were a series of sessions (each building on the previous and conducted periodically over a several week/month period). The goal was to systematically strengthen teaching practices based on local needs and current research. Table 2 on the following page represents a picture of the number of sessions offered and the rate of attendance.

Teachers, on average, spent 19.7 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

		Math	Science	Other	Total
Elementary	Events	0	2	0	2
	Hours	0	6	0	6
	# Participants	0	28	0	28
Elementary & Jr. High	Events	6	2	0	8
	Hours	36	12	0	48
	# Participants	129	14	0	143
Middle School	Events	0	1	1	2
	Hours	0	3	6	9
	# Participants	0	9	10	19
Jr. High & High School	Events	1	0	0	1
	Hours	6	0	0	6
	# Participants	10	0	0	10
High School	Events	2	2	4	8
	Hours	4	12	24	40
	# Participants	12	19	62	93
K-12 Mixed Levels	Events	0	11	4	15
	Hours	0	158	69	227
	# Participants	0	169	54	223
Total	Events	9	18	9	36
	Hours	46	191	99	336
	# Participants	151	239	126	516



Spotlight on Professional Development

High School Mathematics and Science Success

This workshop series provided high school teachers with instructional and assessment strategies aimed at improving student achievement in high school mathematics and science. Teachers created lessons and assessments based on clear learning targets aligned to the High School Content Expectations. Teachers created lessons that focus on student learning by using formative assessment strategies. The High School Science and Mathematics Companion/Clarification Documents were used as resources in creation of the lessons and assessments. Teachers implemented the lessons and assessments in their classroom during the month of March and reflected on the effectiveness of the lessons. This workshop series was made possible by a grant from the Michigan Department of Education.

Summer Institutes

Teachers from all over Michigan attended the following institutes conducted by Western UP Center for Science, Mathematics and Environmental Education in collaboration with Michigan Technological University. Each institute was supported by grant funds from various entities, which allowed teachers to participate for a reduced rate. Teachers had the opportunity to earn graduate credits or SB-CEUs.

Great Lakes Watershed Investigation Institutes- June 22-27, 2008: This Institute focused on the physical, chemical, and biological components of the Great Lakes ecosystem, using Lake Superior as the classroom. The institute was supported by a grant to the Western UP Center from the Michigan Coastal Management Program of the Michigan Department of Environmental Quality with past funding from the National Oceanic and Atmospheric Administration, and the U.S. Department of Commerce.

Future Fuels from Forests- July 7-11, 2008: Teachers worked with an interdisciplinary research team to investigate forest-based ethanol production from the perspectives of ecological economics, spatial statistics, conservation biology, forest and landscape ecology, silviculture, and chemical engineering. Participants evaluated future energy choices using social science and environmental impact analysis tools and techniques. This institute was made possible by a National Science Foundation grant to MTU School of Forest Resources and Environmental Sciences.

Global Change Institute- July 14-18, 2008: This intensive institute prepared teachers to engage middle and high school students in a real-world study of the effects of global change on ecosystems, including the impacts of climate change, elevated carbon dioxide and ozone levels, nitrogen saturation, acid rain, and invasive species. This institute was made possible by a National Science Foundation grant to MTU School of Forest Resources and Environmental Sciences.

Great Lakes Maritime Transportation Institute- July 20-25, 2008: Teachers explored the historical, economical, and environmental aspects of Great Lakes shipping at the “head of the lakes.” Based in Duluth, participants toured the Duluth-Superior harbor, Minnesota north shore, and met with industry to better understand the various cargoes shipped, and how the harbor is managed and regulated. This institute was made possible by a grant from the Great Lakes Maritime Institute.

Spotlight on Partnerships

The Western UP Center for Science, Mathematics and Environmental Education is a partnership of the Copper Country and the Gogebic-Ontonagon Intermediate School Districts and Michigan Technological University (MTU). Center staff contributed time and expertise to fostering a wide variety of partnerships to provide quality programming to the 19 school districts in their service area. These partnerships are crucial to the continued operation of the Center.

The Center collaborated with various entities during the 2007-08 school year to secure funding to maintain math and science programs for the 2008-09 school year. The Center collaborated with faculty at MTU, Boston Museum of Science, American Society for Engineering Education, and the Foundation for Family Science to secure funding from the National Science Foundation (NSF) for the Family Engineering Program.

The Center brought together businesses, community organizations, local educators and MTU faculty to secure funding from Great Lakes Fishery Trust to implement the Lake Superior Stewardship Initiative, which will engage schools in community-based learning opportunities.

The Center collaborated with MTU faculty to secured funding from the Department of Environmental Quality to implement the Lake Superior Education Program for Teachers, Students, and Communities, which created a vessel-based education program for schools and communities on Lake Superior.

The Center collaborated with faculty in the MTU Mathematics and Education Department to secure funding from the Mathematics and Science Partnership Grant program to implement the Rethinking Elementary Mathematics program, which will provide teachers with strategies to build students' mathematical understanding of the concepts in Grade Level Content Expectations for grades 4-7.

Students and faculty from MTU and Finlandia University provide a tremendous volunteer resource for conducting student programs such as Western UP Science Festival, TiViTz tournament, family science nights and community programs. In addition, the expertise of MTU faculty is a crucial component to the success of the Center's summer institute program. Staff work closely with MTU faculty to provide the teachers with relevant ways to present cutting edge technology to their students.

Student Services

Student services are delivered based on identified needs to improve and enhance mathematics and science education. Students who participate in enrichment activities have the opportunity to explore new concepts, develop process skills, cooperate on group tasks, and discuss their findings. Student services include:

- ❖ Family Science and Math Nights
- ❖ After-school enrichment opportunities that engage students in the practical applications of mathematics and science knowledge
- ❖ Field trips to natural areas to promote environmental stewardship
- ❖ Science fairs and TiViTz tournament

Table 3: Student Services Activities Provided in 2007-2008

		Math	Science	Other	Total
Elementary	Events	0	150	6	156
	Hours	0	253	12	265
	# Participants	0	6776	72	6848
Elementary & Jr. High	Events	1	2	0	3
	Hours	4	8	0	12
	# Participants	250	890	0	1140
Middle School	Events	0	13	0	13
	Hours	0	36	0	36
	# Participants	0	1178	0	1178
Jr. High & High School	Events	0	2	0	2
	Hours	0	2.5	0	2.5
	# Participants	0	269	0	269
High School	Events	0	5	0	5
	Hours	0	4.5	0	4.5
	# Participants	0	450	0	450
K-12 Mixed Levels	Events	0	1	0	1
	Hours	0	2	0	2
	# Participants	0	6	0	6
Total	Events	1	173	6	180
	Hours	4	306	12	322
	# Participants	250	9569	72	9891

Spotlight on Innovative Student Services

Family Math and Science Night Program:

Family Nights were conducted at elementary schools or school forests in the Western UP Center service area. Elementary students and their parents participated in two 40-minute inquiry-based activities led by Michigan Tech students. The MTU student presenters were enrolled in an MTU Department of Education 2-credit semester-long course titled "Communicating Science." This course prepared university students to be family night presenters through training in teaching methods, classroom management, lesson plan development, and presentation skills. Due to the success of this program, the Western UP Center received funding from the National Science Foundation to expand this program to include engineering activities.

Forest Field Trip Program

The Western UP Center field trip educator engaged K-8 student in a variety of inquiry-based activities using forests, fields, wetlands, and streams as classrooms. Teachers chose field trips and sites from the Field Trip brochure, which contained descriptions of each field trip and the Michigan Grade Level Content Expectations addressed. This program was made possible by a grant from the Kinship Foundation.

Western UP Science Fair and Festival

Students in grades 4-8 participated in the Western Upper Peninsula Science Fair on March 4, 2008 at MTU Memorial Union. Students present the results of an experiment they had conducted on any topic of interest, using the scientific method. Science fair projects included a display board, a written report, and an interview with two judges. When students were not involved in judging, students and their families had the opportunity to participate in more than twenty fun, hands-on activities conducted by Michigan Tech and Finlandia University students in the MUB Commons area.

Spotlight on High-Priority Schools

All of the schools in the Western UP Center's service area, except AD Johnston High School, made AYP for the 2007. AD Johnston High School did not make AYP because they did not test 95% of their students. In 2006, five districts at the high school level did not make AYP for first time due to their special education subgroup. The Western UP Center implemented the Michigan Mathematics Program Improvement project to address this area of need. This project provided teachers with effective mathematics interventions for the special education students.

The Western UP Center provided teachers and administrators with professional development that helped school districts meet the federal and state mandates and improve teaching and learning.

- *High School Reform and Science Content Expectations.* Multiple workshops were conducted at various locations to help teachers write lessons and formative assessments that address the high school content expectations.
- *New Teacher Mentor Workshop Series.* A series of 7 workshops provided new teachers and their mentors with the resources and knowledge to help new teachers create an effective learning experience for their students. This professional development offering helped teachers and their districts meet the professional development requirements for new teachers.
- *School Improvement Workshop Series.* A series of three workshops guided administrators and school improvement teams on the new School Improvement Framework and associated rubrics. The Center provided assistance to districts on how to complete the rubrics for ED YES.

What was the impact of the Western Upper Peninsula Center for Science, Mathematics and Environmental Education?

Impact on Students	Impact on Teachers
<p>Schools where fourth grade teachers used the TiViTz games as part of their curriculum showed an increase in the number of students who received a proficient rating on the Math MEAP from Fall of 2005 to Fall of 2007. The increase in these schools ranged from 4.0% to 22.5%</p> <p>Schools where fifth grade teachers used the TiViTz games as part of their curriculum showed an increase in the number of students who received a proficient rating on the math MEAP from Fall of 2005 to Fall of 2007. The increase in these schools ranged from 1.9% to 9.8%</p> <p>Elementary and middle schools where teachers integrated the Western UP Science Fair into their curriculum showed an increase in the number of students who received proficient ratings on the science MEAP from Fall of 2005 to Fall of 2007. The increase in these schools ranged from 1.8% to 10.5%.</p>	<p>Teachers in the Michigan Mathematics Program Improvement demonstrated an increase in their understanding of mathematics pedagogy and students' mathematical thinking as evidenced on pre-post results on the Learning Math for Teaching Assessment.</p> <p>Teachers that participated in the Western UP Center's Teacher Institutes found the experiences relevant to their classroom practice as indicated by the following comments:</p> <ul style="list-style-type: none"> • "Everyday was filled with information well planned and professional development activities that developed my skills as an educator" • "I will infuse the knowledge that I gained from all the sessions into my curriculum" • "The instructors were easy to understand and their topics were relevant to us and our students. " • "I liked that we had so many field experiences. It really helped me to learn by doing."
<p style="text-align: center;">Impact on Communities</p> <p>Lake Superior Stewardship Initiative (LSSI) brought together 40 community partners to work with 7 school districts to implement stewardship projects in the Lake Superior Watershed. When LSSI was initiated, only 13 community partners were involved.</p>	<p style="text-align: center;">Impact on Schools</p> <p>In 2006, 5 high schools did not make AYP due to their special education population. The Center implemented the Michigan Math Program Improvement project to improve the achievement of special education and at risk students. In 2007, all high schools experienced an increase in the achievement of the special education students and made AYP.</p>

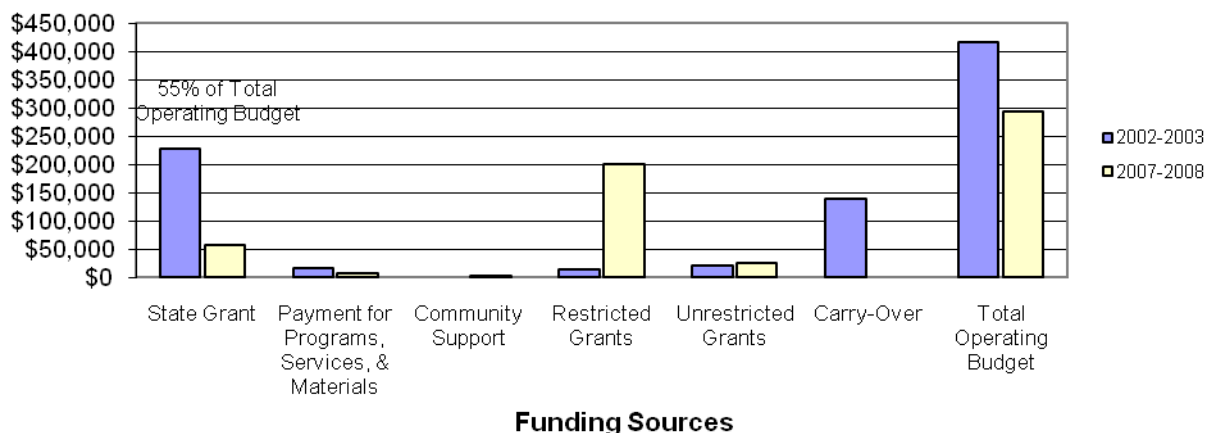
Director's 2007-2008 Budget Discussion

The Western UP Center provided a wide variety of student programs and professional development opportunities by combining funds from Section 99 with eight restricted grants during the 2007-08 school year. The Section 99 allocation to the Center does not provide enough funding for salary for one full time person or to maintain programming. As in previous years, the Center staff was very aggressive in pursuing other grant funds to maintain programming and staff for the 2007-08 school year. A substantial amount of staff time was spent pursuing grant opportunities and building collaborative partnerships.

The school districts in the CCISD and GOISD paid a minimal fee for family science nights and field trips offered through the Western UP Center in the 2007-08 school year. The fee paid for materials and travel but did not pay for staff time. Staff time for these programs were covered by grant funds. These programs are valued by the school districts and they are willing to pay the fees, even in the atmosphere of reduced school budgets.

Since Section 99 funding remains at 25% of full funding, a majority of the Center's operating budget was based on grant monies. Many grants are for one to three year projects and they do not provide sustained support for Center staff. Center staff must take on other responsibilities and duties outside of the Center activities to maintain their salary and benefits.

Changes in the Western Upper Peninsula Center's Financial Support



In addition to the financial support illustrated in the graph above, "in-kind" services received by the Center (donated volunteer time, facilities and equipment) were valued at \$22,700.

Director's Summary 2007-2008

The staff at the Western UP Center made a firm commitment to continue to provide programming that addresses the needs of school districts in their service area and engages students in real-world, relevant learning experiences. Section 99 does not provide adequate funding to provide this programming. The Center spent a substantial amount of time cultivating partnerships and pursuing grant opportunities to provide programming during the 2007-08 school year and into the 2008-09 school year. The efforts of Center staff resulted in successfully securing grant funds from Michigan Department of Environmental Quality, Michigan Space Grant, National Science Foundation, Michigan Department of Education, Great Lakes Fishery Trust, Michigan Community Energy Program, and the Kinship Foundation.

The Center's professional development programs focused on providing resources and assistance to teachers as they implemented the new grade level or high school content expectations in their classroom and worked to meet their school improvement goals. The Center, in collaboration with Michigan Tech's Mathematics Department, conducted the Michigan Mathematics Program Improvement to improve the achievement of special education and at-risk students on the MEAP. The Center conducted the HS MASS 2 workshop series at two locations, Copper Country ISD and the Gogebic-Ontonagon ISD. Participating teachers indicated that they felt more confident designing lessons and assessments to meet learning targets and monitor student learning. The Center, in collaboration with Michigan Tech, provided innovative teacher institutes to provide teachers with ways to engage students in cutting edge scientific research.

The Center's student and community programs focused fostering stewardship of the communities in the Lake Superior Watershed. The Lake Superior Stewardship Initiative, Field Trip Program, and Great Lakes Education program provided a firsthand knowledge of the unique ecosystem of Lake Superior Watershed.

The governance of the Western UP Center has remained the same. The Center is a partnership of the Copper Country Intermediate School District (CCISD) and Gogebic Ontonagon Intermediate School District (GOISD) and Michigan Technological University (MTU) and provides services to schools in the CCISD and GOISD. The CCISD acts as the fiscal agent and the CCISD Board of Education reviews fiscal records.