VISIT Annual Report

Project Participants

What people have worked on the project?

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**Rockman et al**

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Jan 12, 2001
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What other organizations have been involved as partners?

VISIT’s partner organizations include:

Ann Arbor Public Schools;  
Boston area Metropolitan School to Career Partnership;  
Detroit Public Schools;  
Washtenaw County Department of Environment Infrastructure and Services;  
Wayne County Department of Environment; and  
Friends of the Rouge.

Have you had other collaborators?

Other collaborators include:

VISIT National Advisory Board;

Jan 12, 2001
Activities and Findings

1. **Describe the major research and educational activities.**

The Virtual Immersion in Science Inquiry for Teachers (VISIT) project conducted six types of activities between March, 2000 and January 2001 (the period of this report). These included organizational development, materials development, Collaboratory development, recruiting, professional development operations, and formative evaluation.

Organizational Development Activities

The VISIT organization includes the Core Team, Partnerships, and Advisory Board. A Core Team kickoff workshop in April brought together 35 people from twelve different organizations including government agencies, public schools, and universities, from several different localities in metropolitan Boston MI and the Detroit, Michigan area. Core Team members range in background and experience from a 28-year old teacher, the director of science education for Detroit Public Schools, a senior administrator in a county department of environment, to experts in geospatial analysis, educational technologists, and faculty members in teacher education at EMU. The missions of the Core Team are to engage in scientific investigations with high school teachers who participate in the VISIT program and to develop the learning materials for other teachers based on those collaborations and investigations. Over the past 10 months VISIT has conducted face-to-face workshops and meetings as well as online collaboration structures and activities to build teamwork among these Core Team members. These activities also were designed to help team members establish roles in the Investigations and within the collaboratory, such as: finding and assessing the usefulness of educational and scientific resources for purposes of a particular teacher or investigation; explaining technical techniques; developing online courses and case investigations; assessing quality of products; creating rubrics; finding people within the local communities who will engage with teachers and students on projects; finding and organizing scientific knowledge base relevant to an evolving investigation topic; finding and mining relevant databases, tailoring to needs of particular teachers’ investigations; and solving technical problems encountered by teams.

The PI and co-PIs also conducted meetings with representatives of VISIT’s partner organizations including the Detroit Public Schools administration; Boston area Metropolitan School to Career Partnership; Ann Arbor Public Schools administration; Livingston and Washtenaw Intermediate School Math/Science Center steering committee; the Washtenaw County Department of Environment and Infrastructure Services; the Wayne County Department of Environment; and the Friends of the Rouge. VISIT staff held an average of one meeting per month with leadership at the Detroit Public Schools central administration. In addition, the PI’s met with the VISIT national and regional advisors as well as informal advisors to obtain guidance on various aspects of the project.

Developing Learning Materials and Investigation Resources

VISIT acquired, reviewed, assembled, and/or developed the following types of learning materials and Investigation resources to use in the professional development program: geo-referenced
scientific databases on CD-ROM and on the WWW; online and desktop geospatial analysis and visualization tools; demonstrations of how to use tools and datasets; tutorials and hands-on exercises for learning use of tools and databases; investigation process model; local and state curriculum frameworks; investigation scenarios; online course syllabi and courses in WebCT; and teacher lesson plans. The materials developed are available either on the project www site http://www.emich.edu/visit or in the VISIT WebCT courses.

Online Courses have been developed or are being developed under the following topics: Introduction to VISIT; VISIT Workshops and Forums (co-requisite with all other courses); Introduction to GIS; Developing Investigations; Data Mining and Collection; How to Work as a Team; Creating Web Pages; Cameo, Marplot and Aloha; and Science Fair Projects with GIS.

Another major product under development is Water Quality Data Online. This is a data exploration tool that combines data mining, science reasoning, tabular data viewing, data plotting, and mapping. This is one of the scientific investigation tools for the project. The main functions in this system include: search water quality database by locations; search by parameters; search by user-defined query; thematic datasets and scientific reasoning; and visualize via tabular, graphic, and map representations. When it is fully operational, this system will also enable students and teachers to compare student-collected water quality data with the other scientific data for the same watershed, over different points in time. The data currently in this system is archived data from the Rouge River watershed from 1994 – 1999.

Collaboratory Development

The project developed a prototype Collaboratory in WebCT for the Core Team members to learn from each other, exchange materials, and collaborate on development of the investigations and other materials. The Core Team Collaboratory includes workspaces for each investigation team to assemble its materials; assignments for the team members; plus discussion forums for administrators, science help desk, technical help, water quality investigations team, environmental hazards team, geospatial sciences and technologies, radon forum, course design, recruiting, and evaluations. Based on experience with the Core Team Collaboratory, a new structure was designed for the professional development program for Teacher Investigators and Teacher Explorers.

Recruiting

For the first year, VISIT sought to recruit 50 secondary school teachers primarily from southeastern Michigan and the Boston Massachusetts metropolitan area, plus a few teacher leaders from other metropolitan areas to prepare for year 2 recruiting. VISIT used different recruiting strategies for the different locations. In Detroit and other Michigan school districts, VISIT staff worked with central office administrators who directed the recruiting venues and timing. In the Boston area, the Core Teachers and the Metropolitan School to Career Partnership personally contacted teachers they knew from prior GIS-related professional development activities that have been sponsored by the Partnership. For the other metropolitan areas, the PI and Co-PI sought recommendations from the National Advisory Board members. In support of all these strategies, VISIT also created recruiting materials including PowerPoint presentations, paper flyers, and materials on its web site, including a teacher invitation, an interactive application form, and other information about the program. The significant recruiting events in Michigan included the following:

- Detroit Public Schools Science Department Head Meeting on Oct. 16, 2000: about 27 science department heads were present;
- Livingston and Washtenaw Intermediate School Math/Science Center Steering Committee Meeting on Oct. 17, 2000: about 20 committee members were present; and
• Ann Arbor Public Schools Administration VISIT Recruiting Meeting on Oct. 31, 2000: 12 administrators (five principals, and seven school district office directors) were present.

Conducting the Professional Development program

Forty-seven secondary school teacher investigators (Table 1), plus the Core Team teachers, began their participation in the VISIT professional development program on January 6, 2001. This is described further under section 3 below.

Formative evaluation.

In April, the external evaluators (Rockman et al) conducted an online survey of the Core Team members in order to collect baseline data on the backgrounds and experiences of the participants relevant to the project. In December, a second online survey was administered for the Core Team for the purpose of collecting comparative data, and to measure the changes (if any) of the core team members thus far. Core Team members are still completing the survey at the time of this writing.

In July, evaluators observed two days of the Materials Development Workshop, with many opportunities to speak to all the participants. They also developed and analyzed daily, online surveys participants completed throughout the week, and produced a report on the workshop. During December, the evaluators conducted a study of the Core Team Collaboratory, focusing on the communication in the main forum. All of the messages posted between April and December 31, 2000 were read, categorized, and coded. The data was crosstabulated and analyzed. During January 2001, the evaluators provided an online survey for the recruited teachers to provide baseline information that will be used with a post-program survey to assess teacher change in the program.

2. Describe the major findings resulting from these activities

Major findings or outcomes from project activities centered around five topics: Teacher goals and interests; Core Team organization and development; partnership with Detroit Public Schools; prerequisite skills and knowledge for conducting investigations; and design of the online collaboratory.

Findings regarding teachers’ professional development interests and goals. One of the most important findings of the VISIT project this year is the teachers’ desire and motivation to learn VISIT content and to learn via the VISIT strategy of an online collaboratory. Due to the enormous pressures on the teachers in Michigan and Massachusetts from the high-stakes testing programs, we had been expecting that it would be difficult to recruit teachers for a demanding program such as VISIT. Also, many people advised us that teachers would not participate unless they received a stipend in addition to the graduate credits being offered by EMU. Furthermore, the administrators in the Detroit Public Schools felt that the teachers would not participate in an

Table 1. The List of the VISIT Year 1 Teacher Investigators

<table>
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<tr>
<th>Last Name</th>
<th>First Name</th>
<th>MI School Name</th>
<th>School District</th>
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<td>Chartier</td>
<td>Kerri</td>
<td>Acton-Boxborough RHS</td>
<td>Acton</td>
<td>MA</td>
<td>(978) 264-4700</td>
<td>Biology, anatomy &amp; physiology</td>
<td>10-12</td>
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<tr>
<td>Dempsey</td>
<td>Brian</td>
<td>Acton-Boxborough Regional</td>
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<td>MA</td>
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<td>Biology</td>
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<tr>
<td>Hohn</td>
<td>Fred</td>
<td>A-B Regional High School</td>
<td>Acton</td>
<td>MA</td>
<td>(978) 264-4700</td>
<td>Environmental Science, Earth Science, Biology</td>
<td>9-12</td>
</tr>
<tr>
<td>Mathieu</td>
<td>Aaron</td>
<td>Acton-Boxborough RHS</td>
<td>Acton</td>
<td>MA</td>
<td>(978) 264-4700</td>
<td>Biology</td>
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<td>Name</td>
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<td>Blue-Hetter</td>
<td>Community High School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>(734)994-</td>
<td>Chemistry, biology, earth science</td>
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<td>Conger</td>
<td>Community High School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>(734)994-2025</td>
<td>Senior Seminar/Technology/Counseling</td>
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<td>Curtis</td>
<td>Stone High School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>734-971-2665</td>
<td>Algebra,Geometry,Statistics</td>
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<tr>
<td>Dotson</td>
<td>Stone High School</td>
<td>Ann Arbor</td>
<td>MI</td>
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<td>Mathematics, Spanish, Computer Science</td>
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<tr>
<td>Herrera</td>
<td>Stone School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>734-971-2665</td>
<td>Science</td>
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<tr>
<td>Lee</td>
<td>Stone School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>734-971-2665</td>
<td>Poetry,History(U.S),Philosophy</td>
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<td>Puntenney</td>
<td>Huron High</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>734-994-2040</td>
<td>Earth Science</td>
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<tr>
<td>Robinson</td>
<td>Pioneer High School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>734-994-2184</td>
<td>Physics,astronomy</td>
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<td>Biology, chemistry, earth science</td>
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<td>Saffner</td>
<td>Huron High</td>
<td>Ann Arbor</td>
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<td>734-994-1771</td>
<td>Chemistry/Physics</td>
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<td>Stern</td>
<td>Community High School</td>
<td>Ann Arbor</td>
<td>MI</td>
<td>(734)994-</td>
<td>Geography/Global Issues</td>
<td>11-12</td>
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<tr>
<td>Nassiff</td>
<td>Burlington HS</td>
<td>Burlington</td>
<td>MA</td>
<td>781-270-1894</td>
<td>Physics/Technology</td>
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<tr>
<td>Eigél</td>
<td>Cody H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9200</td>
<td>Alg.I,Alg III,Geomentry Prob&amp; Stats</td>
<td>9,10,1</td>
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<tr>
<td>Asadi</td>
<td>CODY High School</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9200</td>
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<td>Garcia</td>
<td>Western INT'L H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-849-4758</td>
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<tr>
<td>Hightower</td>
<td>Cody H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9217</td>
<td>Mathmatics/Algebra &amp; Geometry (Currently</td>
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<tr>
<td>Hosea-Flanigan</td>
<td>Cody High School</td>
<td>Detroit</td>
<td>MI</td>
<td>(313)866-9217</td>
<td>Educational Tech.)</td>
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<td>Jeross</td>
<td>Cody H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9200</td>
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<tr>
<td>Kristy</td>
<td>Peshing H.S.</td>
<td>MI</td>
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<td>3138867700</td>
<td>earth science, Integrated Natural Science</td>
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<td>Schaap</td>
<td>Pershing High School</td>
<td>Detroit</td>
<td>MI</td>
<td>(313 ) 866-770</td>
<td>earth science, biology, chemistry</td>
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<tr>
<td>Skorna</td>
<td>Northern High School</td>
<td>Detroit</td>
<td>MI</td>
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<td>Thompson</td>
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<td>Detroit</td>
<td>MI</td>
<td>313-596-3900</td>
<td>Bio, INS, Environmental Studies, Genetics</td>
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<td>Trainor</td>
<td>Cody H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9200</td>
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<td>Yagley</td>
<td>Cody H.S</td>
<td>Detroit</td>
<td>MI</td>
<td>313-866-9200</td>
<td>Robotic Earth Science</td>
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<td>Abbatinozzi</td>
<td>Everett High School</td>
<td>Everett</td>
<td>MA</td>
<td>(617) 394-2490</td>
<td>Earth Science, Physical Science</td>
<td>9/10</td>
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<tr>
<td>Cianchetta</td>
<td>EVERETTE HIGH SCHOOL</td>
<td>EVERETTE</td>
<td>MA</td>
<td>617-394-2490 X1</td>
<td>Physical science</td>
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<td>Collins</td>
<td>M</td>
<td>Everett High School</td>
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<td>Everett, MA</td>
<td>617-394-2490</td>
<td>OCEANOGRAPHY, EARTHSCIENCE, PHYSICAL SCIENCE</td>
<td>9, 10, 11, 12</td>
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<tr>
<td>Gilroy Tracey</td>
<td>A</td>
<td>Everett High School</td>
<td>Everett, MA</td>
<td>(617) 394-2490</td>
<td>Earth science</td>
<td>10th</td>
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<tr>
<td>martino</td>
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<td>617-394-2490</td>
<td>OCEANOGRAPHY, EARTHSCIENCE, PHYSICAL SCIENCE</td>
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<tr>
<td>Naumann</td>
<td>Erick</td>
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<td>Everett, MA</td>
<td>617-394-2490</td>
<td>BIology/Principles of Technology</td>
<td>10</td>
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<tr>
<td>Nuzzolo</td>
<td>John</td>
<td>EVERETT HIGH SCHOOL</td>
<td>Everett, MA</td>
<td>617-394-2490</td>
<td>Gr.9 General Science/Gr.12 Photography</td>
<td>9 &amp; 12</td>
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<tr>
<td>Saulnier</td>
<td>Charles</td>
<td>Essex Agricultural &amp; Tech</td>
<td>MA</td>
<td>(978)774-0050</td>
<td>Environmental Science, Arboriculture, Urban Forestry</td>
<td>9-12</td>
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<tr>
<td>Workman</td>
<td>Peggy</td>
<td>Henry Clay High School</td>
<td>KY</td>
<td>859-381-3423</td>
<td>Biology</td>
<td>9 &amp; 11</td>
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<tr>
<td>Julien</td>
<td>Patricia A</td>
<td>Hightower High School</td>
<td>Missouri City, TX</td>
<td></td>
<td>Urban Ecology: Environmental Health; Environmental Science Geography/Civics</td>
<td>10 &amp; 12</td>
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<td>Lewandowski</td>
<td>Albert</td>
<td>Port Huron Northern HS</td>
<td>MI</td>
<td>(810) 394-662</td>
<td>Advanced Placement Environmental Science Physics</td>
<td>11 and 12</td>
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<td>Kravitz</td>
<td>Bernard</td>
<td>Swampscott High School</td>
<td>MA</td>
<td>(781)5968830</td>
<td>Physical Science</td>
<td>11, 12</td>
<td></td>
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<tr>
<td>Maccarone</td>
<td>Thomas L</td>
<td>Swampscott HS</td>
<td>MA</td>
<td>(781)596-8830</td>
<td>Chemistry, Physics, Survey of Science</td>
<td>9-12</td>
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<tr>
<td>True</td>
<td>Robert B</td>
<td>Northeast MetroTech</td>
<td>MA</td>
<td>(781)246-0810</td>
<td></td>
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</table>
online professional development program; that they needed to have face to face workshops. Despite all of these obstacles, we have been surprised and pleased at the extent of enthusiasm of teachers for the types of goals and methods that VISIT is offering.

The following are illustrative statements made by VISIT teachers in their self-introductions in their online class discussion, about their goals and motivations in VISIT:

Learning GIS:
I've always wanted to take the GIS course offered at EMU but it never fit into my schedule. I'm still feeling the time crunch but learning about this resource over the Internet should make it a lot easier.

I am a biology and 8th grade science teacher in Detroit Michigan. I Love teaching and am very excited to be learning about GIS.

Applying GIS in the curriculum:
I am hoping to learn a little more GIS and develop plans for its application in the classroom.

I hope that through this class I will gain some experience and ideas in bringing technology into my classroom. I am teaching eleventh graders global issues.
Next semester I will teach geography. My goal in participating in VISIT is to strengthen my skills so that I can incorporate GIS projects in the classroom and to teach other social studies teachers. This semester I plan on attempting to create a project they can complete using GIS technology.

I am really interested in how the GIS technology can be used to look at population demographics and use satellite pictures to analyze topographic features. I enjoy teaching with technology and using modern data collection methods (graphing calculators and CBL units linked to computers) to automate data collection and present real results to students. I look forward to working with my team to figure out cool ways to include the GIS research in all my classes. (Yes, even poetry!)

I find myself wanting to add more GIS to the curriculum. Has anybody done so, i.e. added GIS based material to their science classes and what state objectives did they use in doing so. In Ann Arbor everything is tied to those objectives and for four years I've been plugging away at getting it put into place after taking the GIS course. I believe Mass. teachers fall under the same problem. Your insights would help.

I teach Applied Mathematics, Conversational Spanish, and Field Biology. My main goal at the end of this course is to be able to implement G.I.S. into my current curriculum to make it more interesting and meaningful for my students.

I teach 4 sections of 10th grade Biology and one section
of 10th grade Principles of Technology. I would like to take the information I learn from this class and integrate it into my classes.

Providing students with Real-world contexts for learning:

I am deeply committed to getting learners out of classrooms and into the real world as much as possible.

I have had limited experience with real world learning with my classes, my classes have collected and shared data concerning water quality in pervious years. I am not exactly sure what GIS represents, I would like to be able to incorporate real world experiences in my classroom. Inquiry is best taught with real experiences.

One of my professional goals is to make science more applicable to real world situations. With GIS, I hope to be able to provide my students with the tools to research topics that are related to science and that motivate the students to seek out more than what is presented in the classroom setting.

Developing Environmental Science projects and programs:

My courses are Environmental Science for seniors and Genetics(next year). My students are involved in active environmental research and will GIS the data that they will obtain. The three projects they are currently investigating are: Detroit Salt Mine Co.(the city planning commission has requested our help), project Genisis (teaching handicapped students about butterflies),and Cass Tech environmental issues.

My main goals are to develop materials and get ideas for environmental science programs.

I currently teach 4 oceanography classes and 1 physics class. My goals for the next few years are to incorporate environmental science topics into the oceanography curriculum and also use more technology in teaching and personal development. Our curriculum is driven by the MCAS test and State Curriculum Frameworks and because of this it is exceedingly difficult to find the time and energy to try new things. I hope the VISIT Collaboratory and GIS will help me attain these goals and benefit my students.

Collaborating with other teachers:
This is the first course I have ever taken online .... I look forward to interacting with teachers from all over the country. I hope I can offer you as much as I know you will all offer me.
Each year we run a simulation using CAMEO, MARPLOT, and ALOHA, a trilogy of GIS applications. I hope to be meeting new teachers and professionals interested in exploring the use of GIS in secondary education.

I teach AP Chemistry and AP Physics(C). I enjoy these types of courses (i.e. VISIT) because of the contacts and the time I can spend on it.

Please share your experiences as to how you have your students design their own experiments as we work together in VISIT.

I have extensive experiences in vegetation mapping, forest fire mapping, historic vegetation analysis, watershed mapping and remote sensing applications. I am working on the development of the Detroit Data Partnership Coalition to provide GIS based information about the well being of children and families in Southeast Michigan. I look forward to working in collaboration with all of you.

Working and teaching in cyberspace:
One of my professional development goals is to explore the use of cyberspace as a means of communication and instruction. One of my primary reasons for participating in VISIT is to learn more about this type of communication, practice skills related to online communication and teaching, and to evaluate its effectiveness...so far, so interesting....
I am looking forward to hopefully learning new methods of inquiry for my classroom and perhaps also to see how I can incorporate cyberspace into my lesson plans. I eagerly look forward to our online meetings.

Findings Regarding Core Team Organization and Development

About 25 persons are currently listed as being in the VISIT Core Team. However, not all core team members have participated actively over the past year, and there has been a high rate of turnover and loss of personnel on the project. Three scientists from Washtenaw County Department of Environment were originally assigned to organize the Core Team Science Help Desk, but two of them left the County Department. Thus, in fact, only one of them interacted with teachers and other team members. The EMU technical support person, and the secondary science person at DPS dropped out of the VISIT project due to position changes. Though those positions were replaced later, the personnel change had a negative impact on the project progress. Our partnership with the Wayne County Department of Environment, which was to provide Rouge River water quality data, turned out to involve some political problems that resulted in our not being able to obtain full data sets we expected to get. In the face of these personnel losses and data losses, it is surprising that as much was accomplished as was accomplished.

Findings Regarding Partnership with Detroit Public Schools

Although VISIT is intended to serve teachers in several geographic locations nationally, the Detroit Public Schools (DPS), an NSF Urban Systemic Initiative school district, is a high-priority
partner in the project. The DPS Director of Science Education is a member of the Core Team, and project leaders meet regularly with Dr. Juanita Clay-Chambers (the DPS Deputy Superintendent). Also, one of VISIT’s Advisors is a key person in the University of Michigan’s LETUS project that has a close cooperation with the DPS. Through the project activities identified above, the VISIT project leaders and other members of the Core Team have made several changes in the plan of work and operations based on the requirements of DPS administration and teachers. A change in project staffing was made to regularize coordination with DPS administration. Dr. Joanne Caniglia, a faculty member at EMU Department of Mathematics with special interest in preservice teacher education, has prior experience in conducting teacher enhancement projects with the Detroit Public Schools. Dr. Caniglia was named a VISIT Co-Principal Investigator to provide an ongoing liaison with Dr. Juanita Clay-Chambers of the DPS. DPS administration selected two teachers to serve in the VISIT Core Team, in addition to one Core Teacher from Detroit who had been involved in the VISIT planning and proposal development. The DPS selected teachers to be more representative of Detroit teachers who would be served by VISIT (rather than teachers who are already positioned as teacher leaders). DPS actively supported recruiting strategy and activities (e.g. presentations at District-wide meetings of department heads) but changed the timing of recruiting activities (fall 2000 instead of spring 2000). DPS requested that more face-to-face workshops be provided by the VISIT project than were originally planned and budgeted for. (Three face-to-face workshops are scheduled for January 26, 27, and February 3, 2001 and further adjustments will be made in the second year budget to accommodate 2-3 more workshops.) Investigations and lesson plans need to be keyed not only to national and state frameworks but also Detroit’s local curricula. Schools in Detroit that do have extensive computer facilities actually do not have adequate internet connectivity or bandwidth, and science teachers do not necessarily have access to the computers in the schools. We also learned that although EMU is one of the largest producers of teachers in Michigan, and is located less than an hour away from Detroit, EMU does not have formal arrangements with DPS for preservice teacher development and placement. Taken all together, these factors contributed to a tension in the project between the original purpose, strategies and plan on the one hand, and the DPS needs and requirements on the other hand. The project is actively seeking an appropriate equilibrium relative to these tensions. Regular monthly meetings of the PI and Co-PIs with the DPS administration, and prior discussions and agreements on major project activities began establishing good working relations with the DPS administration and discussion of potential DPS resource support for the teachers and program.

Findings Regarding Prerequisite Skills and Knowledge

Through participating in the activities described in the Activities section, the Core Team members uncovered needs for prerequisite skills and knowledge before the members could contribute productively to the development of Investigations and the operation of the Collaboratory (and by extension, the prerequisites needed by teachers in the program. Examples of these prerequisites (or co-requisites) include data management skills and concepts, data mining, GIS and GPS concepts, WebCT navigation and functions, hypertext and hypermedia development, online collaboration and facilitation, project-based learning as a model instructional mode, project management, working in teams, quality assurance procedures, and processes for linking learning activities to state and local curriculum frameworks and standards. The project is addressing these prerequisites or co-requisites in the design and development of the VISIT courses.

Findings Regarding Design of the Online Collaboratory

The original VISIT concept was that the Collaboratory would be a place where teachers and other members of the Core Team -- teacher leaders, scientists, technologists, university faculty -- would work together in a sustained manner over time, conducting and documenting Investigations. The “Core Team Collaboratory” was designed to support the core team members as they learned how to work together and establish the methods they would use with the teachers.
Majority of the core team members were hesitant to post ideas in draft format on the WebCT, or use the WebCT as a platform for developing materials. It became clear that the original design would not achieve all its original intentions. Based on findings from the core team collaboratory, we changed the design in three important ways. First, starting in September, 2000; we started developing a sequence of structured online courses to teach some of the prerequisite skills and knowledge in a way that prepare teachers, scientists and faculty to work in an online collaboratory environment. Secondly, we are recruiting more Teacher Leaders to serve as facilitators online with the teachers and project staff, and we have a coach to aid the teacher leaders in developing their online facilitation skills. Thirdly – in the Detroit area – we are providing face-to-face workshops to train teachers how to use Internet and WebCT, and to augment the online experiences, especially for teachers who do not have reliable Internet access. These enhancements will improve communications and coordination in the collaboratory.

One significant development that enhances the viability of the project is the fact that two faculty members applied for and received an Eisenhower grant from the State of Michigan (Joanne Caniglia, PI, the Eisenhower Grant; and Yichun Xie, Co-PI). This grant is titled, “Teacher Learning that Supports Student Inquiry: Interdisciplinary Science Investigation of Contemporary Problems.” This project supports secondary science and mathematics teachers in scientific investigations using spatial analysis technologies. It complements the NSF project, VISIT. Teachers, school stakeholders and research groups share scientific and pedagogical information. Teachers experience processes that will be created for their students. This project promotes professional growth on-site throughout year plus several workshops. The project integrates the science and mathematics national curricula and Michigan Framework. The total grant is $73,000, including $31,244 for teacher participation. This grant is providing stipends for MI teachers to attend face to face workshops: VISIT Introduction Workshop (January 26, 2001), VISIT Saturday GIS hands-on workshops (January 27, and February 3, 2001) and VISIT Curriculum Integration Summer Workshop (July 10 – 14, 2001). Dr. Caniglia has played a significant role in developing this grant, and supporting the VISIT project.

In addition, VISIT staff are assisting teachers in Massachusetts in applying for PALMS grant that if funded, would provide additional resources for summer face-to-face institutes for teachers.

The project's Evaluator's Report is attached as a pdf file in this section.

3. Describe the opportunities for training and development provided by your project.

The VISIT goals are to assist teachers in developing their ability to take advantage of digital databases and geospatial tools for analysis, to conduct investigations into phenomena and problems of importance in their local environments and keyed to their curricula. To this end, the project has several main strategies. These include the following:

- Enable teachers to experience for themselves the kinds of learning activities, content and pedagogy they will provide for their students, including teamwork, real-world investigations, a variety of tools for analysis of real-world data, and authentic assessment.
- Provide ongoing, sustained support online for teachers throughout the school year, school holidays, and summers so they can learn at times of their convenience and be assured of dependable support.
- Provide opportunities for collegiality, with teachers taking a range of leadership roles in the program.
- Deepen teachers’ understanding of content knowledge through interdisciplinary inquiry, collaboration with working scientists, and tools to support scientific reasoning.
- Support teachers as they try out investigation techniques in their own classrooms, by
providing examples and contacts with other teachers doing similar things in their own classrooms or similar curriculum; providing feedback from other teachers; and by publishing student work.

Forty-eight teachers registered for online classes that began on January 6, 2001. With the five Core Teachers, these fifty-three teachers include 19 from the Boston Massachusetts area and 31 from Michigan (19 of those from Detroit). Three other areas represented are Lexington KY, Missouri City TX, and Tucson AZ. The following are approximate numbers of teachers who teach various subjects (one teacher may account for several subjects taught):

- Earth Science (19); Biology (16); physics/physical science/astronomy (11); general science, INS (10); environmental/ecology/oceanography (9); chemistry (6); technology (6); mathematics (4); geography (2); bilingual (1); humanities/arts (2).

When they complete the program in June, these teacher investigators will have been involved for 140 hours (or more in the case of teacher leaders and core teachers). By the end of our first grant year (end of February) they will have been involved for 50 hours. The schedule of classes and workshops is as follows (this is posted on the VISIT web site):

- January 6-February 2- Introduction to VISIT; VISIT Workshops and Forums.
- February 3-March 9-Introduction to GIS; VISIT Workshops and Forums.
- January – June (Detroit) Within-school VISIT workshops scheduled and led by school staff development coordinator and/or VISIT Core Team Teacher (January 26 – Face-to-face VISIT Introduction Workshop in Detroit Cody High School; January 27 – VISIT Saturday GIS Hands-on Workshop 1 in Detroit Mumford High School; February 3 - VISIT Saturday GIS Hands-on Workshop 2 in Detroit Mumford High School).
- March 10-April 20-Developing Investigations; VISIT Workshops and Forums
- April 23-June 1-Individual and Team Investigations.
- July 2001 - 3-day VISIT conference for presentation of teacher and student investigations and VISIT curriculum integration workshop in Ypsilanti, MI.

Profile of a VISIT Investigator teacher's Investigation and Learning Time over a 25-week period (academic semester and summer).

<table>
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<th>Venue</th>
<th>Total Duration</th>
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<tr>
<td>2-day regional/metropolitan face-to-face workshop</td>
<td>15 hours</td>
</tr>
<tr>
<td>In-school, 2-4 hour, hands-on, face-to-face workshops with school-based teacher team, led by school-based facilitator, or a Core Team member</td>
<td>10 hours</td>
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<tr>
<td>Online Community weekly interaction facilitated by Core teachers/teacher leaders</td>
<td>25 hours</td>
</tr>
<tr>
<td>Individual-conducted hands-on VISIT structured lessons and exercises in data mining, science reasoning, spatial data analysis, curriculum &amp; standards connections, and assessment</td>
<td>20 hours</td>
</tr>
<tr>
<td>Individual consultations online with teacher leaders, scientists, science help desk</td>
<td>6 hours</td>
</tr>
<tr>
<td>Reviewing case studies of scientific investigations similar to mine</td>
<td>4 hours</td>
</tr>
<tr>
<td>Defining, conducting my own investigation</td>
<td>20 hours</td>
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<tr>
<td>Integrating my investigation with curriculum and standards</td>
<td>10 hours</td>
</tr>
<tr>
<td>Planning, conducting, and reporting on classroom activities with my students</td>
<td>25 hours</td>
</tr>
<tr>
<td>Assessing quality of my own and/or my students' work/ publishing</td>
<td>5 hours</td>
</tr>
<tr>
<td>Total</td>
<td>140 hours</td>
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</table>

4. Describe outreach activities your project has undertaken.
One of the main goals of VISIT is to engage in community-based projects. To assist teachers in making connections with community members and organizations, project staff and core teachers have established or initiated contacts with relevant organizations such as the Friends of the Rouge in Detroit, the Greater East-side Community Organization in Michigan-Flint, the Shiawassee River Task Force in Michigan-Oakland County, and the IMAGIN Organization (Improving Michigan Access to Geographic Information Network). In the Boston area, teachers are working with the MassGIS group and with several public agencies such as HAZMAT emergency planning committee. VISIT staff have begun seeking appropriate contacts in Detroit relevant to hazardous materials emergency planning. The PI and Co-PI have held meetings and presentations, for example at a teacher workshop affiliated with the Friends of the Rouge and the Rouge Education Project. The PI also made a presentation on GIS at a teacher workshop sponsored by the Detroit Urban Systemic Initiative. The project also helped to sponsor GIS Day at Cody High School in Detroit, where several members of the local government and the community, and hundreds of teachers and students participated.

Publications and Products


The VISIT Web Site is http://www.emich.edu/visit

Software: Water Quality Data Online (see description under Activities – materials development).

Contributions to Resources for Research and Education

The VISIT project is constructing instructional materials and an infrastructure in cyberspace to support teachers’ professional development. The courses and other materials that VISIT is building, are expected to be used as a long term resource by other professional development organizations after the project grant period has ended.

One significant outcome is that the VISIT Co-PIs with an EMU research group from the College of Education and the Library have been awarded a two-year grant from the NSF – National Science, Mathematics, Engineering, and Technology Digital Library. The project is called, "TeacherLIB—Digital Community and Collections for Science and Mathematics Teacher Education." Its goal is to work with the Core Integration Group of NSDL to help ensure that the NSDL serves the needs of preservice teacher education and K-12 science education.
TeacherLIB augments the VISIT project in several ways. Through this partnership, TeacherLIB will have the resources of VISIT principal investigators Yichun Xie, Beverly C. Hunter, and Joanne Caniglia (who also serves as senior personnel on TeacherLIB). Through their participation in the NSDL core integration group, the VISIT PI's will be able to ensure that the teacher enhancement materials being developed in VISIT will become an integral part of the NSDL and will conform to relevant technical and pedagogical standards being established by the NSDL for interoperability of the library components and infrastructure.

**Special Requirements:**

Dr. Joanne Caniglia has been added as a co-PI. Her primary role is liaison with the Detroit Public Schools administration, and management of the Detroit component of the project. She will serve at 25% of time per calendar year (budgeted as instruction replacement during the academic year) for the second and third years of the project. The funds will come from the internal personnel adjustment. Thus, the VISIT project (EMU and Piedmont) does not request additional funds for this personnel addition.

**Unobligated Funds:**

Funds estimated to remain unobligated will not exceed 20% at the end of the period for which NSF is currently providing support.

**Continued Funding:**

Yes, the VISIT project (EMU and Piedmont) requests the continued funding from the NSF for the second and third years.