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, 2001 and August, 2002 (the period of this report). These included organizational development, development of investigations and learning materials, recruiting, Collaboratory development and operations, formative evaluation, and dissemination/institutionalization (described in Section 4. Outreach).

1.1 Organizational Development Activities

During the second year (actually 18 months) of the project, we developed a new organizational arrangement, the Teacher Leader team. We recruited 25 high school teachers and other educators to serve in one or more of the following roles: online facilitator; recruiter; lesson developer; technical consultant; workshop presenter. In addition, these Teacher Leaders serve on a Management Advisory Board which meets via teleconference every other week. Major activities in developing the Teacher Leader program included recruiting candidates and selecting leaders, defining contracts with each individual, evaluating their performance, and developing and conducting a leadership development program.

The co-PIs also conducted meetings with representatives of VISIT’s partner organizations as discussed under Recruiting Activities.

1.2 Developing Learning Materials and Investigations

VISIT PI’s, staff, and Teacher Leaders acquired, reviewed, assembled, revised and/or developed the following types of learning materials to use in the professional development program:

Five Investigations (environmental science spatial analysis; water chemistry; ecological classification; HAZMAT simulation; and toxic chemicals); a Teachers’ Guide to geo-referenced databases on the WWW; readings and web sites supporting GIS in schools; 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; sample lessons that apply aspects of GIS in different curriculum areas; investigation process model; investigation scenarios; online course syllabi and courses in WebCT; teacher lesson plans; rubrics for evaluating lessons. In addition, the online
course materials that were developed in Year 1 were evaluated and revised in Year 2, and the course was restructured based on year 1 experience.

1.3 Collaboratory Development and Operation

We revised the design and contents of the Collaboratory, conducted Collaboratory operations with teacher participants and teacher leaders throughout the 18-month period, conducted ongoing assessment of the effectiveness of the Collaboratory, and made ongoing revisions.

1.4 Recruiting Activities

Two types of activities were conducted for the purpose of recruiting teachers:
a) partnerships with other institutions and
b) national recruiting through VISIT Teacher Leaders.

1.4.1 Partnerships. One strategy for recruiting and retaining teachers in the VISIT program is to build partnerships with schools and other educational institutions. Meetings, workshops, and technical assistance sessions were conducted to build the partnerships and recruit teachers under this strategy.

Detroit Public Schools and New Detroit Science Center

- In the Fall 2001, EMU sponsored, face-to-face technical tutoring in Detroit Cody High School, and Saturday GIS workshops at Cass Tech High School centered at the field investigation of the eco-systems at Belle Isle.
- On January 12, 2002, we conducted a GIS workshop for DPS teachers and students who were planning to use GIS for Detroit Science Competition in Mumford High School (Randy Raymond, Mark Schapp and Yichun Xie). DPS Office of Science sponsored stipends for students who attended the workshop.
- We also conducted a two-day GIS training at Detroit Urban Systemic Program Workshop on August 1-2, 2002 at Detroit Northwestern High School.
- EMU is partnering with New Detroit Science Center (NDSC) to provide additional access to schools and teachers in Metro Detroit. Tiah McKinney, Director of Education Relations at NDSC helped in recruiting teachers. Yichun Xie (PI), Randy Raymond (the VISIT project national advisor) and Mark Schaap (a teacher leader from Detroit Persian High School) worked with Tiah McKinney to provide on-site technical support and presentations to Detroit teachers through the NDSC facility. So far, we have provided the following services through NDSC:
  - New Detroit Science Center (NDSC) VISIT Information Workshop in Conjunction with NDSC Planetarium Review on December 8, 2001
  - New Detroit Science Center (NDSC) VISIT Information Workshop in Conjunction with NDSC Human Body Science Review Workshop on February 1, 2002
Colorado State Geographic Alliance and Colorado School of Mines

The VISIT project initiated cooperation with Colorado State Geographic Alliance (CGA) and Colorado School of Mines (CSM) in early 2001. Through the recommendation of the VISIT National Advisory Board member, Dr. Joseph J. Kerski, Education/GIS Coordinator, US Geological Survey Denver Office, we invited Steve Wanner, a teacher of earth science and geography at Boulder High School, as a VISIT teacher leader. The VISIT project staff, and the teacher leader from Ann Arbor Pioneer High School, Ron Robinson, attended the Colorado CGA Conference and presented the VISIT project in April 2001. Beverly Hunter (Co-PI) attended the Colorado VISIT workshop held in October 2001. Yichun Xie (PI) presented at the Boulder National GIS Institute for Educators, jointly organized by CGA, USGS, and GIS Educ. Tech. in June 2002.

Michigan Department of Education and Lansing Community College

Dr. Xie started cooperation with Michigan Department of Education (MDE) – Science Curriculum Assessment Team through the recommendation from New Detroit Science Center.

- Yichun Xie presented at MDE – Assessment Team meeting on June 4 in Genesee County ISD.
- Yichun Xie, Randy Raymond, and Mark Schaap, MDE (Mozzel Lang), and Lansing Community College (LCC) – Science Education Center (Chris Marschall) jointly conducted a two-days summer GIS workshop at LCC on July 23-24. LCC - Science Education Center supported stipends for teachers from LCC Eisenhower Grant.
- Mark Schaap a VISIT Teacher conducted a half-day VISIT presentation and GIS demonstration at Lansing Community College Eisenhower Summer Institute on August 6, 2002.
- Mark Schaap was also invited to join MDE - Science Curriculum Assessment Team as a GIS educator to assist the line-up of GIS lessons with Michigan Science Benchmarks.

Oakland County Public Schools

Yichun Xie and Randy Raymond initiated discussions with Oakland Schools (OS) – Math/Science/Technology Center in late 2001. An agreement of cooperation was reached in January 2002,
To establish a GIS Program in Oakland County Schools as a demonstration of using technology in schools,
- To train classroom teachers in using GIS technology,
- To train classroom teachers in using GIS based curriculum,
- To train teachers to develop instructional materials using GIS,

The timeline of planned activities is as follows,

**February-March, 2002:** Announce & promote project to teachers (OS), establish GIS project team (OS led by Larry Sabbath, Curriculum Specialist, Math/Sci/Tech Center), assign VISIT staff person to be liaisons between VISIT and Oakland Schools (Yichun Xie, Ann Eschtruth, Bob Saxton, Ron Robinson, and Mark Schaap)

**April 16, 2002:** A Kick-off Workshop was held on April, 16 2002 from 3:30-7PM. The purpose of this workshop is to introduce the project and WebCT, to give out Schools and Libraries CD, to announce dates for spring and summer workshops (Yichun Xie, Ann Eschtruth, Ron Robinson, Bob Saxton). Participants began the “Introduction to VISIT” course at the April 16th workshop.

**May, 2002:** Participants expected to complete the “Introduction to VISIT” course module online prior to the June workshop.

**June, 2002:** Host summer workshop June 17 – June 21, 9:00AM-2:30 PM (Yichun Xie, Ann Eschtruth, Bob Saxton, Ron Robinson, and Mark Schaap). This workshop consists largely of hands-on time with the GIS lessons in the “Introduction to GIS” course. Oakland Schools was responsible for the recruitment for this event (approximately 30 teachers) and provided the facility, training materials, breakfast, and refreshment. EMU Eisenhower project (through College of Education) sponsored a stipend for teachers who attended all 5 days ($500). The VISIT project sponsored teacher leaders to provide training at the workshop.

**July – August, 2002:** Participants were required to complete “Introduction to GIS” course and practice with Schools and Libraries lessons.

**September 2002 – May, 2003:** Participants will complete third online module and develop a complete lesson for classroom use. Oakland schools will host periodic team meetings throughout the school year. VISIT grant is paying VISIT teacher leaders to attend each of these meetings.

Ann Arbor Public Schools and Michigan Earth Science Teachers Association

The teacher leader from Ann Arbor Pioneer High School, Ron Robinson, introduced the VISIT project to the Board of Directors, Michigan Earth Science Teachers Association (MESTA). Ron Robinson and Yichun Xie met with MESTA in November 2001. The
VISIT project and MESTA jointly sponsored a one-day VISIT-GIS workshop on January 12, 2002 at EMU and had 27 teachers.

Ron Robinson also keeps active contacts with Ann Arbor public schools and schools in Washtenaw County, promoting the VISIT project. Mr. Robinson’s efforts recruited many teachers from these schools to participate in the VISIT project.

Michigan Geographic Alliance

The VISIT project initiated discussions with Michigan Geographic Alliance (that was housed at Central Michigan University in Mt Pleasant) in June 2002. One of the VISIT teacher leaders, Al Lewendowski, and several of the VISIT participants (teachers) are consultants of Michigan Geographic Alliance (MGA), and they helped to introduce the VISIT project to MGA. Yichun Xie presented the VISIT project at Advanced Institute of MGA on July 2, 2002, and met with Dr. Mike Libbee, MGA Director to discuss an agreement of cooperation. After several round of discussions, the VISIT project and MGA reached the following agreements.

1) The VISIT project team collaborates with MGA to tailor the VISIT online GIS course for the Alliance teachers and consultants. The Alliance will recruit around 25 teachers and consultants for a special Alliance VISIT Online Course starting in Fall 2002. The VISIT project will create a special forum for this course. The Alliance will basically adopt the current online infrastructure of the VISIT Collaboratory and online course (a fifteen week period).

2) The Alliance participants will agree to meet the general expectations and requirements of the VISIT project. In particularly, all Alliance participants will register through the VISIT Online Application Form, participate in the VISIT Collaboratory, finish assigned activities, and develop a lesson plan. Moreover, as requested by MGA, in-service presentations developed by some MGA teacher consultants based on the project will be acceptable as a final product for the course. When completing the VISIT online course, the participants will get three graduate credits from Eastern Michigan University free of charge.

3) The VISIT project supports the selection of two Alliance liaisons (David Patton, a GIS faculty from Central Michigan University - CMU, and Al Lewenowski, a MGA teacher consultant and a VISIT teacher leader) to be responsible for this special Alliance VISIT Online Course. The VISIT project invites the Alliance liaisons as VISIT teacher leaders for online facilitation. The VISIT project is sponsoring a total stipend of $2,400 for the liaisons.

4) The Alliance plans to offer two 1-2 day(s) workshops through the Alliance teacher consultants or CMU faculty. The first workshop (tentatively scheduled on October 26, or November 2, 2002) will be designed to provide technical start-up for the Alliance participants. The second workshop (tentatively scheduled in
early December) will provide curriculum guidance and data collection support to help the participants to develop GIS-based lesson plans (or modules). The Alliance will fund the teacher consultants to participate in these workshops and provide the GIS lab facilities. The VISIT project will sponsor refreshment and lunch for the workshops ($10 per participant per day).

5) The Alliance should encourage communication and discussion between the Alliance participants and the regular VISIT participants. The VISIT project will encourage its teacher leaders (in particular those with strong background in geography, earth science, and social science) to provide additional support to the Alliance liaisons and to the Alliance participants.

Hillsdale/Lenawee/Monroe Intermediate School Districts

The VISIT project, with the introduction of EMU College of Education, started exploration of potential cooperation between the VISIT project and Hillsdale/Lenawee/Monroe Intermediate School Districts (H/L/M ISD). We had discussions with both H/L/M ISD administration and Math/Tech/Sci Center. Yichun Xie and Don Staub (EMU College of Education) presented the VISIT project and demonstrated GIS lessons at H/L/M Math/Tech/Sci Center T3 Summer Institute on August 14, 2002. The VISIT project and H/L/M Math/Tech/Sci Center have arranged a one-day GIS workshop on October 22, 2002 with an attempt to recruit teachers for the 2003 Winter VISIT Online session. The announcement was sent out in mid September 2002.

Maine Math/Science Alliance (MMSA)

Under the leadership of Dr. Henrietta List of the Maine Math/Science Alliance, selected teachers across Maine attended an orientation workshop in the late fall 2001 and joined the VISIT Collaboratory. Henrietta List identified the state math/science standards to be addressed and coordinated with the teachers the types of investigations to be conducted. The MMSA will continue this role into the VISIT third year.

1.4.2 National Recruiting by VISIT Leaders and Advisors
Members of the VISIT Teacher Leaders team and members of the VISIT National Advisory Board assisted in recruiting teachers locally and nationally via a range of methods such as making presentations at meetings of science teachers and social science teachers, and sending email notices through their own professional networks.

1.5 Formative evaluation activities.
Four main types of formative evaluation activities were conducted, and the results of these drove the revision and refinement of VISIT strategies and materials and operation of the Collaboratory:
• Teachers leaders and the Co-PI analyzed the discourse with teacher participants in the Collaboratory and proposed revisions based on those analyses. Teacher leaders met bi-weekly to discuss these findings and their implications.
• Rockman et al external evaluator interviewed a sample of teachers in the fall of 2001 and summarized results, which were then used by the co-PI to propose revisions to the program.
• Progress of teachers in the program was summarized periodically.
• An analysis of the effectiveness of the recruiting strategies was conducted by the Co-PI with assistance of Rockman et al. (See results section.)
• An external expert in online facilitation analyzed samples of the Collaboratory discourse and provided recommendations for training of the teacher leaders in moderation techniques.

2. Describe the major findings resulting from these activities

Major findings or outcomes from project activities include the following: teacher leader program, Collaboratory development and operations, investigations and learning materials, recruiting methods and outcomes, and formative evaluation.

2.1 Findings -- Teacher Leader Program

The design Teacher Leader program of VISIT is one of the most important outcomes of the VISIT program in terms of its implications for design of professional development collaboratories. The recruitment, composition, competencies, roles, activities, training, compensation, and professional development outcomes of this program will be the subject of year 3 summative evaluation, so as to inform other similar projects such as those being developed by state education agencies, partnerships of universities and school districts, industry-led initiatives, and the like.

Composition of the Leader Team. Table I lists teacher leaders and staff members who participated in year 2 and their main subject areas. (Not all of those listed were active at any one time.)

<table>
<thead>
<tr>
<th>Leader/facilitator</th>
<th>Location</th>
<th>Main Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karl Balke</td>
<td>Detroit P.S.</td>
<td>Physics, math, earth science</td>
</tr>
<tr>
<td>John Bayerl</td>
<td>Dearborn MI</td>
<td>Biology, Land surveys, cross-curricular GIS in schools</td>
</tr>
<tr>
<td>*Deborah Boisvert (Boston coordinator)</td>
<td>Boston/Acton MA</td>
<td>Technology in Schools; Tech Prep</td>
</tr>
<tr>
<td>Alfred Doyle</td>
<td>St. Bernard’s, New York City</td>
<td>Academic technology, internet training, online learning</td>
</tr>
<tr>
<td>*Anne Eschtruth (EMU staff)</td>
<td>Ypsilanti/Michigan</td>
<td>Ecology, VISIT operations</td>
</tr>
<tr>
<td>Scott Gaffri</td>
<td>Denver CO</td>
<td>Geology, environmental sciences</td>
</tr>
<tr>
<td>Melanie Goldman</td>
<td>Boston area</td>
<td>Online facilitation, mentoring</td>
</tr>
<tr>
<td>Bill Hamilton</td>
<td>Boston area</td>
<td>GIS, GIS applications, ArcView, IDRISI</td>
</tr>
<tr>
<td>Fred Hohn</td>
<td>Acton MA</td>
<td>Environmental science, IDRISI</td>
</tr>
<tr>
<td>Name</td>
<td>Location</td>
<td>Areas/Activities</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Beverly Hunter (Co-PI)</td>
<td>Virginia</td>
<td>Online collaboration, GIS applications, pedagogy</td>
</tr>
<tr>
<td>Nasreen Jalili</td>
<td>Detroit P.S.</td>
<td>Chemistry, biology, environmental science; water quality</td>
</tr>
<tr>
<td>Jill Kaminski</td>
<td>Parker CO</td>
<td>Computer Science and Cisco Networking; Online teaching</td>
</tr>
<tr>
<td>Joseph Kerski</td>
<td>Denver (USGS)</td>
<td>Data sources, geography</td>
</tr>
<tr>
<td>Al Lewandowski</td>
<td>Port Huron, MI</td>
<td>Social studies, community atlas projects, water quality, radon</td>
</tr>
<tr>
<td>Henrietta List</td>
<td>Maine Math/Science Alliance</td>
<td>Biology, coastal ecosystems, ecosystem preservation, project-based learning</td>
</tr>
<tr>
<td>*Bo Mah (graduate student)</td>
<td>Ypsilanti MI</td>
<td>GIS, ArcView</td>
</tr>
<tr>
<td>Melissa Martin</td>
<td>MA</td>
<td>GIS applications in wildlife conservation, town planning, geology, forestry</td>
</tr>
<tr>
<td>Bill Nedela</td>
<td>Farmington MI</td>
<td>Earth science, staff training</td>
</tr>
<tr>
<td>Walter Paul</td>
<td>Boston area</td>
<td>HAZMAT; community-based projects</td>
</tr>
<tr>
<td>Randy Raymond</td>
<td>Detroit P.S.</td>
<td>GIS, community-based projects, biology, urban ecology, school system admin GIS</td>
</tr>
<tr>
<td>Ron Robinson</td>
<td>Ann Arbor P.S.</td>
<td>Earth science, GIS in school curricula</td>
</tr>
<tr>
<td>Herschel Sarnoff</td>
<td>Los Angeles</td>
<td>History, geography, community-based projects</td>
</tr>
<tr>
<td>Bob Saxton</td>
<td>Novi MI</td>
<td>Environmental science, ecology, community-based projects</td>
</tr>
<tr>
<td>Mark Schaap</td>
<td>Detroit P.S.</td>
<td>Earth science, Arcview instruction</td>
</tr>
<tr>
<td>Alan Sills</td>
<td>Patterson N.J.</td>
<td>Earth system science, chemistry</td>
</tr>
<tr>
<td>Steve Wanner</td>
<td>Boulder CO</td>
<td>GIS in geography, earth science, other social sciences</td>
</tr>
<tr>
<td>*Yichun Xie (PI)</td>
<td>Ypsilanti</td>
<td>GIS, spatial analysis, GIS applications in environmental science</td>
</tr>
<tr>
<td>*Ling Zhang (graduate student)</td>
<td>Ypsilanti MI</td>
<td>GIS</td>
</tr>
</tbody>
</table>

Teacher Leader Roles. Teacher Leaders played several roles and received a variety of professional development opportunities in addition to those received by other teachers in the program. Their primary responsibility is to facilitate learning in the online Collaboratory. They also recruited teachers to join VISIT; developed and evaluated learning materials; made presentations at workshops and conferences; and served on the Management Advisory Board. Some Teacher Leaders provided technical assistance to other teachers in their own school building or school district.

Teacher Leader Compensation and Outcomes. In addition to the intrinsic rewards of collegiality, professional recognition, and developing their own technical skills, Teacher Leaders receive a combination of graduate credits, consulting fees, opportunities to present at workshops and conferences, and travel expenses, depending upon their roles and performance.

Teacher Leader Characteristics and Qualifications. The Teacher Leaders are either currently K-12 classroom teachers or are in other K-12 educational leadership positions such as an educator in the Maine Math/Science Alliance. This is a change from the original design of VISIT’s “Core Team” concept, which was designed to include university faculty and working scientists as well as K12 educators. Intentionally, the
Teacher Leaders are a diverse group, reflecting the range of subject areas and types of expertise of interest to participating teachers. They teach in a variety of settings – inner city, suburbs, rural areas, private schools and public. Some are in their first five years of teaching, while others are veterans of 25 years or more. About a third of them were women. The leaders represent a range of teaching methods as well, covering the spectrum represented in our teacher participant groups. The teacher leaders most actively engaged as online facilitators tended to have experience in using GIS in the real world and/or in the classroom, and were specifically interested in working in cyberspace and in learning to improve their skills in online collaboration. An external evaluation of the Teacher Leader program was initiated and designed, and data collection will take place in year 3.

2.2 Findings Regarding Design and Operation of the Online Collaboratory

The VISIT Collaboratory is the interaction of people, software tools, learning materials, technical information, and a structured set of activities that take place in cyberspace. Between January 2001 and June 2002, 202 persons participated in the Collaboratory. These included teachers, the PI’s, staff members, and teacher leaders.

The Collaboratory supports high school and middle school teachers and teacher leaders as they develop scientific and geographic investigations and lessons that take advantage of tools for spatial visualization and analysis as well as geo-referenced data. The Collaboratory structure includes a fifteen-week course for which teachers who complete the requirements receive three graduate credits in science education. Teachers are encouraged to continue their participation and obtain additional support in the Collaboratory after they complete the course. Teachers have also been encouraged to bring some of their students into the Collaboratory but none have done so.

The Collaboratory structure has become more refined. In year 1, the second Collaboratory was structured into three separate online “courses” in webct, each run by a different instructor. Each course included a syllabus, assignments, set of lessons and asynchronous Forums for class discussion, technical help, and other related topics. Many participants found this structure to be too complicated. We redesigned the 15-week 3-credit course as one syllabus, with all materials accessible through one webct “course”. To improve the quality of learning in the Collaboratory, we also instituted a number of refinements to the roles of teacher leaders and their methods of facilitation.

We monitored the Collaboratory for evidence of “effective collaboration” through the following indicators:

- The work products developed by the participants – projects, investigations, classroom lessons, guides to data sources, technical procedures, FAQ’s and other forms of knowledge built through the collaboration process.
- Nature and quality of interactions among the participants
- Numbers and roles of participants
- Extent of participation as evidenced by number of messages posted and by completion of course requirements.
Teachers’ work. In the Collaboratory, teachers conducted inquiries and developed GIS-based lessons for their classrooms on topics such as: distribution of seismic events in Michigan; global prosperity and ecological sustainability; infrastructure of New York City; impact of subway stop on Cardozo-Shaw neighborhood in Washington D.C.; underground railway stops in Wayne County Michigan; analysis of cancer rates in relation to cement plants; analysis of population, land use, and phosphorus levels in neighboring Cobbosee Lake; mapping hazardous materials; mapping local demographics; relationships of plate tectonics and seismic events globally; environmental justice; mapping Passaic County streets and streams; real-time ozone monitoring in New Jersey; modeling roller coaster locations and attraction factors in Cedar Point amusement park; interaction of water quality parameters from a chemistry standpoint; ecological modeling of streams in Michigan; forest management. These projects involve use of many tools, techniques, and data sources that are new to the teachers. Defining a project of appropriate scope, complexity, and pedagogical usefulness and relevance to their curriculum and implementing the project are quite challenging for anyone. Some of the projects can be viewed on the VISIT web site at http://maps.acad.emich.edu/smpInv/sampleIndex.htm.

Quality of Interactions. The teachers are supported by their interaction with each other and with VISIT’s Teacher Leaders, PI’s and staff. The most common topics of dialogue about a teacher’s project include, for example: Design and scope of a project; Geographic extent and scale; Sources of data and scientific information to support a project; Contacts with people (e.g. in local or state agencies) who can assist with a project; Field data collection; Data formats, preparation, conversion and projections; Data management.; Visualization and data analysis methods and tools; Curriculum integration, pedagogy and classroom management.

Besides the topics of discussion, the nature of the interaction is equally important. In year 2 teachers got more timely responses to their postings through several mechanisms, including a larger number of teacher leaders to provide the support, plus a technically competent graduate student at EMU to provide individual technical procedures in response to teacher questions. In addition, some teacher leaders volunteered to provide real-time chat opportunities on weekends for teachers needing special assistance and that has helped those teachers who took advantage of it. We also conducted an analysis of the quality of the discourse with the help of an expert from Concord Consortium, and developed a guide for moderators to help move from the technical Q&A mode to a higher level of inquiry that helps build a community of practice and helps move the learning forward more productively.

Between January 2001 and June 2002, 202 persons logged in to the Collaboratory. These included teachers, the PI’s, staff members, and teacher leaders. Teacher leaders posted, on average, 72 messages; one or more individuals posted as many as 250 messages. Eighty-four teachers and 40 teacher leaders and staff participated at least at a minimum level of five postings or more. The median number of teacher posts was three, but those who worked on their own projects typically posted 20 or more times during a semester.
2.3 Findings Regarding Investigations and Materials.

VISIT has assembled a growing repertoire of learning materials. These range in topic and forms, such as:

- how to navigate the Collaboratory itself
- how to interact effectively in online class discussions,
- how to use and evaluate resource materials,
- links to research articles, case studies, and web sites illustrating applications of GIS in schools and communities
- exercises in basic skills of using GIS software,
- hands-on tutorial lessons applying GIS to various curriculum topics,
- datasets accompanying tutorial lessons,
- procedures for accomplishing technical tasks such as converting file formats or reprojecting shapefiles
- guide to online sources of georeferenced data
- procedures for locating and downloading data from particular online sites,
- templates and assignments for developing a lesson or investigation,
- advice on pedagogical, curricular, classroom management and assessment matters
- rubrics for evaluating GIS-based lessons, and many other kinds of materials.

Some of these materials are currently available to anyone from the main VISIT web site. Others are only accessible by members of the Collaboratory through webct.

The repertoire of materials has undergone several rounds of revision and expansion. Initially, many teacher participants were not able to overcome the technical challenges involved in using the materials within the amount of time they felt they could afford to invest in this effort. Nevertheless, the expanding scope and improving quality of materials is one indicator of successful collaboration. We employed several techniques for assisting teachers in overcoming technical hurdles. These included providing some of the lessons on CDROM, providing guidance on basic tasks such as downloading datasets from the web, providing rapid turnaround in a Technical Help forum. Teachers desiring more advanced training in GIS are being provided access to the ESRI Virtual Campus through special arrangement.

Five Investigations (environmental science spatial analysis; water chemistry; ecological classification; HAZMAT simulation; and toxic chemicals) were conducted by teams including teachers, consultants and project staff, to serve as models for other teachers to learn from and emulate during their VISIT participation. The products of these investigations include overview documents for teachers that include, for example, connections to state and national standards and scientific background to the problem or phenomena, lessons, and datasets. These materials are available at the main VISIT web site at http://maps.acad.emich.edu/smplnV/sampleIndex.htm. The main challenge encountered in conducting these investigations was in fostering teamwork to draw upon and integrate curricular and pedagogical knowledge, scientific content knowledge, and technical expertise.
2.4 Findings and outcomes from recruiting activities

Approximately 287 teachers registered for the VISIT Collaboratory and online courses during year 2 of the project. Of those registrants, 84 teachers and 40 teacher leaders and staff participated in the Collaboratory during this time, to at least a minimum level of five postings.

As explained in section 1 of this report, two main strategies were pursued in support of recruitment: face to face workshops and national recruitment via leader networking. How effective were the face-to-face workshops in recruiting and retaining teachers for participation? Of the 480 teachers who attended face to face workshops and recruiting presentations, 60 registered for the program during year 2 (some additional teachers -- about 40 -- registered for the fall 2002 semester and are not taken into account in this year 2 report). Of those 60 who registered from having attended a workshop, fifteen participated online in the Collaboratory and of those, four completed the program. Of the 480 teachers who attended face to face workshops and recruiting presentations, around 140 teachers attended one-day to five-days GIS basic skill training. The workshops should contribute to these teachers’ professional development in technology and its use in science education, though no formal evaluation was conducted.

The majority of teachers who registered (227 out of 287), participated (69 out of 84), and/or completed (10 out of 14) the program were recruited through leader networking in their normal professional channels, at a far lower cost in project resources than through the ftf workshops method. One possible explanation for this is that teachers who sign up for ftf workshops prefer that traditional ftf workshop venue of professional development, whereas teachers who sign up for an online program via an online method are more likely to want to work online. Another explanation is that teachers who signed up via the online method were recruited across the nation and usually have had some previous exposure to or experience in using online and/or GIS technologies.

The following report was provided by Rockman et al the VISIT external evaluator, regarding the recruitment of teachers.

VISIT Year Two: March 2001-August 2002

Prepared by Rockman et al, VISIT external evaluator in October 2002

During year two of the VISIT project, 259 teachers registered for a VISIT course or its equivalent. At least 45\(^1\) of these qualify for either Explorer (35) or Investigator (12) status. Some of the Investigators have continued in the program as Teacher Leaders.

Of the 258 who registered for a VISIT course, 12 registered for multiple courses. Of the two teachers given scholarships to attend National GIS Institute in Boulder, CO, one was a previous VISIT course participant.

\(^1\) Course completion status is unknown for some participants
Course Registrants

<table>
<thead>
<tr>
<th>Semester</th>
<th>Period</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1: January – June 2001</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Semester 3: February – May 2002</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Summer session: June – August 2002</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

Course Completion

**Semester 1: January – June 2001**
- 9 completed the course, 7 receiving 3 EMU credits
- 6 completed the first two modules and received 2 EMU credits
- Completion status is unknown for 13: eight having accessed the Collaboratory appreciatively and five having participated in supplemental workshops at Cody High School
- 21 dropped

**Semester 2: October 2001 – January 2002**
- 3 completed the course and received 3 EMU credits
- 1 completed the first two modules
- 22 unknown: six completed at least the first module, nine accessed the Collaboratory appreciatively, and seven participated in supplemental workshops at Cass Tech High School
- 30 dropped

**Semester 3: February – May 2002**
- 57 unknown: 23 completed at least the first module, 27 accessed the Collaboratory appreciatively, and 7 participated in supplemental workshops at New Detroit Science Center
- 42 dropped

**Oakland County Workshops April 16 & June17-21, 2002 Workshops**
- 24 teachers and 1 consultant attended the June workshop to complete the second module
- 5 dropped

**Summer Session June – August 2002**
- 10 unknown: one completed at least the first module and nine accessed the Collaboratory appreciatively
- 26 dropped
Face to Face Presentations and Workshops

Face to face (ftf) presentations and workshops offered throughout the year were intended as means to recruit and support participants. Approximately 480 teachers and teacher leaders attended a face-to-face workshop or presentation. Of the 287 teachers/consultants who were registered for VISIT courses during year two of the project:

- 21 had previously participated in VISIT workshops
- 47 attended workshops while registered for an online VISIT course
- 10 attended workshops or presentations after their participation in a VISIT course.

The EMU workshop in January 2001 was the most successful in terms of successful recruitment for year-two VISIT courses:

- 8 of 13 participants at the EMU July 2001 workshop registered for the October VISIT course; but only 2 ever logged in to the Collaboratory.
- 12 of 25 attendees at the EMU January 2002 workshop subsequently registered for courses:
  - Nine registered for February 2002; eight actually logged in and participated
  - One registered for the Oakland course and attended the course workshop
  - Two registered for June 2002; both dropped
- 1 of 7 people at the Ann Arbor February 2002 workshop registered for June 2002 but never logged in

The Cody High School training sessions and other Detroit workshops offered during the first VISIT course were the most successful support workshops:

- 25 of the January 2001 course registrants attended workshops (5 at Cody; 24 at other); This includes 12 of the 15 course participants who received credit through EMU or are otherwise confirmed as having completed at least the first two modules of course.
- 15 of the October 2001 registrants attended workshops during the course:
  - 6 attended the kickoff workshop in Boulder; only 3 ever logged in again
  - 1 attended the fall workshop in Massachusetts
  - 7 attended Saturday workshops at Cass Tech High School
  - 1 attended the EMU January Workshop
- 9 of the February 2002 registrants are recorded as having attended workshops at the New Detroit Science Center; only four of these ever lodged in

There are no clear patterns as to who would attend workshops or presentations following a VISIT course. Of the 12 who did, 7 had previously registered for the January 2001 course, 2 for October 2001, 3 for February 2002, and 1 for June 2002. Many attended to get what they could not accomplish online (6 had dropped courses) but some attended to build on what they had accomplished (4 had received EMU credits). The workshops they attended are:

- EMU July 2001 (2)
- Massachusetts Fall 2001 (2)
• Ann Arbor 14 Feb 2002 (1)
• NDSC Recruitment Presentation by Tiah McKinney (1)
• Advanced Institute of the Michigan Geographic Alliance (3)
• National GIS Institute (1 by VISIT Scholarship)
• Detroit Urban Systemic Program Workshop (3)

Some of the above workshops are not VISIT workshops but may have included presentations by VISIT staff or Teacher Leaders as part of expansion efforts. These presentations and workshops are listed below along with their attendance numbers. For each one, I’ve listed the number of attendees who subsequently registered\(^2\) for a VISIT course.

\(^2\) Of those that registered for courses which have been held, over half dropped.
<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Participants</th>
<th>Subsequent VISIT Registration</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2001</td>
<td>Massachusetts Workshop</td>
<td>19</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Dec 8, 2001</td>
<td>NDSC Planetarium review</td>
<td>24</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>July 2001</td>
<td>EMU VISIT Summer Workshop</td>
<td>24</td>
<td>8</td>
<td>Fall 2001</td>
</tr>
<tr>
<td>Jan 12, 2002</td>
<td>EMU VISIT Workshop</td>
<td>27</td>
<td>12</td>
<td>Winter 2002 (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oakland (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>June 2002 (2)</td>
</tr>
<tr>
<td>Jan 12, 2002</td>
<td>DPS Workshop at Mumford</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1, 2002</td>
<td>NDSC Human Body Science Review Workshop</td>
<td>188</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Feb 14, 2002</td>
<td>Ann Arbor Public School Workshop</td>
<td>7</td>
<td>1</td>
<td>June 2002</td>
</tr>
<tr>
<td>May 2002</td>
<td>NDSC VISIT Recruitment Presentation By Tiah Mckinney</td>
<td>42</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>June 24-28, 2002</td>
<td>National GIS Institute in Boulder</td>
<td>31</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Jul 1-3, 2002</td>
<td>Advanced Institute of Michigan Geographical Alliance</td>
<td>25</td>
<td>1</td>
<td>Fall 2002</td>
</tr>
<tr>
<td>Jul 23-24, 2002</td>
<td>VISIT Workshop at Lansing Community College</td>
<td>16</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Participants</td>
<td>Additional</td>
<td>Year</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>Aug 1-2, 2002</td>
<td>Detroit Urban Systemic Program Workshop</td>
<td>14</td>
<td>3</td>
<td>Fall 2002</td>
</tr>
<tr>
<td></td>
<td>Registered at Detroit Urban Systemic Program Workshop to receive the VISIT brochure, CD and sample lessons</td>
<td>45</td>
<td>5 additional</td>
<td>Fall 2002</td>
</tr>
<tr>
<td>Aug 6, 2002</td>
<td>Half-day VISIT presentation at Lansing Community College Eisenhower Summer Institute</td>
<td>19</td>
<td>1</td>
<td>Fall 2002</td>
</tr>
<tr>
<td>Aug 14, 2002</td>
<td>3 hour presentation at the Hillsdale-Lenawee-Monroe T3 Environmental Summer Science Institute</td>
<td>11</td>
<td>1</td>
<td>Fall 2002</td>
</tr>
</tbody>
</table>
2.5 Findings and outcomes from formative evaluation

There were three main findings about weaknesses in the program based on interviews with teachers from the winter and fall 2001 semesters. First, some participants felt that the collaboration aspects of the program were not focused enough on the content of the program. Secondly, there were many technical and pedagogical problems with the GIS lessons. Thirdly, some participants found it difficult to navigate through the various places in the Collaboratory.

Revisions process. These issues were brought to the attention of the staff and teacher leaders, who discussed alternative approaches to remediation in bi-weekly teleconferences over a period of several months. Extensive changes were made to the program based on this information and decision process. To correct the weaknesses in the collaboration discourse, we provided additional training to the facilitators in how to help participants focus on the content and inquiry, we employed an external expert to analyze the discourse patterns of the facilitators and provide recommendations for improved technique, and we recruited more facilitators with experience in online facilitation. To correct the limitations of the GIS lessons, we revised some of them, added new ones, provided technical support as discussed in earlier sections of this report, and added more options for the teachers, including the use of lessons on CDROM to avoid initial technical difficulties in downloading lessons and data from the web. To correct the navigation problems, we restructured the Collaboratory to streamline navigation and more tightly integrate the different parts of the program, and added clearer links among the parts of the program and materials.

The following is a formative evaluation report from Rockman et al based on interviews with teachers in the fall 2001 Collaboratory. This information was used to revise the Collaboratory structure, course and lesson materials and moderator training.

December 14, 2001  
Report from Rockman et al from interviews with Fall 2001 Teachers:

Numerical values are from all interviews unless otherwise indicated.

Bullets and comments are from December

IN Volvement

3. Which online VISIT courses have you taken?
5. How do you envision your involvement with VISIT continuing next semester?, over the summer?, during the next school year?

I spoke with 15 people these two weeks
I pursued the interview protocol with 9 of these participants (one of these is partial because the person never began the online portion).

Note: Information on the 5 not interviewed is given in italics and will only appear here, in answer to question 3.
Five have dropped the course,
three never had time to get started:

• has been too busy and he never started the course. He said he couldn't recall if he had contacted anybody about this.

• I took Intro as an intensive course for one full week over the summer (That was marvelous!). I have a student teacher in and we are moving schools, so October was an impossible dream...I’m hoping to pick up w/GIS in the spring.

and two dropped near the end of the first section:

• dropped the course because she ran out of time and was overwhelmed. She said she finished the first section except the quiz. She did not indicate that she had communicated this to anyone, but she was in a hurry so I may have misunderstood. She certainly wasn't aware of a course in the spring and may be interested in trying then.

• It took too much time and I felt a lot of the time was not all that productive, (like) having to share things. If I have time during the summer I’d like to try again.

Three have barely begun the course but plan to catch up:

• One teacher did finally get registered but by then was overtaken by reviews and such at work. Was planning on catching up over holiday break – students don’t return ‘til January 24th - but didn’t know when the course was over.

• Another hasn’t started yet; has just set up ZIP and said needed to have that. Also things have been very busy and all the stuff is all loaded on the computers at school. Had trouble getting online initially – communicated with Bev about that at the time. Is planning to catch up starting next week and some over the holiday. Has books and another person at school taking the course, so has resources – will see how it goes.

• A third hasn’t done anything yet (baby crying in background). Three others at her school are also involved – doesn’t know where they are with it. She wants to do it; doesn’t know if can catch up over holiday or take in February – thinks others may be planning to try again in February.

Three had completed Intro and are planning to catch up.

Regarding future involvement with VISIT beyond this course they said:

• I’m hoping this summer I’ll be less busy. If it’s not too time consuming (I might be involved then). It’s hard to say (though) ‘til I’ve done the GIS portion and see how difficult it is for me.

• Planning to go to workshop in January. I will incorporate concepts in my class next semester and develop lessons for next school year.

• Can’t say at this point

Three were doing GIS for Teachers assignments:

One is currently teaching GIS to school students, putting in a lot of overtime to be staying one step ahead of them along the way.
The other two (C2 and C3) are teachers at Cass Technical school getting one-on-one instruction from Yichun in Saturday sessions at their school.
Regarding future involvement with VISIT beyond this they said:

- I’d like to continue.
- C2: I would like to see teachers who took VISIT mentor other teachers. (Sees self as) continuing networking with other (current) participants and mentoring others.
- C3: I talked with Dr. Xie - they are interested in continuing with us on our habitat restoration project, in help us develop our own maps and showing us how to utilize the data. He has already given us one training at Belle Isle with GPS.

One completed the GIS section and is done with the course (took for 2 credits).

Regarding future involvement with VISIT they said:

- No way in hell. No way would I ever take an online course like this again.

Commentary

It is very unfortunate that these first two people to finish the course had such a negative experience *(the teacher I interviewed completed it with another teacher who is not in my database)*. I am aware that some of the errors, glitches, and omissions they encountered have already been corrected. It is critical that any remaining frustration factors be corrected as soon as possible before the remaining students hit them.

I am very concerned about the students who are planning to catch up over the break who have not attempted any of the GIS portion yet.

- GIS for Teachers on the whole seems to be taking a lot more effort and time
- None of those interviewed have the resources that the students further along had.

The two who worked together to complete the GIS portion had to pull in the assistance of a husband who was an Internet Specialist (who said that he has now seen everything that can possible be done wrong in creating an online course) and the school district’s tech guy. And they were able to work on multiple computers at once at their school, all with a T1 connection. AND they met with Steve Warner and Joe Kirski to complete the course!

The two Cass teachers who are doing the GIS portion have also been working at school (T1 connection) with technical assistance available to them and getting face-to-face assistance on Saturdays from Yichun.

The one other teacher doing the GIS portion is also able using computers at school with a T1 connection and the incentive of having to be almost simultaneously teaching what he is learning. Which also means he is doing a lot more playing around with GIS than what this course asks for.

These latter three teachers are having an overall positive experience, but two of them are not experiencing it primarily as an online course (one of them hasn’t ever even
participated in the online discussions) and the other described it as “the most challenging course I’ve taken in a number of years.”

IN CONTRAST: The three teachers interviewed who have not yet started the GIS For Teachers portion are all working at home on the course. And although one is a Cass teacher (C1), she is much less computer-literate than the other two Cass teachers to begin with, can only work on the course late at night after her children are in bed, has a very slow modem connection, and has already encountered numerous technical difficulties just trying to click on buttons or access articles.

Back to the Interview

1. How did you first hear about VISIT?

<table>
<thead>
<tr>
<th></th>
<th>From a teacher at my school</th>
<th>Email message</th>
<th>Email or call from Bob Sygans. Massachusetts Association of Science Supervisors.</th>
<th>Email from a listserv Joseph Kirski maintains</th>
<th>Our email at school through the listserv for our science teachers. I’m a librarian who sometimes teaches science.</th>
<th>From a teacher/friend at another school</th>
<th>From an administrator at my school</th>
<th>At a conference/workshop</th>
<th>Letter or brochure</th>
<th>From an Internet Search or Site</th>
<th>Flyer in my teachers’ mail</th>
<th>KANCRN - Kansas Collaborative Research Network</th>
<th>Coworker – IT person</th>
<th>I contacted Joseph Kirski at USGS in Lakewood, Colorado. He pointed me to the VISIT program.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

2. **Of the reasons you might have had for getting involved with VISIT how important were each of the following on a scale from 1 to 5 where 1 is relatively unimportant and 5 is very important?**

<table>
<thead>
<tr>
<th>Average</th>
<th>StandDev</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.54</td>
<td>0.74</td>
<td>Learning more about GIS</td>
</tr>
<tr>
<td>4.39</td>
<td>0.96</td>
<td>Learning new ways to use technology in the classroom</td>
</tr>
<tr>
<td>4.25</td>
<td>1.04</td>
<td>Having interest in inquiry-based or project-based learning</td>
</tr>
<tr>
<td>3.75</td>
<td>1.14</td>
<td>Using and contributing authentic data</td>
</tr>
<tr>
<td>3.59</td>
<td>1.39</td>
<td>Collaborating with other teachers and teacher-leaders</td>
</tr>
<tr>
<td>3.11</td>
<td>1.52</td>
<td>Obtaining professional or academic credits</td>
</tr>
<tr>
<td>2.82</td>
<td>1.02</td>
<td>Having an online professional development experience</td>
</tr>
</tbody>
</table>
Four gave other reasons:

- People in my building were also doing it. (ranked 5)
- I want students to be able to see how important GIS is - This is Now. If we’re not progressive (teachers) the students can’t be progressive. (ranked 5)
- They were willing to schedule hands on instruction at our convenience at our school. (ranked 5)
- It was something (to meet requirements) - we’re all required to fill so many credits and I also wanted to use the Internet. (ranked 3)

4. Have you participated in any face-to-face workshops sponsored by the VISIT program? Which one(s)?

- One did the summer workshop (week-long intensive) at Eastern Michigan
- Three attended the one day in Boulder in October
- Three have gone to some or all of the scheduled instructions at Cass Tech
- Two have not attended any, but one of these plans to go to the January session

ACCESS

6.**Where do you usually access the course materials? Why at this location?
7. What type of Internet connection do you use from this location?

13 Usually at home...............4 w/cable and 5 w/56K modem
- Works better with my schedule
  - It’s easier. The computers at school don’t have external drives to copy onto
  - C1: able to do the course late at night when the children are in bed

4 50/50 home and school..........modem at home and T1 or DSL at school
- I prefer at home, but I am fighting with Ameritech about my connection

7 Usually at school........1 modem, 1 ethernet, 10 T1, and 1 microwave
- AT&T went belly up over the weekend so I can’t work at home anymore.
- I am working with another teacher.
- I don’t have an Internet connection at home.

8. Do you find the speed of your connection to be sufficient?

23 Yes
- Not too bad although lately it slows down in the evening. It’s OK, but it could be a lot better.

4 No
- Could not access some things in a discussion one night. Went to public library and theirs was real fast.
9. **Do you ever have trouble gaining access to technology in this/any of these sites?**

   **5 Yes**
   - I share the computer (at home) with my wife and three children.

   **22 No**
   - I’m there (at school) from 7 am until 7 pm every day!
   - Not unless the district server does down.

10. ***Do you have technical assistance readily available when you need it? (e.g. from someone at school or online from VISIT or other)**

   **16 Yes**
   - Assistance is available through my ISP
   - Tech assistance = my boyfriend

   **11 No**

11. **Do you usually find it easy to use the web and navigate the WebCT and online course environment?**

   **21 Yes**
   - Easy to navigate other than discussions.
   - No problems, and I have the website bookmarked.
   - Very easy

   **6 No**
   - Easy now, but only after some assistance – a student showed me how to go about

12. **What have been some of the benefits of taking this course online?**

   **21 Flexibility of when/where to do the work (ease of access)**
   - Don’t feel so pressured to get the (the assignments) done right away.
   - Don’t need to travel
   - It’s free
   - It’s really nice to be able to respond to responses (messages posted) – that accessibility is nice.

   **5 Online collegiality**
13. "Have there been things that have frustrated you as a result of the course being online?"

**From the four interviewed who only have experience with Intro to VISIT**

- I was having a tough time figuring out how to upload things. I was corresponding with Beverly about it, but we never did figure it out.
- Occasionaly I get cut off through AOL and lose my connection. I was typing up stuff online and lost it (my work).
- Having to fit it into my schedule. If I was taking an evening class I would have that time blocked out. It takes a lot more discipline than I've had so far.
- Technical - WebCT infrastructure
- Slow internet connection
- Once I was not able to click on something. Another time tried to read some of the articles and I could not get anything.

**From the two having experience with GIS for Teachers without the benefit of Cass Tech Saturday sessions:**

- Technical - WebCT infrastructure (one)
- Course content and management (both)
- Questions on the quiz all came from one site - this is poor test management.
- I understand that they're still trying to work out bugs of the format, but snags did arise with interfacing and with requirements. They're not clear with expectations, where to find items, etcetera.
- I had a problem - spent 45 minutes completing the rubric (using Explorer) and then couldn't save.
- Erroneous instructions - steps left out, incorrect information, etc. Got through part of an assignment and hit a roadblock; called Beverly and eventually she asked, "aren't you downloading the data?". At the time we printed out the directions, it didn't tell us we had to do that and we'd been using the data on the CD. It took us five hours to figure this out. I wanted to learn GIS, what I learned was frustration. Instructions were wrong or didn't tell you where the data was that you needed to do it. They did change the lesson two days later and added the sentence saying that you had to download the data.
- Outdated inadequate software provided. Software on their server (Import 71) was outdated - didn't match their own data. They are not taking the time to take their own course!
- They didn't say we need Excel, Winzip, and such. They didn't define the hardware and software requirements!
- Mark Schaap puts these lessons out, 4 or 5, and did not define what software we needed.
• They need to try their own course on different computers - schools don't have the new stuff. Because of all the errors got other teacher's husband (an Internet specialist) and the tech guy from the school district involved.
• In the second part spent all that time designing goals; two weeks later we get the course goals. We were lied to - they said we would get to decide but it was they guy Xie's goals.
• The GIS instructions are very clear, but there are language barriers with the course instructor in discussions.

With GIS for Teachers work, Cass Tech:
• C2: None - I have a lot of help here. If I get stuck I just ask one of the kids.
• C3: None

ASSIGNMENTS
14. Do you feel comfortable with the program’s assumptions about how students best learn (inquiry- or problem-based learning, real-world context for learning, integration of technology into the classroom; use of spatial visualization for aiding conceptual development, etc.)?

3 said Yes; no elaboration

Others:
• The course is meeting its objectives in that way (inquiry-based learning, etc.). But I am spending a lot of time trying to use this software outside of the course just trying to stay ahead of my students, and I don’t know how I would keep up (with this course) if that were not the case.
• The real world connections are absolutely wonderful
• I believe it. I think it’s a very idealistic view. I don’t know if it’s attainable. It would take a lot of preparation to make something like this succeed. I agree that students will learn best through inquiry-based. But it (their success) depends on
• C1: I really think they learn best that way - inquiry. Especially if they’re doing something really meaningful. My students are going to map plants on Belle Isle. They like going outdoors and love gadgets and computers - any hands on.
• C3: Haven’t given it a thought

15. How has the pace and difficulty of course assignments been so far?

Intro experience only:
• Too much time is needed. Not difficult.
• More difficult for me, but my fault (behind).
• This is only my 2nd year teaching and I have a new prep (new class to prepare for). I was doing fine with VISIT (the Intro section) but haven’t been able to do any of the GIS. I’m planning to catch up over Christmas break. Reading articles, surfing the
• Not very difficult, but could not get them at home.

With GIS for Teachers work, non Cass Tech:
• This is the most challenging course I’ve taken in a number of years - there are a lot of little tricks to using GIS.
• I think a lot of people are really struggling with the watered down version of the software; struggling to do assignments. It is apparent they (the course leaders) are just realizing the limitations of the free version.
• Don’t know how we could have done this without having five computers at school that the two of us could be working on at once. It was aweful - assignments were not difficult or shouldn’t have been, but all of the glitches made it time consuming and aweful.
• Didn’t learn a whole lot about GIS - I can move around a bit.
• They seem misguided - seems they are approaching this from higher level institution perspective. The need to take the time to get to know K through 12. We don’t have the kind of time and resources they expected. I felt like a was a guinea pig for the program. I would have quit if the other teacher didn’t need the two credits for her license renewal - she wouldn’t let me quit; said I had to see her through it because I was the one who got her into it.
• We were told we could work at our own pace. That was a lie - we had to go week by week at their pace (as teacher had a week I knew I wouldn’t be able to work on it, didn’t realize that would be a problem).

With GIS for Teachers work, Cass Tech:
• 2 1/2 on a scale of 1 to 5. It is a little bit challenging but nothing you couldn’t work over and get through.
• It’s getting faster; initially it was slow ‘cause it was all new to me. Not bad (difficulty), I like a challenge. There are several of us here taking it, so we can all talk and we can call Dr. Xie.

16. In an average week, how much time have you found you are spending on VISIT activities?

Began Intro and dropped the course
• Online - a couple hours at least, three times per week. And there was other stuff to do offline.

Intro experience completed:
• 2 hours per week
• When I was doing it on a regular basis, at least 3 hours per week.
• Quiz took me about 4 hours and then I did my goals in 1 hour.

With GIS for Teachers work, non Cass Tech:
• Hard to separate that (time spent on VISIT activities) from time spent teaching my course, Scientific Data Analysis. I’m teaching kids to use ArcView (as I learn myself!). Just to do the lesson once and filling out those silly rubrics is three hours a week. The rubrics are way long.
• Six hours every weekend plus four hours 2 to 3 times a week. (=14-18 hours)

With GIS for Teachers work, Cass Tech:
• Three hours (not counting Saturdays).
• 5 to 6 hours by my self plus 5 on Saturdays.

17. In your opinion, what is a realistic amount of time that you can spend on VISIT-related activities each week?

19 1-3 hours
• During the school year, one hour three times per week.
• Three hours each week
• Three to four
• Could be three to four

8 4-6 hours
• We had to spend that much time alone on all the course errors!
• Need that amount of time because of my skill level (really not good at this computer stuff).

1 7-9 hours
• 5 to 10 is realistic not counting time on Saturdays

18. **Are you currently working on an investigation using databases and GIS?

6 Yes: Cass Tech teachers into the GIS section were only ones this round–
• C2: Yes I am. We’re trying to write a grant (for GPS equipment/GIS software) for going to Belle Island - want to plot wildlife habitat and rehabilitate wildlife habitat. Currently we are doing plotting with a regular compass and we use a satellite photograph of the island.
• C3: Belle Island, just instituted. I’m director of the Detroit Academy of Environmental Science. We began with a Great Lakes watershed (unit) for ninth grade. This unit (on habitat restoration) is for eleventh grade. It is a Saturday and summer
enrichment program for students. We are working with the Friends of Belle Isle and the Detroit Department of Recreation’s Nature Center at Belle Isle.

22 No

- Planned for later. Just ordered the GPS units last week so they can pinpoint where they’re taking their data. So far they (my students) are using data published on the web.
- Not yet, got one in mind
- (Dropped course – took intensive Intro course last summer) Plan to!

Developing two projects: 1) We’re going to do trash collection and map to make recommendations to the city on where to place waste cans. 2) ground water modeling collecting local data - an environmental company in town is working with me on this

EXPERIENCE

19. **Have you had much individual communication from/with the course leaders and instructors? If yes, has it been helpful?**

14 Yes

**Helpful (all from the four who made it into the GIS section)**

- Usually I post questions on the discussion page. Everyone is very helpful. Everyone is jumping in with advice.
- We met with Steve Warner and Joe Kerski (USGS guy) and completed the course (through end of second section).
- C2: The guy who introduced me to VISIT comes every second or third Saturday (to Cass Tech) and I’m usually there for 5 hours. I’m there Saturdays anyway - kids come for tutoring. I work on it while they are there doing math or something. He’s (VISIT person) very helpful.
- C3: Yes, here on Saturdays (at Cass Tech).

**Not helpful**

- Can’t remember who. Someone emailed me, they (a he, I think) were curious why they haven’t heard from me in a while. I emailed him back to ask if It’s OK if I couldn’t get to the GIS part until Christmas and I haven’t heard back. This was 2 1/2 weeks ago.
- It took me 3 or 4 times emailing to find out about credit options and when grades would be available from the different crediting institutions (there was a significant time difference) - usually you know this information up front.
• One person emailed me and said that as a media specialist I should know technology well - but (I am) not (a specialist in) this technology! I have to fix and maintain the technology and computers at school.

13 No
• Not really. I could go to the watering hole or whatever and post. Beverly was the only interaction - she was encouraging.
• No. It’s kind of ironic. The gentleman in my building (is one of the course leaders), but I am not on his list. I have had zero contact from leaders.
• C1: None.

20. **Have you participated in online discussions for the course? If yes: Have you found this experience to be beneficial? Why/why not? **

20 Yes
Helpful
• Yes, although there has been confusion on where we should be posting things.
• It’s nice to get feedback.
• It was really nice to see their enthusiasm and what kind of investigations they’ve done. It was nice to see other teachers and their experiences. And they’re good resources as well - maybe down the road.
• (participated in) just a couple. (helpful) because sometimes you think you’re the only person it’s not clicking with immediately and you realize there are others its not clicking with. Also, I like seeing the views of others in other areas. For example: water, seeing how others view it. They have different issues. Another teacher said in her area they get it from underground (aquifers). We just pump it out of the river.
• I shared information about CBLs. Some discussions were beneficial - One gave information on some lessons and where I could go to get more information.

Not helpful
• Some were interesting, it was interesting to see others’ interests. But not particularly helpful at that point of the course (expect that discussions would have been more helpful in the GIS section of the course).
• Was time wasted and I don’t have time for that. You were just proving that you were online. I think that’s so stupid.
• Online discussions participated in (were) nothing really important - Water Cooler stuff. I shared information about CBLs. Some discussions were beneficial - One gave information on some lessons and where I could go to get more information.

7 No
21. **Do you see the course content as relevant for your job and the courses you are currently teaching?**

**21 Yes**
- I teach biology and AP biology. I wanted to become familiar with GIS to do something on water quality testing for ecology in May and June and want to use it for that.
- *Other reasons mentioned earlier:* Important for students to be progressive, to know how important GIS is, GIS is central to current investigation, getting students interested in science and learning, etc.

**6 No**
- Not at that point of the course (Intro to VISIT).

22. **In what ways have you benefited personally and professionally from your experiences with VISIT so far?**

- 1 I benefited from the workshop, but not from the online course.
- 1 None yet, but am sure I will. The kids will realize that science is more than something in a book.
- 6 Gaining GIS skills, software, and resources
- 2 Improving computing and technology skills
- 1 Justifying use of computers in science labs and convincing others that computers should be taught in the disciplines (instead of just as separate courses).
- 1 From reading articles and seeing the wealth of information. I'm still kind of vague on what GIS can do, but what I have seen seems pretty good.
- 1 Information to give to students involving GIS.
- 2 Networking with experts/scientists
- 2 Networking with other teachers
- 1 GIS is big, but equally important is online access to people in the field and collaborations. I am very isolated in my small school, and I hope to be able to continue with that
- 1 Professional learning/development.
- 1 Support from the organization - they seem excited about it (our project)
- 1 Validation for what we're attempting to do.

23. **To make this course and your experience better, what additional services or resources could VISIT provide?**

**Communication and Support**
• It would be nice if there was an email newsletter - gentle reminders along the way. You know - Out of site, out of mind. Something released once in a while to keep your mind on it (would help).
• From experience with other online courses, know it would be good to have back up phone numbers to contact staff instead of having to be online for contact - because systems crash.
• Should have buddy people who collaborate together - someone they can "talk" to. 
• We were assigned an individual and I could have called that person, but it’s so late when I go to work on it and I don’t want to bother anyone.

Design and Management

• They need to look at their design. In the second part Dr. Xie and Mark, it appeared like they weren’t talking to Bev. "They’re" not collaborating!
• Biggest suggestion - use the data on the CD; In face to face class go over how to download and importing data off of some site.

Timing

• make available during the summer.

Emphasis

• I liked the way it was organized basically, and with the first 3 weeks I understand why they did it that way, but I felt I was already on board with why to use it and such and wanted to get into the how. I had tried from some books on GIS on my own and not gotten very far.

Resources

• One of the web pages on VISIT lists GIS data on the web and this is helpful. You expand this or simply reinforce for the person who made it that it’s great work!
• Being a ninth grad teacher, I’d like to see it as part of a curriculum for ninth graders. It gets them interested in science (coming from eighth grade they have a lot of misconceptions about concepts and have also lost interest); And they like computers and handheld gadgets - it gets them interested in "learning."

Additional participant comments

• (From the person who completed the GIS section): I will take it (a GIS course) locally. I know how much fun I could have with it with my kids (but don't know enough about GIS to actually do any such thing).
• C1: This has been really great for me learning to do something using computers besides grades and email."
• I've been interested in GIS for a "very" long time. I went to Colorado last year, 2000, for a course. It went from June through the beginning of July. It was a geology course and we did elementary GIS. I want to learn more, to get very, very proficient with it (GIS).

Cass Tech Overview

Two dropped:
Cecile Keshishian

Dear Jodi,

Sorry it took me so long to get back to you. I will not be participating in the class. I did not realize when I signed up that it would be so involved. Since I already have a master's degree and am not too far from retirement, I really don't need the college credit. I would like to find out more about the GIS software since it will be installed on the computers in my lab but aside from that, my interest in science is nil. Sorry if I caused you any inconvenience.

Sincerely,
Cecile Keshishian

Karen Kachadurian

I did originally register for the course but I have been too busy to do any of the program.

Sorry K

The remaining four have all been interviewed at this point:

Gwendolyn Hamilton, Flonia Chillis, and Henry Cabanne, and Lenora Ashford

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

The purpose of the VISIT project is to provide opportunities for training and professional development of teachers. The development opportunities for the 20 teacher leaders were described above. 126 teachers in addition to leaders and staff logged in to the Collaboratory between January 2001 and June 2002. 84 teachers and 40 teacher leaders and staff participated in the Collaboratory during this time, to at least a minimum level of five postings.

In year 2, fourteen teachers and teacher leaders earned graduate credits from EMU for completing the course. A total of 72 credits have been awarded by EMU thus far, out of 300 available in the program. Moreover, around 140 teachers participated in one-day to five-days face-to-face and hands-on GIS workshops and summer institutes. About 300 teachers attended one-hour – four-hours VISIT project recruiting presentation and GIS demos. Moreover, 290 teachers have registered for the Fall 2002 VISIT online course, which started on October 13, 2002.
4. Describe outreach activities your project has undertaken.

Dissemination and Institutionalization Activities

The project leaders conducted several activities in pursuit of institutionalization and dissemination of the VISIT model and materials.

Michigan Virtual University - MVU

With the introduction of Randy Raymond, the VISIT PI met several times with Michigan Virtual University administration to discuss a potential state-wide ESRI K-12 GIS license and possible illustrations of GIS in classroom instruction, technical career development, and school management through the VISIT project. Dr. Xie and EMU College of Continuing Education jointly developed a proposal to Michigan Virtual University, called, The Geographic Information Systems (GIS) in the Classroom Module. This proposal was awarded in June 2002.

The Geographic Information Systems (GIS) in the Classroom Module combines an overview of the general principles of GIS with an introduction to using GIS to teach science concepts in the classroom. Through the use of demonstration lessons this module will introduce teachers to the basic technical skills needed to understand spatial data and analysis. This course will include information about the VISIT (Virtual Immersion in Science Inquiry for Teachers) program. This module will coincide with the Engineering/Manufacturing, Industrial Technology, Natural Resources and Agriscience elements of the Michigan Career Development Program.

University of Massachusetts & Boston Metropolitan Area Partnership

The Boston Metropolitan School to Career Partnership was an original partner in the VISIT project design. Deborah Boisvert, VISIT coordinator for the Boston Metropolitan Area Partnership, in the spring and summer of 2002 developed a plan in collaboration with the Dean of Education at University of Massachusetts, Boston, to incorporate the VISIT Collaboratory into a science education graduate program at UMass Boston that would combine the online Collaboratory with field studies. This plan would institutionalize the VISIT program on a regional level and provide teachers in the Boston area with graduate credit from UMass Boston. This proposal was not implemented because the PI determined that it was quite late to get all details clarified and to get resources to support. Thus, he suggested that this partnership be supported through other funding sources.

Colorado School of Mines

The graduate credits for teachers in Colorado who take the VISIT Collaboratory online course are offered through Colorado School of Mines. CSM sends out the VISIT Online Course as a class listed in CSM Continuing Education (CE) Class Schedule. CSM-CE places a small fee charge to cover processing cost ($75 for 2 credits and $150 for 4
CSM Teachers who are participating in VISIT are asking their school districts to pay CSM the processing fee.

ESRI International Education User Group Conference
The PI, Co-PI, and members of the VISIT project presented major sessions at the ESRI International Education User Conferences in the summers of both 2001 and 2002. The paper for the 2002 conference is available at http://www.piedmontresearch.org/visit/esri2002.html

Publications and Products

The VISIT Web Sites are http://www.emich.edu/visit and http://www.piedmontresearch.org/visit/index.html

Hunter, Beverly “VISIT Guide to Online Sources of Geo-referenced Data” available at http://www.piedmontresearch.org/visit/gis_data.html

Hunter, Beverly and Xie, Yichun (2001) "Data Tools for Real-World Learning" Leading and Learning with Technology, International Society for Technology in Education


GIS introduction and Integration of GIS in the Classroom by Ron Robinson, Ann Arbor Public Schools

"Best practices" presentation by John P. Bayerl from Fordson High School


VISIT Presentations from the ESRI Education Conference 2001

VISIT Newsletters

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 resources are expected to be used as a long term resource by other professional development organizations after the project grant period has ended.
Special Requirements:

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: