



ANNUAL REPORT FOR FISCAL YEAR 2000-2001

FUNDING REQUEST FOR FISCAL YEAR 2001-2002

PREPARED FOR THE  
SCHOOL/UNIVERSITY PARTNERSHIP PROGRAM

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## EXECUTIVE SUMMARY

The UC Berkeley Interactive University Project (IU) seeks to use the Internet to open the extraordinary resources and people of the Berkeley campus to thousands of K-12 teachers and learners in the Bay Area and California. A key IU goal is to make engagement with K-12 teachers an integral part of campus research and teaching. We believe that with the right models of technology use and programmatic support we can make this happen. Using the Internet to translate a faculty member's research into K-12 learning materials needs to be a manageable and seamless practice if we are to involve much of the campus community. At the same time, the IU has as its goal that Berkeley/K-12 web-based content and interactions have meaningful impact on teacher practice and professional development, and, importantly, on K-12 student achievement. If we can realize these two goals---campus wide engagement and positive impact on K-12 education, the IU will have helped to create a *new model* for the public university in the digital age: a university using the Internet to engage its core community with K-12 education at a very large scale.

These are complex and ambitious goals. They will take much work and a long time to accomplish at a large scale. The IU has structured its work in the last three years to explore how to build this new model. A primary aim of our current IU phase 2, which began in 1999 and will end spring 2002, is to understand how to develop a system for large-scale university/K-12 partnership using technology balanced with networks of collaborative communities. We have explored this question by creating an ecosystem of campus units partnering with K-12 teachers to develop web-based learning materials from Berkeley content with the aim of improving student achievement and professional development. Our Report for 2000-2001 outlines the structure and results of many of the 12 IU Internet Learning Community Projects. These projects constitute a community of approximately 25 campus units, 35 schools, 75 teachers, and 2000+ students. We are proud to report the accomplishments of campus and K-12 IU partnerships and to explain a number of other IU initiatives and awards from this last year.

In the last year, the IU has defined the broad technical and programmatic architecture for a new model of large-scale University/K-12 partnership. This Future Interactive University Model will be the foundation for our next major phase of work. We will implement this new IU Model in summer/fall 2002, and hope that it will run for three-to-five years. In the Proposal below we outline and detail this Future IU Model.

The new fiscal year, 2001-2002, is thus an important transition year for the IU. We will complete our phase 2 work, finish defining our Future Model, and then begin this new model and next major phase. In the Proposal we discuss how in the coming year the IU, as a partner in the School/University Program, can help with, and benefit from, a renewed focus on Partner Schools. The IU seeks to have a number of its projects work intensively with Partner Schools in San Francisco and Oakland to improve student achievement, support professional development, and build a stronger link to a college-going culture. By using the Internet to do this we believe the IU can build web-based materials, new practices, and knowledge that can scale to serve other K-12 schools as well.

# FINAL REPORT FOR FISCAL YEAR 2000-2001

## 1. BACKGROUND

### 1.1 MISSION, GOAL, AND OBJECTIVES

The mission of the Interactive University Project (IU) in FY 2000-2001 has been to develop a national model of how a public university can best use the Internet to support K-12 teachers, students, their families, and local communities. Our overarching goal for the current three-year phase (1999-2002) has been to develop the foundation for large-scale, Internet mediated learning communities among the University, K-12 schools, and adjacent communities. To accomplish this goal, the IU has developed several objectives based on experiences and lessons learned over five years of work:

- Enable teachers to use technology to improve teaching and learning;
- Enhance student achievement;
- Foster collaborations and common educational culture between the campus, schools and community;
- Promote the integration of teaching, research, and service; and,
- Identify effective, scaleable and sustainable Internet-supported outreach methods.

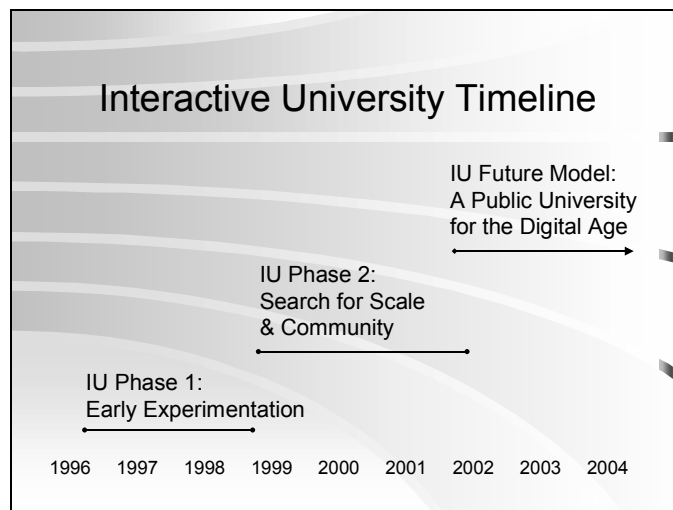
To realize these objectives, the IU defined an integrated system of activities and programs for its current phase of work. Each component was designed to support and reinforce the others and lay the foundation and structure to support large-scale learning communities supported in part through by Internet technologies. These components include:

- Internet Learning Community Projects (ILCPs);
- After-school community technology center to link in-school and after-school work using the Internet;
- Collaborative technology leadership to train teachers and campus partners to work together using new technologies;
- Web technologies and tools to provide places for online discussion and publication, libraries of digital learning materials, and a channel for news about the best uses of technology to improve teaching and education; and
- Evaluation and research that examine the work-in-progress to enhance and refine the model.

These components make up the core work of the IU, define its intervention strategy, guide the growth of existing and emerging partnerships within the campus and with Bay Area districts and schools, and highlight the importance of ongoing evaluation and assessment.

## 1.2 HISTORY AND TIMELINE

Beginning in 1996, the Interactive University Project has sought to use technology, at a large scale, to link the people and content resources of the University to Bay Area and California K-12 teachers, students, and families. The IU is concluding its second phase of work, which will run for a little more than three years from January 1999 to spring semester 2002. The structure of this work evolved from initial explorations and assessment carried out in the IU's initial two-year phase of work, 1996-1998. (Extensive internal and external evaluations of IU's phase 1 work are available at our website, <http://iu.berkeley.edu>). This report documents the work of the Interactive University Project in Fiscal Year 2000-2001, including its operations and accomplishments, lessons learned, and plans for future work. The IU's work should be looked at in the context of its long-term goal to use the Internet to open up the unique resources of Berkeley to K-12 teachers and learners at a very-large scale. We hope to make it possible for many campus faculty and units to use technology wisely to engage with K-12 schools, even on a small scale. And we hope to enable thousands of K-12 teachers to access and use Berkeley resources to improve teaching and learning. In this way, we seek to create a university for the public in the digital age. The IU is currently preparing for its third phase of work, in which we seek to realize this goal. This future IU model will begin fall semester 2002, with transition to this phase taking place in spring and summer 2002.



The IU is a central campus program led by Executive Vice Chancellor and Provost Paul Gray, the campus' chief academic officer, and Berkeley Chief Information Officer Jack McCredie. Since its inception in 1996, the IU has maintained a central focus on supporting the work of the core academic and research community at the campus. As part of the Information Systems and Technology organization, the IU is able to partner with many campus units and to provide technology and programmatic leadership.

The IU supports and integrates the work of units that have a common interest in using the Internet to share their content and expertise with K-12 educators, learners and the community; in this sense, the IU is a program of programs. Over two-dozen departments, institutes, libraries, museums and research and academic units from major disciplines on

campus participate in IU-supported Internet Learning Community Projects (ILCPs). These include approximately 50 faculty and staff, and over 100 undergraduate and graduate students, as well as local K-12 district staff, teachers, and students. The ILCP's have been formed in close partnership with the Oakland and San Francisco Unified School Districts. They are unique K-12 and university collaborative communities that illustrate the benefits of K-12 and University representatives working together to identify, transform, translate and make available University content for K-12 teaching. During the 2000-2001 fiscal year, ILCPs have continued their work with over 35 schools and 70 teachers in the Bay Area, impacting an estimated 2500 students.

### **1.3 ORGANIZATION: PARTNERSHIP STRATEGIES AND EXPECTED OUTCOMES**

The IU's organization seeks to achieve its goals and objectives in a coherent and effective way, nurturing partnerships and learning about emerging best practices through ongoing reflection and evaluation. This section describes the core components of the IU's work and specific objectives for the period encompassing the 2000-2001 fiscal year.

#### **A. INTERNET LEARNING COMMUNITY PROJECTS (ILCPs)**

A central part of IU's work is to support and facilitate the successful operation of Berkeley/K-12 partnerships through the work of IU Internet Learning Community Projects (ILCPs). The IU provides over \$300,000 a year in grant funding to campus units to support ILCPs. The core work of each ILCP involves:

- work with a team of K-12 teacher leaders to build high-quality digital learning materials based on Berkeley content;
- test and evaluate these materials in the classroom;
- improve student achievement
- explore communication and collaboration tools and practices for the group's work;
- support teacher professional development using technology;
- define best practices for Berkeley/K-12 technology-supported outreach activities;
- share digital materials and practices with others;
- help the core IU team figure out how we can build a larger, campus-wide program.

The essential ideas behind ILCPs include:

- create and support the growth of strong teams of Berkeley and K-12 partners;
- jointly develop web-based digital learning materials, driven by school standards and curricular needs, that make the best use of materials and people at Berkeley;
- explore how technology can be integrated into classrooms in pedagogically sound ways;
- provide leadership development opportunities for teachers and district specialists so that they can help to support professional development in their districts;

- use and evaluate web-based materials and activities in classrooms to improve student achievement;
- select the best web materials for publication and dissemination throughout the district.

In defining the work of ILCPs in this way, our intent was to build a structure with the potential to scale from the start: by developing web-based activities and curriculum, we expect to have flexible and scaleable learning objects and materials which are available for dissemination. Our focus is on developing these materials in supported partnerships between UC Berkeley and local districts; our intent is to find ways to support ongoing communication and collaboration between the University and schools. By training teacher leaders and working closely with curriculum specialists, we expect to develop a cadre of K-12 partners who can train other teachers on how to access and use Berkeley-based digital resources and curriculum materials.

For the reporting period, the twelve ILCPs supported by the IU focused their work on five areas:

- student achievement and assessment;
- teacher professional development in the use of the Internet to improve teaching and learning;
- production of digital learning materials and identification of effective teaching and learning strategies using the Internet;
- collaborative learning relationships facilitated by the Internet; and,
- dissemination of progress and outcomes with school personnel, families and communities.

We also note that in addition to the ILCPs, the IU, as a major partner in the San Francisco Unified School District's National Science Foundation (NSF) Urban Systemic Program (USP), led an Information Technology Pathway program working to build a pathway from high school, to college, to careers. In collaboration with staff at SFUSD, the IU has defined the core structure and curriculum for this program, provided extensive teacher professional development and graduate and undergraduate student teacher assistants, and carried out evaluation and research of the pathway. This is a significant program that will continue into the coming fiscal year. A profile of the program's work is found later in this report in the discussion of student learning and professional development.

## **B. AFTER SCHOOL COMMUNITY COMPUTING CENTER**

During 2000-2001 the IU sought to create and support safe places, at schools and in community based organizations, where students and family members can come during non-school hours to learn, explore and interact using technology. The Expedition after school program, an IU-supported project that brings together UC Berkeley's Archeological Research Facility, the Roosevelt Village Center community collaborative and Oakland Unified School District, illustrates the implementation of this objective. The shared program goals are: to enhance educational opportunities of low-income

children in Oakland; to provide a safe and enriching after-school environment for these children; to develop critical thinking and literacy skills; to provide access to computer technology; and, through the use of computer-based tools and archeology as a learning framework, to facilitate and motivate children to create their own stories and artifacts and to explore their communities in the context of the world beyond their neighborhoods. See Appendix 2 for a detailed case study of the Expedition program.

### **C. TECHNOLOGY LEADERSHIP DEVELOPMENT AND COLLABORATION**

Throughout its work, the IU, supports the exploration of Internet technologies to facilitate communication and collaboration among diverse and geographically dispersed teams. This has created leadership opportunities within the campus and at Oakland and San Francisco Unified School Districts, and remains an especially important objective that will support stronger partnership and the wise use of technology. Developing a cadre of technology leaders in schools and the university who know how to use a variety of technologies to work together will enable the IU and UC Berkeley to establish a foundation of trained and experienced personnel around which a larger Internet mediated University-school- partnership can be built, expanded, and sustained.

Specific objectives for the reporting period included:

- continued development of technology-supported partnerships with teachers and school personnel;
- identification of teacher leaders for technology professional development;
- design and implementation of professional development programs for teacher leaders;
- support for campus units and organizations in the critical evaluation and implementation of information technologies to facilitate communication and collaboration.

### **D. WEB-BASED COLLABORATIVE TOOLS**

During the 2000-2001 period, the IU continued to explore and evaluate existing and emerging Internet-based technologies that seek to support joint work and collaborations across social contexts. The overarching objectives have remained to identify, adapt and implement easy-to-use and powerful tools to support collaborative relationships, and to provide access points for the wealth of expertise and unique materials housed and developed at UC Berkeley. Specifically, the IU sought to find web-based places to foster communication and collaboration; develop a library of digital learning materials (DLMs); identify exemplary projects and teaching practices; and publicize best practices in the use of technology to improve teaching and learning through electronic publication and distribution.

## 1.4 EVALUATION AND RESEARCH

The IU prides itself on having developed a culture of reflective practice. From the start of its work in 1996, the IU, in partnership with the Graduate School of Education, has developed and administered a comprehensive evaluation plan, devoting substantial resources to this effort. The plan is designed to assess several broad issues—enhanced student achievement; increased university/K-12 collaboration; integrated research, teaching and community service; identification and assessment of technology related needs such as training, infrastructure, technical support, and best practices in Internet-mediated University/K-12 partnerships. These issues are assessed through specific instruments (pre- and post-questionnaires, and individual and focus group interview protocols) designed for IU project target audiences in K-12 and University settings. The evaluation employs the descriptive survey method as described by Leedy (1985) and Miles and Huberman (1984), and quantitative analysis of questionnaire data will provide descriptive information about specific target groups.

The scope of our work requires a two-tiered evaluation plan comprising two primary levels: 1) Micro-level: pertaining to individual ILCPs, and, 2) Macro-level: pertaining to broader measures. The micro-level evaluation focuses on key issues of student achievement and outcomes resulting from the use of digital learning materials (with curriculum embedded assessments) developed through ILCPs. The macro-level evaluation addresses project-wide issues of collaborative work, focusing on key learning experiences, effective strategies for impacting student outcomes, and recommendations.

For the 2000-2001 reporting period, the evaluation and research team developed several objectives:

- Continue macro-level evaluation by conducting teacher focus groups in San Francisco and Oakland school districts;
- Develop supplementary data for macro-level evaluation through the administration of online surveys for teacher and project participants;
- Assist ILCPs in developing student outcome instruments, administering these instruments in classrooms, and analyzing collected data;
- Conduct a formative assessment with San Francisco Unified teachers and students on the implementation of a National Science Foundation (NSF) supported Urban Systemic Project grant focusing on Information Technology (IT) Pathways and classroom technology integration.

The IU is pleased to report that this semester the IU was chosen by the U.S. Department of Commerce Technology Opportunity Program as one of three model projects nationwide for its evaluation report and methods (note that the IU received substantial grant funding for this work from the Department of Commerce in its first phase).

The IU's will complete its full micro- and macro-level at the end of IU phase 2---spring semester 2002. Individual ILCPs will be reporting the results of their micro-level analysis and the IU evaluation team will complete the analysis of focus groups and final

surveys at this time. In the interim, we present in the results section below preliminary data on student outcomes, professional development, curriculum development, and other key IU work based on early quantitative and qualitative analysis from a range of IU projects. (See the case studies in Appendix 2 for more detailed information on evaluation methods used by different projects).

## **2. RESULTS AND ACCOMPLISHMENTS**

This section describes the IU's successes based on objectives for the 2000-2001 period, using excerpts from short case studies of IU projects to illustrate our work and highlight campus unit participants. We begin with a review of work related to student learning, teacher professional development, and curriculum materials. We conclude the section by highlighting ways in which the IU continues to develop scalable models for how UC Berkeley, as a research and teaching institution, can undertake to better share its content and human resources with large and diverse K-12 and community audiences. In the following major section, section 3 on Collaborations, we explain the IU's partnerships with schools, collaborations among Berkeley units, and an exciting new program that enhances and strengthens these connections. Together, these discussions will provide the backdrop for understanding in our proposal how the IU's next major phase of work defines a new model for integrating research, teaching and service at UC Berkeley.

### **2.1 STUDENT LEARNING, PROFESSIONAL DEVELOPMENT, AND CURRICULUM MATERIALS**

A central component of the IU is the creation and support of Internet Learning Community Projects (ILCPs). For its second phase of work, between 1999 and 2002, the IU is supporting 12 projects. Each ILCP is led by a campus department and includes teacher leaders from two or more schools, technology specialists, curriculum or literacy specialists, a district liaison, and an IU program manager and/or technology consultant. The projects are listed here, and descriptions detailing activities and participants are included in Appendix 1.

- [Archaeological Research Facility Project](#)
- [Bay Area Writing Project: Teaching Writing and Technology Project](#)
- [California Heritage Project](#)
- [Connecting Students to the World](#)
- [Office of Resources for International and Area Studies: History through Literature](#)
- [Integrating Science, Teaching, and Technology](#)
- [Project FIRST: Foundations in Reading through Science and Technology](#)
- [Center for Latin American Studies: Exploring Latin America](#)
- [College of Natural Resources: CityBugs Project](#)
- [Environmental Science at Galileo Academy of Science & Technology](#)
- [Electronic Cultural Atlas Initiative: Cultural Exploration](#)
- [Local Context Project: Institute of Government Studies](#)

Each ILCP is charged with developing standards-driven, web-based digital learning materials from high-quality Berkeley digital content that can have a positive impact on student achievement and teacher professional development and practice. ILCPs have pursued different strategies and focused in different ways on student learning, teacher practice, and curriculum development. Recognizing the variety of skill levels, disciplinary focuses, and teacher team experience, the IU encourages ILCPs to explore a range of methods for using the web and learning technologies to develop scaleable digital learning materials. Below we provide case study excerpts and highlights from many of the IU projects.

One important example of an ILCP developing standards-based, content-rich learning materials able to improve student learning and teacher professional development, is the ISTAT project: Integrating Science, Teaching and Technology.

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### ***Integrating Science, Teaching and Technology (ISTAT) – Case Study Excerpt***

ISTAT is a collaborative project between the San Francisco Unified School District (SFUSD) and four science units of the University of California, Berkeley: The Berkeley Seismological Laboratory, the Center for Particle Astrophysics, the Center for Science Education at the Space Sciences Laboratory and the UC Museum of Paleontology. Tapping the rich assortment of online data and materials available at UCB, ISTAT is creating a suite of inquiry-based digital science curriculum materials for grades 6-9. These materials support science standards of the SFUSD, focusing on Earth and Space Science. ISTAT has been working with SFUSD teachers for five years, through two IU project phases. Phase I (1996-1998) was primarily a time for assessing needs and developing awareness and partnerships. Phase II (1999-2001) is focusing on materials development, implementation, evaluation, dissemination and professional development. The project goals are to improve student comprehension, performance, and appreciation of science; to support science teachers in content knowledge, pedagogy, and the use of technology; and to disseminate technology-based science curriculum beyond the immediate partners.

#### ***Materials Development***

Through this Berkeley/K-12 collaboration, ISTAT has developed and implemented various materials, as well as engaged in professional development and evaluation activities. Products developed over the last 5 years include:

- Nine web-based modules covering earth, space and physical sciences for grades 6 through 9, including embedded assessment tools and teacher resource materials
- A digital curriculum guide (DigiGuide) which provides easy access to modules described above, available at: <http://www.ucmp.berkeley.edu/iu/template/itilepgnew.html>
- An Earth Science Scope and Sequence for 9<sup>th</sup> grade which includes outlines to cover 6, 9 and 12 week courses, embedded assessment tools and teacher support materials. Available at: <http://perry.geo.berkeley.edu/seismo/istat/9th/feature/feature.html>
- A six-week earth science unit for 6<sup>th</sup> grade with resources and activities
- Four two-week curriculum units for Summer Step-Up programs.
- *Earth Science News*: a monthly feature developed by UC team members that takes current events and news stories related to earth sciences—volcanoes, fossil finds, earthquakes—collects them and suggests ideas for classroom use. *Earth Science News* is published during the academic year.

#### ***Professional Development***

Professional development (PD) and dissemination activities are a second major focus of the ISTAT project. For these activities, ISTAT members work closely with participating SFUSD teachers in presenting and training other teachers. This approach emphasizes teachers'

leadership development and highlights the nature of a close partnership. Over the last five years, ISTAT has worked directly with seventeen teacher leaders, providing training in content specific areas, technology and pedagogy. During the 2000-2001, professional development and dissemination through ISTAT included: two site presentations conducted jointly with lead teachers (6 teachers); training and presentation during SFUSD's district-wide professional development day (approx. 65 teachers); participation in SFUSD's Inquires Institute (6 teachers); one full-day workshop for 9<sup>th</sup> grade science teachers (approx. 20 teachers); and one full-day workshop for science teachers participating in the Inquires program and focusing on physical and space science (approx. 20 teachers).

### *Evaluation*

Materials implementation and dissemination have included formative and summative evaluation efforts. In conjunction with the Center for Particle Astrophysics, one 8<sup>th</sup> grade teacher conducted pre- and post-tests for a unit exploring forces and motion concepts within physical science standards. Data gathered was analyzed and used to refine student materials and lesson plans, teacher comments and continued work with ISTAT team members suggested ways to improve preparatory teacher materials, suggested activities and teaching methods.

### *Student Outcomes*

As part of their science curriculum, ninth grade students in four classes at Galileo High and four classes at Mission High participated in ISTAT projects focusing on the structure of the Earth and the theory of plate tectonics. At both high schools students took a pre-test, learned the material, and took a subsequent post-test. While

the tests also included non-ISTAT material, for the purposes of this analysis, only ISTAT-related questions that were on both the pre-tests and post-tests were analyzed.

At Galileo High data were available for a total of 43 students, 30 female, 13 male, across 4 classrooms taught by the same teacher. A comparison of the 18 pre-test and post-test items shows that overall students scored 30 percent higher on the post-test. In the three conceptual clusters covered in the pre- and post-tests, students also increased their scores, scoring respectively 18 percent, 33 percent, and 37 percent higher. Male students increased their overall score by 25 percent, while female students increased their overall score by 31 percent.

At Mission High data were available for a total of 48 students, 24 female, 24 male, across 4 classrooms taught by the same teacher. A comparison of the 24 pre-test and post-test items shows that overall students scored 15 percent higher on the post-test. In the four conceptual clusters covered in the pre- and post-tests, students also increased their scores, scoring 18 percent, 10 percent, 22 percent, and 7 percent higher. Male students increased their overall score by 20 percent, while female students increased their overall score by 11 percent.

While analysis of the data is in process, preliminary results suggest that students in classes where ISTAT materials were used scored significantly higher in post-tests. Final results and analysis of these data will be available in the coming months. A more detailed description of ISTAT's work is included in a short case study presented in Appendix 2.

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During 2000-2001 the IU continued the support of after-school community technology programs. The Expedition after school program, an IU-supported project that brings together UC Berkeley's Archeological Research Facility, the Roosevelt Village Center community collaborative, and the Oakland Unified School District, illustrates an important area of IU work.

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## *Expedition—Computers and Archaeology After School – Case Study Excerpt*

The Expedition after school program partners the Interactive University Project with the Archaeological Research Facility, the Roosevelt Village Center community collaborative, and the Oakland Unified School District to address shared youth development goals. The shared program goals are: to enhance the educational opportunities of low-income children in Oakland; to provide a safe and enriching after-school environment for them; to help develop their critical thinking and literacy skills; to provide access to computer technology; and, through the use of computer-based tools, with archaeology as a learning framework, to facilitate and motivate children to create their own stories and artifacts and to explore their immediate community in the broader context of the world beyond their neighborhood.

Expedition follows the UC Links after school model originally developed by researchers at UC San Diego. UC Links programs are designed to link the University with K-12 students by creating activities that promote problem-solving, decision-making, and creative thinking skills in a warm, supportive environment emphasizing learning, play and technology. Expedition involves UC Berkeley faculty, staff, and students directly with sixth graders through a service learning course, Anthropology 128, Archaeological Practice in a Sixth Grade After-school Program. This course provides undergraduates with a survey of anthropological, archaeological, pedagogical and social theories related to the program's goals. It also gives students a unique and socially responsible field study experience. This allows them to develop their skills in participant observation, creating ethnographic field notes, and developing research questions to be answered with their own field data. This course also fulfills the field methods requirement for Anthropology majors.

The primary focus of Expedition is to provide an environment where children can spend time with adults in playful activities that are fun, but that also enhance their computer skills and engage

them in critical thinking, reading and writing. The “hidden” educational agenda of Expedition drives the highly structured focus of our “play” activities. Each educational game or activity has a pre-defined set of tasks that must be accomplished to move on to other levels or games. These are laid out as beginner, good, and expert tasks. This structure provides children the opportunity for strategizing and planning activities that are missing in a freer play setting. Another key objective is for the children and the UC Berkeley students to interact and play in a non-hierarchical setting. Adults are instructed to encourage children to read the instructions themselves and to make their own decisions. They act as older brothers or sisters in this environment, providing hints, encouragement and companionship. They do not teach in the traditional sense or act as experts. When children work and play with university students who share some of their cultural backgrounds, we have seen an increase in self-esteem and confidence. Through role modeling, we hope to inspire Roosevelt's students to pursue higher education as an attainable and worthwhile life choice.

Throughout the year the Expedition staff and Roosevelt teachers noticed gains in self-confidence, cooperative problem solving, reading and writing skills, content knowledge of ancient history, and computer skills. In summary, we found that the Expedition after school program stimulated confidence and learning in many children, but most notably among youth who are shy and silent in larger groups. These are often students who need extra patience and attention with their emerging English skills. They are students who have difficulty sitting still and listening all day. They are young people who do their best “work” and their best learning in a small group. This supportive environment is created with a rich array of activities, a very small adult to child ratio, a purposefully non-hierarchical role structure, and an overall goal of fun.

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An expanded description of the Expedition program, including several participant quotes, is included as a short case study in Appendix 2.

Another key example of IU work—carried out in partnership with San Francisco schools—is the NSF Urban Systemic Program’s Information Technology (IT) Pathway Project.

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***SFUSD’s Urban Systemic Program IT Pathway – Case Study Excerpt***

The Urban Systemic Program’s (USP) Information Technology Pathway is a five year partnership program with San Francisco Unified School District, funded by the National Science Foundation (NSF), and designed to improve K-12 math, science and technology education and prepare students for college and careers. The IU is currently entering its third year of work as the technology partner of the USP. In year one, the IU worked closely with SFUSD to develop curriculum and staff development opportunities to enable schools to develop IT Pathways. This included developing curriculum, introducing Internet tools and work-based learning activities for USP teachers to develop and adapt in their classrooms. In year two, the partnership successfully pilot-tested the IT Pathway curriculum and training in one high school, John O’Connell, and completed a formative evaluation to support and inform the expansion of this program to other SFUSD high schools developing an IT Pathway. In this pilot year, ten Introduction to Technology Courses were offered to all 218 incoming 9<sup>th</sup> grade freshmen students. In the remaining three years, the focus of this collaboration will be to continue to build and expand IT Pathways to other high schools, possibly including Mission, Burton, and Marshall, and conduct an intensive evaluation of this work.

Consistent with NSF concerns, evaluation research is a major focus of the USP IT Pathway project. The evaluation design incorporates a one-year formative evaluation stage and three-

year summative evaluation process, including the collection and analysis of qualitative and quantitative data. The formative evaluation is designed to collect and share, with program managers, planners and staff, information that will lead to the modification and/or improvement of the IT Pathway program. The four stages of this process included: (1) setting the boundaries of the summative evaluation; (2) selecting appropriate evaluation methods; (3) collecting and analyzing information; and (4) reporting findings about changes to be made in the program for its future implementation.

Close, intensive work with John O’Connell high school lent itself to a case study methodology for the formative evaluation. From working collaboratively with participating teachers, students and administrators over the year, three areas were identified for research during the formal, summative evaluation: (1) students’ learning outcomes, e.g., are students able to use the technology they learn in an introductory Pathway course in other academic classes; (2) the effectiveness of the staff development training e.g., are teachers able to work collaboratively and integrate technology across subject areas thus preparing students for the demands of college and professional work; and, (3) the responsiveness of the school administration to restructuring its organization around an IT Pathway, e.g., are high schools able to break from traditional subject courses by integrating courses around a career theme.

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A short case study of IT Pathway is included in Appendix 2. The following examples of other IU projects and partnerships illustrate the heterogeneity of the work carried out by Berkeley/K-12 partnerships in support of student learning, teacher professional development, and the creation of learning and curriculum materials.

## ***“Urban Dreams” in Oakland High Schools***

*Strategies for teaching reading, writing and thinking skills with technology*

Urban Dreams is a project of the Oakland Unified School District’s Office of Instructional Technology. Funded by a five-year U.S. Department of Education Technology Innovation Challenge Grant, the project supports the work of high-school History and English teachers by providing access to appropriate technology tools and professional development opportunities. The IU/OUSD Urban Dreams collaboration began with the submission of the initial proposal, and IU continues to play a major role carrying out the work funded by this grant.

Of the five Urban Dreams Partner Projects, three are also IU Internet Learning Community projects: California Heritage, Connecting Students to the World, and Exploring Latin America. The two other Urban Dreams projects are: "Negotiating Unresolved World History Problems" (a joint project of The Contemporary World History Project at Stanford and The World Affairs Council), and The Martin Luther King, Jr. Papers Project at Stanford University. Each of the projects uses the thematic context of Human Rights and Civil Rights as a focus for teaching and learning. Students and teachers, through the innovative use of technological resources, explore this theme in history and literature.

For two weeks in July, 2000, the Oakland Unified School District’s Urban Dreams Project conducted summer workshops that featured presentations by each of its five Partner Projects. High-school History and English teachers attended the presentations and did work that included: meeting in study groups; focusing on teaching to standards; and exploring course content and the connections between content, technology, textbooks, and the district standards. The goals of the Institute were to provide teachers with improved knowledge in content areas; new strategies for teaching expository reading, expository writing, and historical thinking skills; and tools and techniques to integrate technology into their classrooms.

### ***Environmental Science-2***

During August 2000, at the Presidio of San Francisco, the Urban Watershed Project conducted a five-day teacher symposium to develop digital learning materials for online courses in Environmental Science for San Francisco high school students. The Urban Watershed Project and the Environmental Sciences Program at SFUSD's Galileo Academy of Science and Technology are partners in IU's Environmental Science project at the Academy.

The project focuses on environmental restoration at the Presidio of San Francisco, specifically in the Tennessee Hollow Watershed, an area where the Urban Watershed Project is spearheading restoration activities. UC undergraduates studying restoration issues at the Presidio meet Galileo High students and follow up with e-mail mentoring as part of the process.

During the summer and throughout the 2000-2001 academic year, teachers developed a working draft for environmental sciences lesson plans and modules. The curriculum was developed and piloted by the teachers, and upon final completion will be considered for adoption by the SF school district. Activities for the 2000-2001 academic year included the distribution and implementation of the curriculum to more school districts in the Bay Area, with teachers already involved in the Oakland and Berkeley Unified school districts.

### ***The California Heritage Project***

How can teachers and students most effectively use UC Berkeley's digital library collections to enhance their understanding of California's history and culture? This is the challenge of the California Heritage Project, which brings the California Heritage Collection directly into the classroom for the first time.

The California Heritage Collection is an online archive of over 30,000 digital images and manuscripts documenting California's history and culture. Selected from the special collections of the Bancroft Library at UC Berkeley, the themes in this comprehensive database are as rich and varied as California's multi-faceted past. Highlights include materials covering indigenous California peoples and early California exploration, the Gold Rush and the 1906 San Francisco Earthquake, scenes from California's changing landscape, portraits of notable Californians, and selections from contemporary California history.

In early June 2001, the California Heritage Project in partnership with the Bay Area National Digital Library (BANDL) and the Bay Area School Reform Collaborative (BASRC) hosted a digital curriculum expo at the Zeum in San Francisco's Yerba Buena Gardens. The program demonstrated to nearly 200 participants how teacher and school librarians have made use of high quality materials from Internet-based digital libraries. Participating school teams demonstrated curricula developed over the academic year that promote classroom inquiry-based activities and use materials from digital libraries.

### ***SFUSD-CLAS Latin American History Project***

Eight San Francisco Unified School District (SFUSD) teachers participated in the Latin American and Latino History Project (LAHP) Summer Institute held at the Center for Latin American Studies (CLAS) at UC Berkeley during the summer of 2000.

The institute included a combination of lectures and discussions with Berkeley and other invited faculty, as well as working time for group research and materials preparation. The central CLAS goals are: to develop content-rich digital learning materials to supplement existing curriculum within San Francisco's classrooms and schools; to establish collaborative relationships among Berkeley faculty, staff and students and K-12 teachers and students; and to develop innovative and effective ways to integrate technology into classroom activities in pedagogically-sound ways.

Commenting on the Summer Institute activities, Patricia Spencer, SFUSD liaison to UC Berkeley, noted, “On three separate days, teachers were able to explore content through lecture and discussion presentation. Teachers were able to research content areas of interest using UC Berkeley libraries and CLAS resources. With the guidance of CLAS staff and affiliated students, Alison Shepard, SFUSD Teacher on Special Assignment, and Walter Brem at Bancroft, they began construction of curriculum units that are focused and robust.” Teachers continued preparing digital learning materials through the use of a *CourseInfo* web site and through small group meetings and professional development days hosted at Berkeley and SFUSD's curriculum office.

### ***Office of Resources for International and Area Studies (ORIAS)***

As students in middle and high school expand their knowledge of world history, teachers have the opportunity to introduce links between the historical and modern world. At the ORIAS summer 2000, institute over 40 teachers from nearly 20 districts in Northern California considered continuity in the history curriculum by spending a week with colleagues and University scholars looking at the legacies of historic conquest, colonialism, and myth in modern nation building.

The summer institute was co-sponsored by the Centers for African Studies, Latin American Studies, Middle Eastern Studies, South Asian Studies; the Institute of East Asian Studies; the Institute of Slavic, East European and Eurasian Studies; the Institute of European Studies; and the International and Area Studies Teaching Program.

Summer work was complemented by a series of five Saturday institutes for teachers, held monthly between October 2000 and March 2001. During these institutes, teachers, assisted by Berkeley academic staff, considered how to employ increasingly available Internet materials, such as video, audio, and unique image files. ORIAS program director Michele Delattre explained that while teachers are trained to teach from textual and verbal materials in a number of methods and approaches, there is less information out there about building skills for teaching from visual examples—particularly from the materials now available on the Internet. Using pictures and visual representations of some of the world's oldest religions and civilizations, the ORIAS Saturday institutes aim to help teachers develop those skills.

### ***Library of UCB/K-12 Digital Learning Materials***

The 2000-2001 school year culminated with the web-publication by the IU of a Digital Learning Materials (DLM) Index—a compilation of some of the online resources developed by the [Internet Learning Community Projects](#). The recently compiled IU archive contains a first sample of the DLMs produced by the ILCPs during the current phase of IU work. The Index can be accessed from the IU website. While this is just a beginning, and we expect to regularly add to the resources in the index, you can now find recently developed learning materials--created by local teachers and students in collaboration with the IU Projects.

The DLM Index includes: images, interviews, lesson plans, activities, and data sets. Material from seven of the IU's twelve current projects will be found in the index; subject areas are in the humanities and sciences, and cover topics for K-12 students. We expect to enlarge the index regularly, and to soon have each of our projects represented.

## **2.2 DEVELOPING SCALEABLE MODELS FOR SHARING UNIVERSITY RESOURCES**

The mission of the Interactive University project is to find ways for the University to make its tremendous human and content resources available to K-12 schools with informed and thoughtful use of the Internet, in effective and scaleable ways. To accomplish this, the IU has developed a culture of reflective practice through evaluation, research, public forums, and experimentation with programmatic structures and emerging Internet technologies. This developmental approach to our work is essential if we are to build a national model for connecting a research university and K-12 schools. This section describes selected accomplishments in 2000-2001 by the IU core team and IU projects in the development of models for the dissemination of university resources via the Internet to K-12 partners.

### **A. AWARDS AND CITATIONS**

#### ***HUD Best Practices Award for OCII Conference***

In recognition of the leadership role the IU and UC Berkeley played in the planning and implementation of the February 2000 "Oakland Connects" conference about the digital divide, the U.S. Housing and Urban Development Department presented a Best Practices Award to the IU and UC Berkeley during July of 2000.

#### ***Evaluation Report Selected as Outstanding Model by U.S. Department of Commerce***

We are proud to report that in April 2001 the U.S. Department of Commerce selected as "outstanding" the IU's final evaluation report for work conducted under a Technology Opportunities Program (TOP) grant. As an "exemplary project" the report has been made available at the TOP web site for prospective applicants. Researchers can review project problems, details about how they were resolved, conclusions drawn from the work, and recommendations for improving similar projects. The report, also available at the main IU web site (<http://iu.berkeley.edu>), evaluates the IU's first phase of work from 1996 to 1998.

#### ***Finalist for EDUCAUSE Award for Exemplary Practices in Information Technology Solutions***

Though award winners will not be announced until September, 2001, we are pleased to report that EDUCAUSE, the premier association of higher education technology professionals, has selected the Interactive University as one of its finalists in the

competition for exemplary practices in information technology solutions. "The award program honors campus projects that have identified and solved significant problems with creativity, efficiency, and effectiveness worthy of emulation -- to serve users, provide for professional development of campus constituencies, or otherwise apply the potential of information technologies to the business and mission of the institution." (<http://www.educause.edu/awards/>)

## B. CAMPUS PROJECT MODELS FOR DISSEMINATION OF RESOURCES

While proud to be recognized through leadership opportunities and awards, the IU's ongoing reflection and evaluation suggest that more research and better understanding of technology and programmatic structures is necessary. To this end, the IU continues to identify, adapt, and implement easy-to-use and powerful tools to support collaborative relationships, and to provide access points for the wealth of expertise and unique materials housed and developed at UC Berkeley. One example of these efforts is Connecting Students to the World, an educational program produced by Harry Kreisler, Executive Director of the Institute of International Studies at UC Berkeley. The description below is excerpted from a short case study included in Appendix 2.

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### *Connecting Students to the World – Case Study Excerpt*

The (CSW) program uses the Internet and the World Wide Web to further collaboration between the University and K-12 educators. At the heart of the program is Conversations with History, <http://globetrotter.berkeley.edu/conversations/> which features interviews with distinguished men and women from all over the world who talk about their lives and their work. There are 200 one-hour videotaped interviews in the archive and approximately twenty to thirty are added each academic year. Close to one hundred have been posted on the World Wide Web in text with images and video.

Connecting Students has worked closely with teachers from over 10 different schools. In addition to Oakland and San Francisco School Districts, we are working with Monterey and Mendocino School Districts and several private schools. We have also made presentations at Columbia University, NYU, the California State Library Convention, and to *EDUCAUSE* conferences in Orlando and Long Beach.

Started in the fall of 1996, Connecting Students to the World (CSW) is an educational program developed and produced by the Institute of International Studies at the University of California, Berkeley. The Institute of International Studies, established in 1955,

promotes interdisciplinary research in international, comparative, and policy studies. Professor of Geography [Michael Watts](#) is its Director, and [Harry Kreisler](#) is the Executive Director. The current emphasis is on the following intellectual themes:

- [Peace and security after the Cold War](#)
- [Environment, demography, and sustainable development](#)
- [Development and comparative modernities across regions](#)
- [Globalization and the transformation of the global economy](#)

To implement this research and training agenda, the Institute has several major [research programs](#), and provides support to Berkeley faculty and fellowships to Berkeley graduate students. Ongoing research colloquia bring together faculty, advanced graduate students, and visiting scholars for discussions. The Institute hosts distinguished visiting fellows who participate in Institute programs while in residence at Berkeley. Its [public outreach](#) programs include lectures, forums, and conferences. The Institute also produces videotaped interviews with distinguished international figures, and these are a regular feature on UCTV. The Institute's award winning

web site at <http://globetrotter.berkeley.edu> is a pioneer in using the World Wide Web to link academic research in global affairs to policymakers and the general public. Because of these resources, the Connecting Students to the World (CSW) program is a unique effort to translate academic research on international/global issues into a form useable by high school students throughout the world.

The site has been recognized for its outstanding achievement by the National Endowment for the Humanities, the New York Times, the Scout Report, Cal Monthly, MSNBC, USA Today, Netscape, and Lycos. Globetrotter, the server for the Institute's site, which houses the K-12 outreach program, receives on the average 160,000 hits per week. K-12 sites throughout the country have linked to our site.

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The evolution of Internet Learning Community Project structures and their partnerships with district personnel and teachers suggests their overall effectiveness in bringing together University content and resources with K-12 educational practitioners—curriculum specialists from the district and pedagogically effective classroom teachers from neighborhood schools. One important example of this work is the City Bugs project from the College of Natural Resources. The project has opened up its rich resources in creative and effective ways, while experimenting with service-learning courses, conducting teacher professional development sessions, and holding contests for area K-12 students.

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### ***City Bugs – Case Study Excerpt***

The College of Natural Resource's (CNR) City Bugs Projects is also sometimes known more formally as Exploring Urban Biodiversity. Early goals of this project included developing an online insect taxonomy field guide and classroom lessons and activities that will support teachers in the standards-based exploration of their local ecology while gaining an appreciation for biodiversity, learning scientific classification, and integrating science education with technology literacy skills. The project has expanded its work by continuing to build web-based digital materials, working with teachers to build content knowledge and develop curriculum, and running its first undergraduate course.

The City Bugs web site (<http://www.cnr.berkeley.edu/citybugs/>) continues to grow with both new content and new features. Besides a rich searchable database and virtual bug collection, and the online field guide, new features include separate sections of specialized content for students and teachers, and such catchy and appealing components as Bug Trivia, Top Bug News, and Ask the Expert. In

spring 2001 City Bugs produced an online contest for Oakland middle schools. Sixteen students from four middle schools were the lucky winners. CNR rented a van to bring them to Berkeley for the day on June 7, during which the students were treated to a campus tour, insect collecting in Strawberry Creek, lunch, and lab work at CNR.

Led by Don Dahlsten, Associate Dean, College of Natural Resources and City Bugs Director, the project has a four-year history in the Oakland schools. Over the past year, beginning in March 2000, the project has hired a new part-time coordinator, Debbie Lenz, a former Oakland teacher. Working with CNR staff and Oakland Science Specialist Dale Koistinen and Norman Brooks, Debbie has recruited seven middle school teachers who have met monthly since last March to work as a group both in the district and at CNR. Represented Oakland middle schools include Frick, King Estates, Carter, and John Swett. This group has worked to develop content knowledge, familiarity with CNR digitized content, and to write curriculum using this content that has been classroom tested

during the 2000-01 school year. The teachers are supported in this work by the expert advice and make classroom visits of Berkeley entomologists. This curriculum will be reviewed and refined during the summer, with the fall 2001 goal of publishing this material on the web and disseminating it to all Oakland middle school science teachers using strategies that involve the City Bugs teachers as key leaders. In addition new work is being piloted at Lafayette Elementary School, and the CNR Outreach Course is working with another teacher at Havenscourt Middle School.

City Bugs hosted a "Science Walkabout," a monthly informal gathering of Oakland middle school science teachers to share ideas for science lessons. Titled "Going Buggy with City Bugs," the City Bugs teachers discussed ideas for lessons about different insects and raising insects in the classroom, and how to use the City Bugs web site to study and teach about insects. Attendees received a starter kit of supplies to catch and raise insects in their classrooms

City Bugs ran its first undergraduate course titled the "City Bugs Education Outreach Seminar". During this course college students observed City Bugs teachers, studied learning styles and teaching methods, researched and designed

lessons and activities to teach insect curriculum to children in a specific grade level, taught these lessons in one or more classrooms, and made a web page for the lesson to be added to the City Bugs web site. This outreach course is being offered again in fall 2001.

Debbie Lenz is working with two teachers in a comprehensive assessment of the impact of the City Bugs project on their science instruction. City Bugs teacher lessons include built-in student assessments. The UC Berkeley students' lessons include assessments about student achievement related to these lessons.

City Bugs is working to make connections with other organizations that may form into partnerships in the future (the Audubon Society of Alameda, Tech Bridge Week, the Insect Zoo in SF, etc.), and has begun meeting with representatives from other outreach agencies with the hope of forming partnerships in the future.

City Bugs received the Chancellor's Award for Community Partnership last year, and was featured in the College of Natural Resources monthly newsletter. City Bugs received an award from the Exploratorium as one of February, 2001's ten cool websites

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### C. DISSEMINATION AND SHARING OF WORK THROUGH IU COMMUNITY NEWS

The IU has sought to disseminate information and foster dialogue about developments in the use of information technology in higher education. Beginning in April, 2000, the IU began electronic publication of the IU Community News. The IU Community News provides news for all members of the broader IU community: UC faculty, staff, and project coordinators, partner district teachers and administrators, community partners. It provides visibility of the IU and IU projects through a circulation of incoming and outgoing news; shares relevant education and technology news with the IU community; and engages members of the greater IU community in online discussion and sharing of ideas.

A feature of the news is the use of a web site to distribute the news at <http://interactiveu.berkeley.edu:8000/IUnews/>; this site uses a recently developed Internet tool called *Manila*, which facilitates text-based web publication, enables reader responses and discussion, and reader contributions of news items. The use of *Manila* to achieve the above goals gives us the opportunity to learn to use and experience the possibilities and limitations of a tool of this kind, which will further enable us to evaluate other kinds of web tools.

In addition to the IU Community News, the Berkeleyan began a series of articles profiling IU Internet Learning Community Projects in April, 2000. The articles, introduced by IU's former PI and Executive Vice Chancellor & Provost Carol Christ, focused on faculty, K-12 teachers, staff, and/or students who participate in projects. Each profile highlighted the Berkeley/K-12 partnership, and explored how UC and schools work together using the Internet to improve education.

#### **D. CURRENT WORK INFORMS OUR FUTURE PLANS**

The IU has spent a substantial amount of time this year developing our next major phase of work---the IU Future Model, to begin Fall 2002. We have looked critically and thoroughly at what has worked and not worked in our current phase. This has been done through research, writing white papers, presentations, discussions with a wide range of campus and K-12 partners, and building a new web sites to collaboratively explore this model (see the IU New Model site at <http://iu.berkeley.edu/newiu>).

Later in this report we provide an overview of this future model (see request section). As a team, the IU is proud of the hard and innovative work we have done to develop this IU Future Model. We will continue this development work in 2001-2002, and we will invite an even wider range of groups to participate in this effort. A key measurement of success for the coming year will be the completion of this model and ensuring that it is understood and supported by a broad constituency of campus and K-12 partners.

### **3. COLLABORATIONS AND PARTNERSHIPS**

#### ***A Broad Foundation Supports IU Work***

Partnerships and collaborations are at the core of IU's mission and daily activities. Our continued work with Oakland and San Francisco teachers is supported by a strong and growing partnership with district leaders and representatives. While recent changes in the top leadership ranks at each district have been challenging for district personnel, IU's strong relationships with grant and technology coordinators, curriculum supervisors, directors, and instructional specialists allow us to continue daily work with teachers and schools. This relationship has resulted in the IU being a partner in five successful major grants during this reporting period:

- Two California Department of Education Technology Literacy Grants with Oakland;
- A California Department of Education Technology Literacy Grant with San Francisco;
- A U.S. Department of Education Technology Innovation Challenge Grant with Oakland;
- A National Science Foundation Urban Systemic Project with San Francisco.

As a result of these five multi-year grants, the campus, through the IU, received over \$500,000dollars to support collaborative work during 2000-2001.

In addition to strong partnerships with school districts, the programmatic infrastructure established through Internet Learning Community Projects continues to support daily activities, and helps define technology infrastructure and professional development strategies with Partner Schools. Regular meetings and online work among campus-based ILCP members have helped the IU foster collaborative relationships among several units on campus, creating a cross-disciplinary, cross-functional, community of learners participating in outreach work at Berkeley. Over the last five years, the IU has supported over 40 campus units and developed curriculum with over 150 teachers for approximately 3,000 students. For the 2000-2001 phase of work, participants in IU projects include the following:

Berkeley Faculty and Researchers	Berkeley Staff	Graduate and Undergraduate Students	K-12 Teachers	K-12 Students
14	30	80 (approx)	70 (approx)	2500 (approx)

At the school level this breaks down as follows:

### Interactive University K-12 Schools

OUSD Schools	Teachers	SFUSD Schools	Teachers
Bret Harte MS	5	Cesar Chavez Eleme.	1
Brewer MS	1	Redding Elementary	1
Carter MS	2	Ben Franklin MS	2
Claremont MS	2	Gloria Davis MS	1
Elmhurst MS	2	Hoover MS	3
Frick MS	4	Horace Mann MS	3
Havenscourt MS	4	Balboa HS	1
John Swett MS	2	Burton HS	1
King Estates MS	1	Galileo HS	2
Lowell MS	3	Ida B. Wells HS	2
Montera MS	1	Int'l Studies Academy	2
Roosevelt MS	5	Leadership HS	1
Simmons MS	2	Lincoln HS	2
Fremont HS	1	Lowell HS	2
McClymonds HS	1	Marshall HS	1
Oakland Tech HS	1	Mission HS	2
Skyline HS	2	O'Connell HS	4
		Washington HS	2
<b>Total</b>	<b>39</b>	<b>Total</b>	<b>33</b>

Note that this only includes those teachers that IU projects have worked closely with in their Internet Learning Community Project teams. We have not included the wider range of teachers that IU projects have provided professional development and curricular materials to. This would add an additional several hundred other teachers in Oakland, San Francisco, and other Bay Area districts the IU has impacted.

A full list of the approximately twenty-five campus units leading and participating in IU ILCPs in 2000-2001 can be found in Appendix 1.

### ***Internet Technologies in Support of Campus/K-12 Collaborations***

The IU has continued to play a central role in the research into, and implementation and critical evaluation of, Internet technologies that support communication and collaboration among diverse teams of people working in joint projects. This has created leadership opportunities within the campus and at Oakland and San Francisco Unified School Districts, and it remains an especially important objective as the number of market-based technology options for successful partnership work increases.

For example, during the spring 2001 semester, IU Director David Greenbaum chaired the Technology Working Group (TWG) of the Berkeley Outreach Steering Committee. The committee's charge from Vice Chancellor Padilla was to define ways to use technology to further the goals of coordination, communication and collaboration in UC Berkeley's outreach effort. Topics for discussion included: defining the high priority needs for information sharing, both within the campus and with partner districts and schools; looking at how other campuses are using technology for their outreach partnerships and learning from that work; and reviewing specific technologies for collaboration and communications. The committee's work produced a set of recommendations for creating an Action Plan on Technology in Outreach for review and adoption by the campus and its district partners.

The IU is committed to productively uniting its experienced understanding of the K-12 community with the best of emerging technological developments to bridge cultural and technological gaps between UCB and learning communities. For example, Raymond Yee, the Technology Architect and Lead Software Developer for the IU, is a member of Information Systems and Technology's E-Architecture Working Group (<http://socrates.berkeley.edu:4259/e-Arch/>). The Working Group studies architectural issues surrounding campus web applications, informs the campus about these issues, and makes recommendations concerning "system architecture, system integration, and the use of standards." Other forms of participation in campus efforts include membership in working groups concerned with important developments such as XML and related technologies, and ongoing discussions with researchers and program representatives from the University Library, the Lawrence Hall of Science, and the College of Engineering, who are interested in making sure that research, teaching and service concerns adequately inform the design and implementation of the campus technology infrastructure and systems.

The IU has also been effective in infusing technology into teachers' professional development programs, and in developing curriculum materials. For example, all IU ILCPs conduct aspects of their work as Internet-enabled collaborations between campus and K-12 personnel. The work of the Bay Area Writing Project (BAWP) illustrates how collaborative technology tools have been used in teacher professional development. The following excerpt comes from a short case study included in appendix 2.

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## ***Bay Area Writing Project (BAWP)***

BAWP, one of 12 Interactive University Internet Learning Community Projects (ILCP), works in collaboration with the UCB Graduate School of Education in Bay Area middle schools, using expository writing in social studies and language arts curriculum to improve students' historical thinking and writing skills. BAWP is a collaborative program of UC Berkeley and Bay Area schools, dedicated to improving writing and the teaching of writing at all grade levels and in all disciplines. The Project includes an expanding network of exemplary classroom teachers, kindergarten through university, who, throughout the summer and school year, conduct professional development programs for teachers and administrators. The Bay Area Writing Project operates on a teacher-teaching-teachers model. Successful teachers of writing attend Invitational Summer Institutes on the University of California, Berkeley campus. During the school-year, these teachers provide professional development for other teachers in schools.

The Bay Area Writing Project was established in 1974 in the Graduate School of Education on the Berkeley campus. Each year close to 4,000 teachers participate in BAWP summer and school-year programs. For many, BAWP remains a resource throughout their teaching careers. BAWP's commitment to the professional growth of teachers is key to the high-level of interest by classroom teachers and to their enduring support. BAWP overall goals are:

- To increase the academic achievement of the Bay Area's diverse student population.
- To improve student writing abilities by improving the teaching and learning of writing in Bay Area schools.
- To provide professional development programs for classroom teachers.
- To expand the professional roles of teachers.

As the flagship site of the National Writing Project, BAWP's program model and design are replicated at 160 colleges and universities throughout the country and five sites internationally.

### ***BAWP's IU / OUSD***

#### ***Foundations Program***

In 2000/2001, BAWP's 5<sup>th</sup> Grade Foundations Program was the focus of its IU work. The goal of the year's Foundations Series was for teachers, supported by technology, to improve student achievement in writing. To reach that goal, teachers learned strategies to teach writing, learned and practiced technology skills, and used technology to support relationships and collaborate in the teacher and classroom communities. While participation in the series ranged from 12 to 40 during initial sessions, eventually, a core group of about 15 teachers surfaced and participated in almost every session.

At the first workshop meeting, the Foundations Program was reviewed, and aligned with the OUSD writing and technology standards. It was emphasized that the focus was on writing achievement as supported by technology. The district social studies curriculum was to be tied in along the way. The participants would also be researchers—testing and learning new technologies, and in turn using them, just as they would in their classrooms.

The year-long workshops were designed to model one way of setting up a writing community. Each month focused on a specific aspect of building a writing community. The sessions were designed to include: writing standards, the social studies Williamsburg curriculum, literature, student work and technology strategies. As a backbone technology component of the workshops, a *blackboard.com* site was used as an instruction tool for this year (<http://courses.berkeley.edu:8000/courses/BAWP21>). (password protected) *blackboard.com* provided teachers with easy access to all of the course materials and to on-going communication in the form of online conversation between the participants. By using *blackboard.com*, teachers saw how a web-based tool might increase student access to information, to the school and to other students. The *blackboard.com* site also allowed teachers to be receivers and senders of information; it was the medium for the teachers to write literature logs to each other, post struggles and successes, and house monthly

reflections about the sessions. As we have discovered before, our how-to's and

understandings paralleled those of the students we teach.

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### ***Academic Talent Development Program (ATDP)***

Another emerging partnership with important possibilities is between the IU and the Academic Talent Development Program (ATDP) which offers challenging summer classes for highly motivated K-12 students, giving them a chance to gain in-depth knowledge of subjects that interest them. For "The Internet Classroom" and "The Advanced Internet Classroom," course instructor Lloyd Nebres has used *Manila*—an Internet-based collaboration tool—since summer 2000. Students use *Manila* to write regular, sometimes daily, reflections about their work and life, and publish them as "weblogs" ([http://whatis.techtarget.com/definition/0,289893,sid9\\_gci213547,00.html](http://whatis.techtarget.com/definition/0,289893,sid9_gci213547,00.html)). IU staff serve as consultants to ATDP on the technical and social use of the *Manila* software. The IU's growing relationship with ATDP provides an opportunity to discover and evaluate the use and integration of technology in new pedagogical models, while working directly with high-school students.

### ***The IU Jill Vorhaus Fellows Program***

An important recent addition to the IU is the Jill Vorhaus Fellows Program. Funded during the 2000-2001 academic year by Rick Vorhaus in memory of his wife—a former teacher—and intended to honor teachers and their work, the program provides a year of guidance and support for technology using educators interested in creating stories about their classrooms that involve artifacts, memories, storytelling skills and technology. The program began in June 2001 with eight Fellows.

Over the course of the year, Fellows will learn tools and strategies for storytelling, and create digital stories about current classroom experiences; they will conduct a mini-classroom cycle of inquiry into technology supported instruction; they will research and discuss current trends and literature in technology education, and they will have access to IU/ UC resources and programs. As the year progresses, Fellows will write, collect artifacts, and create one to two more personal digital stories that capture classroom experiences. The Jill Vorhaus Fellows Program is another important vehicle for bringing technology to bear on teacher professional development in the areas of content, pedagogy and leadership, and it builds a foundation for stronger University/school/community partnerships. The Jill Vorhaus Fellows Program recognizes that the successful implementation of technology in classrooms can only emerge from informed use and users' ongoing reflection and analysis. A further description of the Jill Vorhaus Fellows Program is included in the "New IU Model" section below.

# REQUEST FOR FISCAL YEAR 2001-2002

## 1. GENERAL DESCRIPTION

The IU occupies an unusual place in K-12 partnership efforts at Berkeley. While our work is, and will continue to be, closely aligned with specific School/University Partnership (SUP) objectives, we also hope to realize a broader vision—enabling the Berkeley campus as a whole to use the Internet to open its tremendous human and content resources to many K-12 schools in effective and highly scaleable ways. We seek to make Berkeley a national leader in the use of the Internet to democratize its knowledge for the public, with a particular focus on supporting K-12 education.

The IU sees three critical circles of possible K-12 partnerships and objectives on the campus. First, there are the schools, programs, and objectives that are part of the School/University Partnership program. This includes campus units who work with one or more Partner Schools with the aim of meeting S/UP goals. Second, there is the larger set of campus units involved with a wider range of schools, pursuing varied service and/or research goals. This includes a large number and range of campus outreach and academic programs. Finally, third, there are many campus faculty and units who have little, if any involvement, with K-12, but whose growing digital content and technologically enabled communities might be of significant benefit, if properly translated, to K-12 teachers and learners. The IU hopes to support the campus in working with all three of these Berkeley/K-12 partnership populations.

In this regard, the IU's strategic position as a campus-wide "program of programs" affords opportunities for working simultaneously at both the SUP and broader levels: we will continue working with teachers and students in certain key Partner Schools in the dissemination, implementation, and assessment of technology-enhanced curriculum materials and their impact on student outcomes and professional development; and we will continue cultivating partnerships within the campus and across area school districts as we learn how Internet technologies can broaden access to Berkeley resources and support collaborations. We believe that the model of work proposed uniquely allows us to address concerns at these multiple levels. We see this work as thus both fulfilling the campus's Conceptual Framework and its SUP Implementation Plan.

For fiscal year 2001-2002, we are requesting \$100,000 dollars from the School-University Partner Program, the same amount requested and received the previous fiscal year. This funding will be used to support IU work with SUP schools and objectives. The IU receives significant funding from a wide range of sources: grants, corporate gifts, school-district grant partnerships, and the campus. SUP funding will be critical to our overall IU efforts, but in FY 2001-2002 we will target it specifically to SUP schools and focused objectives. At the same time, we will be able to use and leverage significant other resources to support our work in these Partner Schools. We also hope that the SUP work can help to inform the efforts of other IU projects who are not in Partner Schools.

We are proposing in the coming year to work in particular with all or some set of the following SUP schools:

IU Project	School	Teachers	Students
Environmental Science-2	Burton* and/or Marshall* (SFUSD)	2	60-120
IT Pathway	O'Connell*, Mission* (SFUSD)	2	60-120
Local Context	Fremont*, McClymonds* (OUSD)	2	60-120
California Heritage	Lowell MS* and/or McClymonds (OUSD)	2	60-120
City Bugs	Cole and/or Lowell MS (OUSD)	2	60-120
ARF Expedition Program	Cole and/or Lowell MS (OUSD)	2	60-120

\*denotes existing IU relationships with Partner Program school

As an overview, in each school we will work closely with a focused group of teachers and district partners to develop, implement, and disseminate high quality web-based Berkeley content with the aim of improving student achievement and teacher professional development and practice. Our focus will particularly be on the students of those teachers who are key IU partners in these Partner Schools. In addition, this coming year we would like to work more closely with leaders and staff from the Admissions Office and the Center for Educational Outreach to build a closer bridge between IU projects and the admissions process. For example, we might do this through the development of web-based curriculum that ties to college-going and admissions information. We would also like to explore whether participation in IU projects might give students recognition in the admissions process.

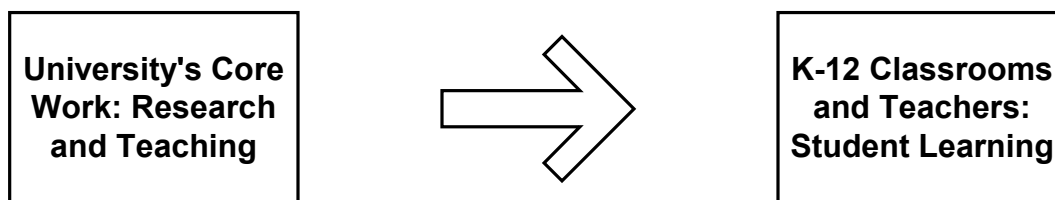
This renewed focus on Partner Schools is a shift in emphasis for parts of the IU. In the last several years there was little request and guidance from the campus to work closely and intensively with particular schools. We welcome the chance to be an important campus partner in these efforts, and look forward to the support that will be aimed at Partner Schools.

In the following sections of the proposal we address in more detail how the IU's work will integrate with the campus's vision and goals for outreach. Before doing so we spend some time outlining the IU's Future Model. This model will be the foundation for our next major phase of work and will begin a year from now in summer/fall 2002. It will be a key driver in the work and prototyping we ask our current IU projects to complete in fiscal year 2001-2002, which is the end of our second phase and the transition year to our new model (see the Timeline section in the earlier report for more detail on the IU's overall phases of work). The future IU model will thus play an important role in 2001-2002 in the IU's focus in certain SUP schools and with the SFUSD and OUSD partnerships.

## 1.1 FUTURE IU MODEL: A PUBLIC UNIVERSITY IN THE DIGITAL AGE

### *Challenge and Opportunity*

K-12 schools in California are in need of powerful academic support if they are to improve student outcomes. The scale of this challenge is daunting. The Bay Area alone has approximately 55,000 K-12 teachers and over 1 million students. UC Berkeley has a wealth of digital content and an extraordinary community of 40,000 faculty, students and staff. But only a small fraction of this community is productively connected to K-12 schools. At the IU we recognize the important opportunity we have to use the Internet to make available the knowledge and people of UC Berkeley on a very large-scale to K-12 teachers and learners across California.



### *Mission and Principles for the IU Future Model*

The Interactive University will use the Internet to bring the unique resources and people of UC Berkeley to Bay Area and California K-12 teachers. Our goal is to use technology to democratize the knowledge of the Berkeley campus in order to support and improve K-12 education.

Our approach incorporates key dimensions learned through five years of work with K-12, campus, and community partners. It is based on and embodies four key principles:

- *Build from the Academic Core of the Campus:* use technology and supportive project structures to enable faculty, researchers, staff, and students to connect their research and teaching to K-12 service.
- *Support K-12 Teachers:* give K-12 teachers powerful tools, digital content, and professional development communities so that they can improve student outcomes.
- *Employ Technology Wisely:* employ the right balance of technology and face-to-face work and the right mixtures of content and collaborative focused technologies.
- *Scale:* design web-environments and campus projects structures that from the start encourage and enable many campus members to participate and thousands of K-12 teachers and learners to access materials.

Through these principles, our hope is to realize:

## *A New Vision for Supporting K-12 Teachers And Learners*

Every school teacher possesses a box full of hand-collected teaching materials, "stuff", gathered over the years from various and ephemeral sources. Stored in closets and garages, these primary source materials—pictures, maps, news articles, short stories, speeches, graphs, and charts—are carefully guarded and preserved over a career, the right item ready to be retrieved at just the right moment, year after year. These materials and the contextual knowledge teachers have about them are key to the quality of teaching.

Instead of a cardboard box imagine a digitized "box of stuff": high quality teaching material, available on the web anytime, all the time.



Imagine resources that are ever growing, renewable, recyclable, and easily shared. Any teacher, student, or family member will easily search and sort through this material to build, for instance, custom collections of pictures and data of newly found stars, video clips of historical figures, and reports from remote archeological sites.



Think of powerful tools and applications to make the rich contents of this digital box alive and effective in the classroom as well as valuable for teacher professional development.

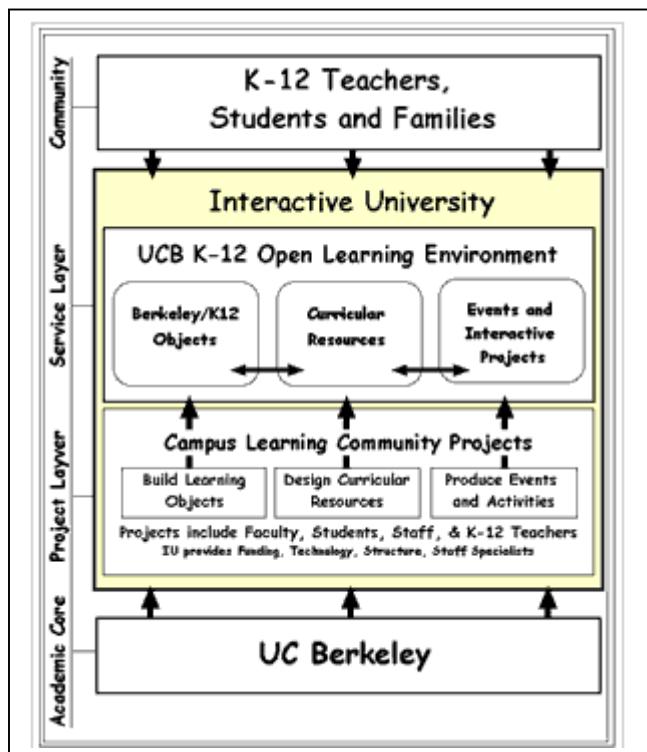
Imagine this entire effort---these digital boxes---supported and populated by the collections, experiences, and expertise of the faculty, staff, and students of Berkeley. This is the goal of the Interactive University at UC Berkeley.

### *Overview of Structure*

The IU has developed an integrated programmatic and technical model to connect the core of the campus and its academic work to support K-12 teachers, students, their families and communities. (See <http://iu.berkeley.edu/newiu> for a detailed description of IU's new model.) The model involves three major components: (1) collaborative projects (University and K-12 participants) producing, creating, and disseminating learning objects, curricular materials, and web events; (2) a sophisticated web environment supporting Berkeley/K-12 partnerships and providing access to Berkeley's rich resources; and (3) a cadre of teacher and campus leaders who are deeply integrated

in Berkeley/K-12 partnership work and can help to facilitate use of the Berkeley digital materials and interactive events.

The diagram below illustrates the IU's new work model for identifying, translating and categorizing research objects into learning objects and web events to affect student outcomes. A campus-led Berkeley/K-12 organizational structure (similar to Internet Learning Community Projects (ILCPs) described earlier) identifies curricular needs and Berkeley resources to satisfy them. Supported by IU program and technology specialists, Learning Community Projects translate those materials for K-12 use, categorize and mark them for easier searching within K-12 communities, create collections of digital objects supporting standards-based curriculum, and produce engaging web events from these materials. These collections make up the core of the Open Learning Environment (OLE). Also important is the development of campus and K-12 leaders who can train colleagues on the value of collaborative work and the wise use of technology, and can coach on successful techniques and practices that positively affect K-12 student outcomes. A more detailed description of these structural elements and processes follows.



### *IU Learning Community Projects*

Central to the Interactive University are the campus/K-12 IU projects that build and publish collections of learning objects, design web curriculum, and produce web events. Campus IU projects are based on lessons learned over five years through the IU's current programmatic structure, the Internet Learning Community Projects. IU Learning Community Projects are made up of departmental teams of faculty, staff, graduate students, K-12 teachers, curriculum specialists, and production experts. These teams will be a wonderful and structured environment for University and K-12 staff to learn from each other while building resources and activities that

can serve thousands of others. The IU will provide campus units with funding, structure, tools, and staff specialists to help carry out these projects. This structure also allows for close work with teachers in testing and refining curricular materials used in classrooms, including assessments of student outcomes. We hope to create and fund IU Learning Community Projects in every major school, college, library, museum, and outreach program on campus, with some centered in Partner Schools.

### ***Berkeley Open Learning Environment (OLE)***

As important as Learning Community Projects is the Open Learning Environment, a web-based tool built on portal technology, that will provide K-12 three key services:

- Teachers will be able to build and manipulate their own digital collections (box) of Berkeley/K-12 learning objects. These flexible learning objects are built from the high quality Berkeley digital content and are designed from the start for use by K-12 as well as higher education. Marked up with University and K-12 metadata, these are a new kind of learning object, which we hope to see published in the future by scholars and teachers together.
- The Berkeley Open Learning Environment provides integrated web based K-12 curriculum constructed from these highly flexible learning objects. Teachers are thus given ready-to-use teaching curriculum that at the same time is easily modified.
- The Open Learning Environment will be a gateway to web events in which K-12 students and teachers can interact with faculty, distinguished visitors, and others at the Berkeley campus. These web events allow a scaleable person-to-person interaction, creating human connections, which are key to effective learning.

The central user scenario for the OLE is analogous to how teachers currently gather supplementary teaching and learning materials for their classroom use—by collecting them in a subject-specific box with items ready to be retrieved at just the right moment, most often used in addition to or instead of textbooks. Existing and emerging technologies increasingly allow instructional designers to identify, craft, or create components – “learning objects” – that can be reused a number of times in different learning contexts (Wiley, 2000). These objects are flexible and repurposable, and can be assembled and distributed in the Berkeley Open Learning Environment (OLE). In addition to serving as an entry point for growing collections of digital objects, the OLE will also provide various web-services for educators interested in using Berkeley learning objects to construct their own learning activities. These may include albums, bibliographic lists, email messages, lesson plans, readers, slideshows, etc. In effect, users will have the possibility of constructing a customized digital “box” of supplementary materials to use for learning activities.

For example, a teacher may search for butterflies in the Open Learning Environment for her Biology course. Upon finding several representations in collections contributed to the OLE by the California Heritage Collection at Bancroft Library, the UC Museum of Natural History, and the College of Natural Resources, the teacher can make an album by placing them into a desired sequence and attaching notes to individual pictures. She can assemble a lesson plan by adding written questions related to the collected artifacts. Students can access these materials and work with them online, responding to questions, researching assignments or assembling their own collections of artifacts. The teacher can re-order objects, annotate and create slide shows or package materials for storage, display or download. A teacher's digital box is a collection of various types of digital materials,

including guides, background and assessment materials, activity ideas and other supporting materials. Teacher's stories about their use of specific materials – their challenges, successes and ideas – will complement learning materials, as will sample student work produced through the use of materials collected in that box. This design follows an important tenet of constructivist pedagogy: learning objects should be open because teachers and students add value and meaning to learning resources by directly manipulating them.

### *Advocates and Trainers*

Meaningful use of technology in the schools and great scale come not only from well-designed technology, content, and programs, they come from individual teachers and scholars who are able to share the value of a tool and environment. In the past five years, IU project work has required the development of strong partnerships with local K-12 teachers and Berkeley staff and faculty. As relationships have strengthened and endured, we have looked for ways to more deeply involve K-12 teachers on campus and recognize their efforts, while also finding ways to support these teachers in their own development and movement towards new leadership opportunities. The third component of the IU's new work model seeks to strengthen partnerships with campus units and personnel, while deepening the training and involvement of teacher leaders.

During June and July, 2001, the IU will host its first IU Vorhaus Teacher Fellows Program. Eight local teachers have been selected in recognition of their teaching effectiveness, experience, and use of technology. They will begin a yearlong association with UC Berkeley and each other through the IU during the 2001-02 school year. Francesca Saveri, an Oakland teacher with extensive experience as a BAWP Teacher Consultant and reformer with the Bay Area School Reform Collaborative, will co-lead this group with IU staff.

During summer 2001 IU Fellows' will experience a powerful weeklong workshop at the Center for Digital Storytelling. Each teacher will go through the entire process of developing and crafting, with assistance, a digital movie that tells a story about his or her teaching practice, reflecting on what worked, what didn't, how to reach all students, and the difference technology can make in doing that. This experience will lead to a yearlong teacher inquiry project in which each teacher asks an essential question about his or her practice, and gathers data in the form of lessons, assessments, student work, and reflection that will culminate in another story in spring 2002. During the school year the Fellows will form a learning group that meets face to face each month, and interacts online using a groupware tool to share readings, discuss challenges, and coach each other.

The IU will assess the effectiveness of this program through work samples, interviews, and fellows' input into the following year's program. This work will inform the design of IU technology, teaching materials, and professional development activities.

The IU's goal is fund, formalize, and grow this program to build a network of *teachers teaching teachers* about the effective integration of technology into teaching, with an

emphasis on using Berkeley research and learning objects. We would like this program to develop into one in which teachers from around the Bay Area have varying levels of engagement, from teachers who deliver professional development and lead professional seminars, to teachers with a yearlong campus residence who work closely with academic departments to identify and develop Berkeley research objects into Berkeley K-12 learning objects.

### *A Model for Research Universities in the Digital Age*

These three interrelated components define a model that addresses the current challenges and opportunities for universities to better engage with K-12 teachers, students and families. Supported by new technology, the model creates a campus-based ecosystem of Berkeley/K-12 partners who mobilize the core of the university to jointly create rich learning materials and positively impact K-12 student outcomes. This robust and scaleable model brings the campus closer to using the Internet to serve thousands of teachers and involve hundreds of campus participants while supporting the campus core research, teaching and service mission.

## **2. INTEGRATING WITH CAMPUS VISION AND GOALS**

This section explains the IU's alignment with key elements of the campus's major outreach strategies. For each of the five key elements of campus outreach we briefly reflect and review on IU activities in 2000-2001, we look forward to adjustments in 2001-2002, and we note areas of need that will strengthen the IU's and/or the campus's outreach partnerships.

### **2.1 ALIGNMENT WITH PRIMARY GOALS - STUDENT LEARNING, PROFESSIONAL DEVELOPMENT, COLLEGE PREPARATION**

#### 2000-2001

- As described in the report above, the core of IU's work involves professional development for K-12 teachers creating learning materials from Berkeley content for their classroom use, and using these materials to improve student outcomes. See Results section above and Appendix 2 for examples.
- In addition to close Berkeley/K-12 collaborations through Internet Learning Community Projects, all projects led several professional development programs with several dozen teachers each.

#### 2001-2002

- The IU's intent is to focus during the 2001-2002 academic year on assessment of student achievement, especially in Partner schools.
- We will expand professional development opportunities for teachers to learn to access web-based content identified and developed by IU projects.

- We would like to explore ways in which admissions and college preparatory information can be better integrated with our project structure.
- We would like to develop mechanisms for students involved in IU projects to be recognized during the admissions process. A good point of departure may be the IT Pathway project with San Francisco schools, whose focus is on developing school-career and school-college pathways. A stronger partnership with the Center for Educational Outreach and Admissions Office will be an asset for this objective.

Needs

- It will be important for the campus to better define how meaningful student achievement will be determined and how this is related to eligibility and admissions goals.
- More generally, measures of success for campus engagement in partnership efforts ought to be more clearly defined.

**2.2 PARTNER SCHOOLS**

2000-2001

- IU projects work closely with teachers at Burton, Marshall, and Mission and O’Connell high schools in San Francisco, and Lowell middle school, and Fremont and McClymonds high schools in Oakland.
- Through Oakland’s Urban Dreams program, three IU projects have engaged in professional development activities with teacher representatives from all high schools in Oakland.
- IU Projects working with San Francisco include teachers from an additional eight high schools.

2001-2002

Based on our proposal, the IU’s possible engagement with Partner Schools, teachers and students for 2001-2002 will be as follows:

IU Project	School	Teachers	Students
Environmental Science-2	Burton* and/or Marshall* (SFUSD)	2	60-120
IT Pathway	O’Connell*, Mission* (SFUSD)	2	60-120
Local Context	Fremont*, McClymonds* (OUSD)	2	60-120
California Heritage	Lowell MS* and/or McClymonds (OUSD)	2	60-120
City Bugs	Cole and/or Lowell MS (OUSD)	2	60-120
ARF Expedition Program	Cole and/or Lowell MS (OUSD)	2	60-120

\*denotes existing relationships

- We define these as possible projects because our ability to effectively work with teachers and students in these schools will require, in some cases, significant coordination and partnership-building efforts. We will work with IU project

participants, SFUSD and OUSD coordinators, and partner program school representatives to define the best fit for successful joint work. See needs below.

### Needs

- There is a need to better define how districts will participate in the School/University Partnership, especially with identified Partner Schools. What is the nature of the districts' contribution to partnership work, for example?
- Central to effective partnership work will be coordination through district personnel with Partner Schools. A district liaison supported by district personnel, along with a clear process for conducting this coordination and sufficient campus support staff, will improve the work of campus units in Partner Schools.

## **2.3 CAPACITY FOR COORDINATION AND COLLABORATION**

### 2000-2001

- IU's Internet Learning Community Projects (ILCPs) are an important example of an effective and replicable model for involving Berkeley faculty, staff and students with K-12 teachers and curriculum specialists in productive working arrangements.
- The structure of ILCPs is based on communication, coordination and collaboration among campus units and area school districts, teachers and students. By sharing information and resolving issues around common objectives, participants have begun to bridge the cultural-institutional gap that often makes partnership work challenging.
- ILCP's work has led to stronger relationships between UC Berkeley and school districts and teachers, in addition to new collaborations among campus units interested in K-12 partnership work. Ongoing work continues to lay a strong foundation for expanding partnership opportunities.
- The IU has developed major partnerships with Oakland and San Francisco, partly reflected in ongoing major grants supporting joint work, such as those with the National Science Foundation (NSF) and the U.S. Department of Education.
- The IU is recognized as a campus leader in the use of technology for Berkeley/K-12 partnership work.
- IU representatives are active participants in campus-wide committees and taskforces charged with improving coordination and communication among campus units and K-12 partners. IU's Director David Greenbaum's participation in the Outreach Steering Committee and chairing its Technology Working Group is an example of this leadership role.

### 2001-2002

- The IU would like to continue and to expand its coordination and collaborative efforts, both within the campus and districts, and in Berkeley/K-12 joint collaborative work.
- Consistent with the new IU model of work, the IU will explore greater collaboration with academic and research units; we will explore simpler and easier ways to integrate faculty research and teaching into K-12 partnerships.

- We will strengthen our coordination and collaboration work with districts through continued integration with major district grant-based initiatives, and through the dissemination with districts of standards-based learning materials via the web.
- The IU will target an expansion of its Vorhaus Fellows program to include teachers from Partner Schools.
- The IU will continue to be a key participant in campus and district partner program teams.
- On behalf of the Outreach Steering Committee and the e-Berkeley initiative, the IU will lead a workgroup whose focus will be a broad assessment of how technology can help Berkeley/K-12 partnerships.

### Needs

- As campus units expand focus work with Partner Schools, we expect the campus will need additional SUP coordinating staff to facilitate this process.
- Growth of the School/University Partnership Program will likely require new structures and processes to support this growth. A clear understanding of these will greatly aid the program's expansion.

## **2.4 INFORMATION TO ENHANCE STUDENT ACHIEVEMENT AND EDUCATIONAL ACCESS**

### 2000-2001

- ILCPs have identified and developed content used by trained teachers in San Francisco and Oakland classrooms.
- Materials developed have focused on academic content and pedagogical strategies, and generally not on admissions information.
- The IU has explored important collaborative tools for dissemination of materials and information, including the use of web logs and learning management systems.
- The IU has developed prototypes of its Open Learning Environment with the goal of providing an entry point for accessing Berkeley teaching content and expertise, and to establish a general environment to facilitate information dissemination and collaboration.

### 2001-2002

- The IU would like to explore how to link and integrate admissions information into its digital learning materials.
- The IU will expand efforts to use collaborative tools to support the work of the School/University Partnership Program and other partnership efforts on campus.
- The IU will continue its development of the Open Learning Environment.

### Needs

- A strengthened focus on integrating information about admissions and educational access may require the development of a campus-wide communications strategy regarding such information.

- The adoption and development of a campus portal for K-12 partnership information is a very important strategy to pursue.

## **2.5 EVALUATING PROGRAM EFFECTIVENESS**

### 2000-2001

- IU's activities are supported by ongoing evaluation activities, formally conducted in partnership with Berkeley's Graduate School of Education.
- The IU has been recognized for its evaluation efforts by the U.S. Department of Commerce, as described in the Results section above.
- The IU is not satisfied with how academic evaluation and research methods intersect with the nature of technology-supported Berkeley/K-12 partnership work. More work needs to be done to clarify the interrelationships of these areas.
- IU projects have requested more focused support on conducting evaluation and assessment in their work.

### 2001-2002

- The IU will continue to explore cutting edge approaches to better capture changing teacher practices and student outcomes resulting from technology-supported partnership work.
- The IU will provide focused and additional support for evaluation and assessment activities to campus units in IU ILCPs working with Partner Schools. This will be a key focus area.
- The IU will link its future evaluation efforts to those defined by granting institutions such as the NSF through our partnership with San Francisco Unified.

### Needs

- There is a need to more clearly define how evaluation data can and will be used for campus purposes; it will be important to have a strong alignment between School/University Partnership participant data analyzed by campus programs and campus level data and reporting requirements.

## **3. CHALLENGES AND OPPORTUNITIES**

### **3.1 CHALLENGES**

Clearly, the education and achievement of K-12 students, especially in urban school districts, is in need of powerful academic support. The scale of this challenge is daunting—the Bay Area alone has more than 55,000 teachers and over one million students. An important opportunity exists now to use the Internet to make available the knowledge and people of UC Berkeley on a very large scale for K-12 teachers and learners in California. How to best do that has been the mission of the Interactive University since 1996. Several key challenges exist:

- How to integrate the core work of the University—teaching and research—into productive K-12 partnerships that impact student achievement?
- Opening up and sharing University resources and expertise raises questions about intellectual property rights—a central concern of faculty in research universities.
- What kinds of technologies and infrastructure are necessary to scale partnership work?
- Schools, teachers and students remain segregated by a “digital divide”.
- Teachers remain key to improving student learning, but institutional factors in K-12 settings restrict their time and incentives to participate in partnership work.
- Teacher turnover rates remain high; skilled teachers with strong pedagogical and technology integration practices are difficult to find.
- What is the appropriate balance between the use of face-to-face interactions and the use of technology for educational engagement? How can we blend more traditional social structures and on-line communities to support university/K-12 collaborations? And what is the right mixture of abstracting, highly scaleable technologies and technologies that help to create narratives, tell stories, and ground and reinforce particular experiences and communities?

Our current work and especially our future model is a response to these challenges. Our current work has been designed to allow us to explore and assess various ways to address these issues. In our future IU model we believe we have laid the foundation for incentives, structures, and partnerships to engage the academic core of the campus. We will alleviate intellectual property issues principally by campus units choosing which of their materials to publish for public use and through the use of metadata for indicating provenance. Infrastructure questions, and the issues of social justice that often underlie them, can not be downplayed, but we believe that a patchy yet viable foundation of school, home, and community access has been built, and that with the continued decrease in price and commoditization of Internet access devices that access will continue to improve. Teacher participation is key to the IU model and teacher retention overall in urban school districts will remain troubling in the next few years; but we are hopeful that our new investment in direct teacher and IU fellow development combined with our existing wide range of teacher participants will give us a growing circle of teacher partners and advocates who can help to translate campus IU work to other teachers and schools. Finally, the dense questions of how technology best shapes pedagogy, learning, social networks, and communities are ones that, at the least, we have established a campus/school ecosystem to explore and reflect on. Through this research informed environment we hope to incorporate the best of developing knowledge on the wise use of technology for large-scale educational partnership between the University and schools.

## **3.2 LEVERAGE AND SCALE**

### **A. LEVERAGE**

As suggested in the report above, the IU has been successful in leveraging School/University Partnership funds through fund-raising and strong relationships with Oakland and San Francisco school districts. These relationships, for example, have resulted in partnerships with each district in continuing grants that support joint goals.

For the 2000-2001 period, funds to IU through partnerships with districts include:

- California Department of Education Technology Literacy Grant, Oakland: Core Values: \$70,000
- California Department of Education Technology Literacy Grant, Oakland: Foundations: \$35,000
- U.S. Department of Education Technology Innovation Challenge Grant, Oakland: Urban Dreams: \$120,000
- California Department of Education Technology Literacy Grant, San Francisco: Foundations: \$75,000
- National Science Foundation Urban Systemic Project, San Francisco: USP: \$200,000
- Total for 2000-2001: \$500,000 dollars.

For the 2001-2002 period, funds to IU through partnerships with districts will likely include:

- U.S. Department of Education Technology Innovation Challenge Grant, Oakland: Urban Dreams: \$120,000
- California Department of Education Technology Literacy Grant, San Francisco: Foundations: \$75,000
- National Science Foundation Urban Systemic Project, San Francisco: USP: \$217,000
- Total for 2000-2001: \$412,000 dollars.

In addition, in 2001-2002, the IU, under the leadership of EVC Paul Gray, will submit several major new grants and embark on a next major round of fund raising. We hope that SUP program will be a key partner in a number of these grants and programs.

### **B. CAPACITY TO SCALE**

Scale, and the balance of scale and effectiveness using technology and social relations, has been the fundamental concern of the IU from the start. Phase 2 of the IU centered on the search for scale and community. The Interactive University's innovative funding and organizational structure allows its participants to engage campus units directly with K-12 partners in developing learning materials and providing professional development to teachers. Campus and K-12 participants in ILCPs speak highly of the opportunities that

working together in this arrangement provides: an understanding of campus resources and expertise, an appreciation of challenges campus and K-12 participants face, and an opportunity to bridge cultural differences while working together to improve learning opportunities for K-12 students. Another important lesson learned by the IU and ILCP participants has been the tremendous importance of face-to-face interactions—organized and supported—to establish and nurture long-lasting relationships, with technology supplementing and enhancing the interactions and work of existing relationships. This working structure, we believe, provides the right mixture for building capacity on campus and laying the strongest foundation for scaling any future successful partnership work. The IU Future Model, we believe, will go even further in supporting and encouraging scale through an informed and dynamic system of structuring relationships around technology, extending and reinforcing them with collaborative tools, and building new relationships through opportunities to share high-quality teaching materials and best practices.

# Appendix 1: IU's Internet Learning Community Projects

The Interactive University Project is committed to supporting campus departments in the use of technology to improve student achievement and create an educational community. The IU is providing grant funding for 1999-2001 to 12 Internet Learning Community Projects. Projects are listed here, followed by a brief description of each project and its key participants.

- [Archaeological Research Facility Project](#)
- [Bay Area Writing Project: Teaching Writing and Technology Project](#)
- [California Heritage Project](#)
- [Connecting Students to the World](#)
- [Office of Resources for International and Area Studies: History through Literature](#)
- [Integrating Science, Teaching, and Technology](#)
- [Project FIRST: Foundations in Reading through Science and Technology](#)
- [Center for Latin American Studies: Exploring Latin America](#)
- [College of Natural Resources: CityBugs Project](#)
- [Environmental Science at Galileo Academy of Science & Technology](#)
- [Electronic Cultural Atlas Initiative: Cultural Exploration](#)
- [Local Context Project: Institute of Government Studies](#)

## Project Descriptions

### 1. [Archaeological Research Facility Project](#)

The Archaeological Research Facility project uses multimedia and Internet technologies, as well as hands-on, experiential activities, to teach archaeology to middle school students in Oakland. UC Berkeley graduate and undergraduate students work directly with teachers and students in classes and after-school programs to enhance students understanding of archaeology as a practice, and to encourage the development of critical thinking skills.

- Principal Investigator: Professor Ruth Tringham, Department of Anthropology.
- UCB Partners: Department of Anthropology, Archaeological Research Facility.
- Oakland Middle Schools

### 2. [Bay Area Writing Project: Teaching Writing and Technology Project](#)

The Bay Area Writing Project, in collaboration with the Graduate School of Education, works in Oakland middle schools using expository writing in social studies and language arts curriculum to improve students historical thinking and writing skills.

- Principal Investigator: Carol Tateishi, Director, Bay Area Writing Project.

- UCB Partners: Bay Area Writing Project, Graduate School of Education.
- Oakland Middle Schools.

### 3. [California Heritage Project](#)

The California Heritage Project explores how the Bancroft Library's California Heritage Collection, an online archive of over 30,000 images of California history, and other primary source materials, can best be used to support local, California and U.S. History curriculum standards in San Francisco and Oakland schools.

- Principal Investigator: Thomas Leonard, University Librarian.
- UCB Partners: The Bancroft Library, the Teaching Library, the American Cultures Center.
- San Francisco Middle and High Schools; Oakland Middle Schools.

### 4. [Connecting Students to the World](#)

The Institute of International Studies (IIS) uses online conversations and digital curriculum to link Berkeley faculty and distinguished visitors to San Francisco and Oakland high schools. IIS employs these resources to enhance U.S. History and Civics curriculum.

- Principal Investigator: Harry Kreisler, Executive Director, Institute of International Studies.
- UCB Partners: Institute of International Studies, Human Rights Center.
- San Francisco and Oakland High Schools.

### 5. [Office of Resources for International and Area Studies: History through Literature](#)

The History through Literature project is developing web-based learning materials that will support 6th and 7th grade curriculum about World History. This project will integrate literature and resources from International and Area Studies and other partners, to help students understand the histories of the Near East, China, India, Africa, Japan, Western Europe and the spread of Islam.

- Principal Investigator: Steven Poulos, Vice-Chair, Institute for South Asia Studies, International and Area Studies.
- UCB Partners: Departments of Near Eastern Studies, South and Southeast Asia Studies, East Asian Languages, Classics.
- Bay Area Middle Schools.

### 6. [Integrating Science, Teaching, and Technology](#)

The Berkeley Seismological Laboratory, the Center for Particle Astrophysics, the Center for Science Education at the Space Sciences Laboratory, and the UC Museum of Paleontology have developed a partnership for Integrating Science, Teaching, and Technology (ISTAT). The ISTAT team works with 6-12 grade teachers in San Francisco to create a suite of inquiry-based digital science curriculum materials.

- Principal Investigator: Professor David Lindberg, Director, UC Museum of Paleontology.
- UCB Partners: UC Museum of Paleontology, Space Sciences Laboratory, Berkeley Seismological Laboratory, Center for Particle Astrophysics.
- San Francisco Middle and High Schools.

#### 1. [Project FIRST: Foundations in Reading through Science and Technology](#)

In Project FIRST, the Center for Science Education at the Space Sciences Laboratory leads a partnership with rich expertise in the areas of literacy, science, technology and curriculum development. The goal of Project FIRST is to increase the literacy development and proficiency of Oakland elementary school students through a model program that integrates inquiry-based science curricula, Internet technology and a mentored learning environment.

- Principal Investigator: Dr. Isabel Hawkins, Senior Fellow, Center for Science Education.
- UCB Partners: Space Sciences Laboratory.
- Oakland and Berkeley Elementary Schools.

#### 2. [Center for Latin American Studies: Exploring Latin America](#)

Exploring Latin America investigates contemporary and historical aspects of Latin America and its relationship to teachers and student curricular needs in the Oakland and San Francisco Unified School Districts. The Center for Latin American Studies is working with teachers to develop standards-based curriculum units and explore the best approach for setting up conversations with visiting experts on Latin America, UCB faculty and graduate students, and with students in Latin America.

- Principal Investigator: Professor Harley Shaiken, Director, Center for Latin American Studies.
- UCB Partners: Graduate School of Education, Graduate School of Journalism, Departments of Geography, Sociology and Ethnic Studies.
- Oakland and San Francisco Schools.

#### 9. [College of Natural Resources: CityBugs Project](#)

The Environmental Leadership Program of the College of Natural Resources is exploring how to best use a unique Internet-based tool to support science curriculum standards across grade levels in the Oakland Unified School District. This tool will enable students to use insects to explore their local ecology, gain an appreciation for biodiversity, learn scientific classification, and integrate science education with technology literacy skills.

- Principal Investigator: Professor Donald Dahlsten, Associate Dean, College of Natural Resources.
- UCB Partners: Environmental Leadership Program, College of Natural Resources, Division of Insect Biology, Essig Museum of Entomology.
- Oakland Middle Schools.

#### 10. [Environmental Science at Galileo Academy of Science & Technology](#)

The Environmental Sciences Program and the Department of Ethnic Studies work with the Galileo Academy of Science and Technology of the San Francisco Unified School District to develop and implement digital learning materials for an online course in Environmental Science for 11th and 12th grade students. These learning materials integrate the resources and expertise of the Urban Watershed Project at the Presidio of San Francisco. The project also explores how to involve Environmental Science and Ethnic Studies students as mentor/tutors through a UCB service learning class.

- Co-Principal Investigators: Professor William Berry, Environmental Science; Professor L. Ling-chi Wang, Chair, Ethnic Studies.
- UCB Partners: Environmental Science, Ethnic Studies, Lawrence Hall of Science, the Urban Watershed Project.
- San Francisco High Schools.

#### 11. [Electronic Cultural Atlas Initiative: Cultural Exploration](#)

The Electronic Cultural Atlas Initiative (ECAI) is a collaborative project combining global mapping, imagery and text to envision the world through space and time. ECAI employs new technologies and the paradigm of the Internet to redefine the production and exchange of research on culture, society, and history. ECAI is developing a searchable index of materials with a map-based interface. The Institute of East Asian Studies is building a prototype of an interactive electronic tool that will help San Francisco schools use the resources of ECAI to support Social Science standards in World History, Culture and Geography.

- Principal Investigator: Professor Lewis Lancaster, Acting Chair, Center for Korean Studies.
- UCB Partner: Center for Korean Studies, Institute of East Asian Studies.
- San Francisco High Schools.

#### 12: [Local Context Project: Institute of Governmental Studies](#)

The Local Context Project currently works in the Oakland Unified School District, to develop curriculum that teaches students how local government works, and how it can be accessed to work for them. To accomplish this, the Local Context Project collaborates with teachers on the design of curriculum that best fits the teacher's style and classroom schedule. Students learn new forms of communication, how to collect data, and how to put the information on a web site, providing a context to data from elections, the census and other statistical sources.

- Principal Investigator: Professor Bruce Cain, Director, Institute of Governmental Studies
- UCB Partner: Institute of Governmental Studies
- Oakland Schools

## **Appendix 2: Selected Case Studies**

- Integrating Science, Teaching and Technology (ISTAT)
- Archeological Research Facility and Explore!
- SFUSD's Information Technology Pathway
- Connecting Students to the World (CSW)
- Bay Area Writing Project (BAWP)
- City Bugs

# 1. INTEGRATING SCIENCE TEACHING AND TECHNOLOGY (ISTAT)

Prepared by ISTAT staff and IU Evaluation team

ISTAT is a collaborative project between the San Francisco Unified School District (SFUSD) and four science units of the University of California, Berkeley: The Berkeley Seismological Laboratory, the Center for Particle Astrophysics, the Center for Science Education at the Space Sciences Laboratory and the UC Museum of Paleontology. Tapping the rich assortment of on-line data and materials available at UCB, ISTAT is creating a suite of inquiry-based digital science curriculum materials for grades 6-9. These materials support science standards of the SFUSD, focusing on Earth and Space Science. ISTAT has been working with SFUSD teachers for five years, through two project phases. Phase I (1996-1998) was primarily a time for assessing needs and developing awareness and partnerships. Phase II (1999-2001) is focusing on materials development, implementation, evaluation, dissemination and professional development. The project goals are to improve student comprehension, performance, and appreciation of science; to support science teachers in content knowledge, pedagogy, and the use of technology; and to disseminate technology-based science curriculum beyond the immediate partners.

## Materials Development

Through this Berkeley/K-12 collaboration, ISTAT has developed and implemented various materials, as well as engaged in professional development and evaluation activities. Products developed over the last 5 years include:

- Nine web-based modules covering earth, space and physical sciences for grades 6 through 9, including embedded assessment tools and teacher resource materials
- A digital curriculum guide (DigiGuide) which provides easy access to modules described above, available at: <http://www.ucmp.berkeley.edu/iu/template/titlepgnew.html>
- An Earth Science Scope and Sequence for 9<sup>th</sup> grade which includes outlines to cover 6, 9 and 12 week courses, embedded assessment tools and teacher support materials. Available at: <http://perry.geo.berkeley.edu/seismo/istat/9th/feature/feature.html>
- Six-week earth science unit for 6<sup>th</sup> grade with resources and activities
- Four 2 week curriculum units for Summer Step-Up programs.
- Earth Science News is a monthly feature developed by UC team members that takes current events and news stories related to earth sciences—volcanoes, fossil finds, earthquakes—collects them and suggests ideas for classroom use. The Earth Science News is published during the academic year.

## Professional Development

Professional development (PD) and dissemination activities are a second major focus of the ISTAT project. For these activities, ISTAT members work closely with participating SFUSD teachers in presenting and training other teachers. This approach emphasizes

teachers' leadership development and highlights the nature of a close partnership. Over the last five years, ISTAT has worked directly with seventeen teacher leaders, providing training in content specific areas, technology and pedagogy. During the 2000-2001, professional development and dissemination through ISTAT included: two site presentations conducted jointly with lead teachers (6 teachers); training and presentation during SFUSD's district-wide professional development day (approx. 65 teachers); participation in SFUSD's Inquires Institute (6 teachers); one full-day workshop for 9<sup>th</sup> grade science teachers (approx. 20 teachers); and one full-day workshop for science teachers participating in the Inquires program and focusing on physical and space science (approx 20 teachers).

### **Evaluation**

Materials implementation and dissemination have included formative and summative evaluation efforts. In conjunction with the Center for Particle Astrophysics, one 8<sup>th</sup> grade teacher conducted pre- and post-tests for a unit exploring forces and motion concepts within physical science standards. Data gathered was analyzed and used to refine student materials and lesson plans, teacher comments and continued work with ISTAT team members suggested ways to improve preparatory teacher materials, suggested activities and teaching methods.

During the 2000-2001 academic year, ninth grade students in four classes at Galileo High and four classes at Mission High participated in ISTAT projects focusing on the structure of the Earth and the theory of plate tectonics. At both high schools students took a pre-test, learned the material, and took a subsequent post-test. While the tests also included non-ISTAT material, for the purposes of this analysis only ISTAT related questions that were on both the pre-tests and post-tests were analyzed.

At Galileo High data were available for a total of 43 students, 30 female, 13 male, across 4 classrooms taught by the same teacher. A comparison of the 18 pre-test and post-test items shows that overall students scored 30 percent higher on the post-test. In the three conceptual clusters covered in the pre- and post-tests, students also increased their scores, scoring respectively 18 percent, 33 percent, and 37 percent higher. Male students increased their overall score by 25 percent, while female students increased their overall score by 31 percent.

At Mission High data were available for a total of 48 students, 24 female, 24 male, across 4 classrooms taught by the same teacher. A comparison of the 24 pre-test and post-test items shows that overall students scored 15 percent higher on the post-test. In the four conceptual clusters covered in the pre- and post-tests, students also increased their scores, scoring respectively 18 percent, 10 percent, 22 percent, and 7 percent higher. Male students increased their overall score by 20 percent, while female students increased their overall score by 11 percent.

## **Challenges and Lessons Learned**

ISTAT team members have identified several challenges, suggestions and lessons learned through five years of close, collaborative work among campus units and with K-12 schools and teachers. These include:

*Teacher Participation:* teacher participation is fundamental to strong partnerships that create useful materials and professional development. Berkeley teams working in outreach efforts must include teachers at all levels, encourage ownership of the process and products wherever possible, and recognize and respect the expertise that teachers bring to a partnership. Teacher participation in joint workshops, for example, highlights their role as teacher leaders while improving peer-to-peer training and strengthening professional development programs.

*Institutional Support:* in terms of collaborations with K-12 districts and schools, changing institutional environments complicates the work of K-12 partners who must first respond to changing institutional priorities and often lack basic support for instruction, equipment, technology implementation and materials development. Additionally, teachers' participation in collaborative work depends on the institutional commitment from districts to provide compensated time for teachers to attend workshops and meetings, while covering classroom needs with substitute teachers. If districts are unable to compensate teachers for their time, collaborations must make efforts to include adequate compensation for teachers in their operating budgets.

*Dissemination and Evaluation:* It is important to continue and expand dissemination efforts. In this regard, all materials developed by ISTAT are closely aligned and reflect national science standards. This will facilitate dissemination throughout the state and nation wide. At the same time, more and better student outcome and teacher assessment can inform materials refinement and provide insights on how teaching practice changes with the use of digital learning materials. Nonetheless, the adoption of standards and effective curricular materials does not guarantee the use of either.

*Partnerships:* Rigorous standards, even with a true commitment to the teaching of Earth Science, are only a first step. On-going professional development must be provided and include content knowledge, effective teaching strategies, and attitudinal changes both within the University and with K-12 teachers. Negotiating interactions between the scientific community and the educational community can be challenging. Major cultural differences need to be addressed in order to establish a true collaboration.

## **Future Plans**

ISTAT's future work plans include: the revision and completion of a comprehensive digital curriculum guide (DigiGuide); the expansion of existing Earth Science Scope & Sequence to include meteorology material; and identification or development of materials and activities suitable to use with 6<sup>th</sup> grade classes; exploring the extension of the Earth Science Scope & Sequence to provide a fuller resources that integrates themes such as waves, scales, cycles and energy and overlapping subjects like climate and extinctions; further dissemination, evaluation and refinement of materials, including the development

of promotional materials to increase materials distribution and professional development participation.

## 2. EXPEDITION – COMPUTERS AND ARCHAEOLOGY AFTER SCHOOL

Prepared by Tamara Lynn Sturak, Interactive University Project and Expedition Program

### Background, Partnerships, and Goals

The Expedition after school program partners the Interactive University Project with the Archaeological Research Facility, the Roosevelt Village Center<sup>1</sup> community collaborative, and the Oakland Unified School District<sup>2</sup> to address shared youth development goals. The shared program goals are: to enhance the educational opportunities of low-income children in Oakland; to provide a safe and enriching after-school environment for them; to help develop their critical thinking and literacy skills; to provide access to computer technology; and through the use of computer-based tools, with archaeology as a learning framework, to facilitate and motivate children to create their own stories and artifacts and to explore their immediate community in the broader context of the world beyond their neighborhood.

Expedition follows the UC Links after school model originally developed by researchers at UC San Diego. UC Links programs are designed to link the University with K-12 students by creating activities that promote problem-solving, decision-making, and creative thinking skills in a warm, supportive environment emphasizing learning, play and technology.<sup>3</sup> Expedition involves UC Berkeley faculty, staff, and students directly with sixth graders through a service learning course, Anthropology 128, Archaeological Practice in a Sixth Grade After-school Program. This course provides undergraduates with a survey of anthropological, archaeological, pedagogical and social theories related

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<sup>1</sup> The Roosevelt Village Center Collaborative (at Roosevelt Middle School), administered by the East Bay Asian Youth Center, is the site and administrative home for Expedition. Oakland's village centers are collaborative ventures of community organizations and schools to implement coordinated, comprehensive programs and services for youth at school sites after school and on weekends. A key strategy is a vision of middle schools as community hubs for addressing several issues: there are not enough positive activities for children and youth; the hours and places surrounding school are critical to child safety; young people need more contact with caring adults; and in order to create a secure environment and significant new opportunities for children and youth, it is critical to create neighborhood-level supports and institutions.

<sup>2</sup> A California Technology Literacy Challenge Grant awarded to the Oakland Unified School District has resulted in the acquisition of computers and Internet connectivity for all middle school classrooms in the district. Part of this grant's subject focus for technology and the exercise of student's critical thinking skills is Social Studies, in particular the ancient cultures curriculum that is part of the California State Curricular Framework. The basic skills targeted in this coordinated approach are reading and writing.

<sup>3</sup> Underwood, C., Taub, L., Bielenberg, B. & Lerner, D. (1998). UC Links: Building a pipeline to higher learning through after-school technology-based activities, 1998 Annual Report. University of California Office of the President.

to the program's goals. It also gives students a unique and socially responsible field study experience. This allows them to develop their skills in participant observation, creating ethnographic field notes, and developing research questions to be answered with their own field data. This course also fulfills the field methods requirement for Anthropology majors.

## **Program Overview**

The primary focus of Expedition is to provide an environment where children can spend time with adults in playful activities that are fun, but that also enhance their computer skills and engage them in critical thinking, reading and writing

The "hidden" educational agenda of Expedition drives the highly structured focus of our "play" activities. Each educational game or activity has a pre-defined set of tasks that must be accomplished to move on to other levels or games. These are laid out as beginner, good, and expert tasks. This structure provides children the opportunity for strategizing and planning activities that are missing in a freer play setting. Another key objective is for the children and the UC Berkeley students, to interact and play in a nonhierarchical setting. Adults are instructed to encourage children to read the instructions themselves and to make their own decisions. They act as older brothers or sisters in this environment, providing hints, encouragement and companionship. They do not teach in the traditional sense or act as experts. When children work and play with university students who share some of their cultural backgrounds, we have seen an increase in self-esteem and confidence. Through role modeling, we hope to inspire Roosevelt's students to seek higher education as an attainable and worthwhile life choice.

Expedition's activities have been designed for Roosevelt specifically to coincide with the ancient cultures social studies curriculum in the sixth grade. All of the activities have been selected by faculty and UCB students. The Berkeley students have written and designed all of the activity card instructions that guide the play activities.

## **Middle School Students**

Roosevelt Middle School, in Oakland's San Antonio neighborhood, is one of Oakland's most culturally diverse schools. With a large population of recent immigrants, literacy is a major challenge, with 64% of the students in limited English proficiency (LEP) status. Eighty-two percent of Roosevelt's 1,090 students qualify for a school-provided lunch program. During 2000-2001, 75 children came to Expedition at least one time. Thirty-six children were regular participants, providing us with most of the ethnographic data.

The children's ethnic profiles were: African American / Black (11), Chinese and Chinese American (6), Mexican American (5), Asian (1), Latin American (1), Native American (1), Honduran (1), White (1), and Salvadoran (1). Languages spoken at home included English (17), Spanish (13), Spanish and English (2), Chinese (2), Cantonese and Mandarin (2), Chinese and English (1), and Mien (1). Fifteen children had a computer at

home, and eight children had used email. Twelve children did not have a computer at home. Asked at the end of the school year if they planned to attend college in the future, 14 children said “yes” or “definitely yes” and one child said she was “not sure.”

### Activities and Skills

Expedition’s thirty unique after school activities included computer games, CD ROM resources for various countries and cultures, hands-on archaeology activities, and improvised activities to meet a child’s individual needs. UC Berkeley undergraduates staffed Expedition two days each week for 22 weeks, resulting in 1,558 child contact hours.

### **Student Outcomes**

Berkeley Anthropology undergraduates were required to write up detailed field notes after each Expedition session. Their field observations focussed on individual students and activities, their interactions with other students and adults, as well as their interactions with computers and other activity tools. Thus, we have very deep and detailed qualitative field data on each child in the program. This year we also interviewed three teachers of the students in our program. The teacher interviews confirmed several of our most consistent observations. Some of these observations are summarized here in boldface, and illustrated by only a few of the relevant notes from the school year’s field observation data.

#### ***One-on-one practice with an adult greatly increases literacy in students who are below grade level in reading, writing, and English speaking skills.***

Expedition had a large number of non-native English speakers this year. We think this happened primarily because children bring their friends to this program. Furthermore, LEP children brought their friends to this program because our staff included several bilingual mentors.

“After talking to him for a while he realized that I was actually going to help him read and understand the questions. First he would say that he did not know how to read English. Then he admitted that he knew, but he did not understand what he was reading. After a while, I got him to read everything and he would actually ask me why some words have different meanings sometimes.”<sup>4</sup>

“Edwardo is more quiet than Olivar I think because he does not know English that much. But he is paying attention all the time. They like to learn things because they are asking questions all the time. Mostly about English and reading..”<sup>5</sup>

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<sup>4</sup> Field notes of Eva Aguilera-Aisner, October 3, 2000.

<sup>5</sup> Field notes of Eva Aguilera-Aisner, October 20, 2000.

“Having worked with Edwardo before I’ve noticed that since the program began his English has improved.”<sup>6</sup>

Also, native English speakers who were below grade level in reading skills were supported and more willing to practice reading in one-on-one situations.

“For example, times when I was working only with Taneesha, she was persistent in her reading and even though she may have felt challenged, she was comfortable in taking the time to sound out words, and we wouldn't go on until we had read it correctly. Since we have been working in groups, she has been afraid to read, and often the others are so anxious to read, that she ends up not reading at all. And when she does read, she is definitely not as persistent in sounding out the difficult words because there is an audience of her peers listening to her, and perhaps she is embarrassed that her reading ability is not as high as theirs.”<sup>7</sup>

***For some students, including another child or two in the supportive small group setting is equally helpful.***

“They slowly read the instructions together, one sentence each. Most of the time they were able to read what it was, but not really understand, in which case I would have to explain it to them. ... Their comfort shows in that they are less afraid of situations and even more willing to try. They are not embarrassed by reading in English and they are beginning to be more vocal with the English they do know.”<sup>8</sup>

***Hands-on activities and problem solving games are very effective learning tools, especially for children who have difficulty with the dominant paradigm for learning in our schools.***

“Once we started to play, he really got into it. He made sure he knew exactly what was going on, and he asked a lot of questions. For example, when we had to decide whether or not to build a stronger wall, he thought about it a long time before making his final decision, and he went over all the pros and cons with me.”<sup>9</sup>

“She seemed to enjoy seeing and touching things, putting bits of history back together again. She would analyze the artifacts in detail, what were they used for, where were they made, and I was excited to see what type of conclusion she would come to.”

“When I asked him what he is interested in doing today, Charlie started off with a little explanation of what he would like to do. He had a long day in school and

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<sup>6</sup> Field notes of Kobie Lyons, December 5, 2000.

<sup>7</sup> Field notes of Rebecca Sampson, November 8, 2000.

<sup>8</sup> Field notes of Sergio Serna, October 3, 2000.

<sup>9</sup> Field notes of Sheila Bock, February 13, 2001.

wants to do something which is a lot of fun. I asked him what he meant by having a long day, and he responded 'my teachers always tell me what to do in class and I don't like that. They should lighten up a little.'

... Charlie completed the game in less than thirty five minutes. He was really excited about not being told what to do."<sup>10</sup>

"We took more notes on the artifacts that we found and used our archaeological sketches to reference the objects to the book. The girls were excited about this game and wanted to explore every room as it magically transitioned to the past and filled with life and color. They specifically were interested in the grinding of the corn, and Anita was delighted to know that she could make baskets the way the ancient Pueblo People could."<sup>11</sup>

***Children's self esteem and self confidence flourish and increase markedly in a setting where they are permitted to be the experts, with adults who have abandoned the authoritative role.***

"This activity has been great for both girls because they love the pottery and the kiva (ceremony room). They have both wanted to look up more information than necessary for the game and have read aloud from the book on their own. They have corrected my pronunciation on more than one occasion for words like "metate," which are similar to Spanish."<sup>12</sup>

"Like many other students, Anita seems to show more confidence in her abilities, taking a risk in trying them out, with the more challenges she successfully overcomes. ... It is at this level that I am starting to see a definite change in Anita's approach to the game. She is now more independent, challenging the ideas that I put forth. I have often detected a sense of doubt in her after I have answered some of the questions that she has asked, but she has never been so forward as to openly challenge my ideas. I am happy to see the change."<sup>13</sup>

"In all the other times I had worked with her where we were both starting out on an activity, she always looked to me for guidance and tried to make me make decisions for her. But now, she was making decisions for the tribe on her own and then asking ME my opinion. It was interesting. I should play dumb more often."<sup>14</sup>

"At one point during the day, Olivar turned to me and asked me if I spoke Spanish. The question came completely out of the blue, so I was kind of surprised. It had nothing to do with what we were talking about at the moment. I told him no, and then asked if he would be willing to teach me some. He seemed

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<sup>10</sup> Field notes of Rezaul Bashar, November 1, 2000.

<sup>11</sup> Field notes of Jennifer Vakiener, March 13, 2001.

<sup>12</sup> Field notes of Jennifer Vakiener, March 13, 2001.

<sup>13</sup> Field notes of Cynthia Sperberg, October 31, 2000.

<sup>14</sup> Field notes of Jenny Yap, November 7, 2000.

happy about this, and he promised to teach me some things next week. I think he liked the idea of switching roles with me, where he would be the teacher and I would be the student. It gave him a sense of power and confidence in the program that he did not seem to have before.”<sup>15</sup>

***In general sixth and seventh graders do not like to write and will go to great lengths to avoid a writing task. However, Microsoft Word is a very popular activity. When given the option to type on the keyboard, students are eager to write.***

“Charlie did well on this activity. He learned what ‘double click’ means, and how to copy and paste on Word. He was really productive.”<sup>16</sup>

“When he noticed that line would appear under a word he had typed, he would realize he had spelled it wrong. I never saw Microsoft Word as a learning tool, but he was able to spell the words correctly because immediately when he misspelled the words a line would appear.”<sup>17</sup>

“Although her letter to Supernova was very short, her writing was much better. Her sentences were complete and contained no misspelled words.”<sup>18</sup>

In our conversations with three Roosevelt teachers, they were quick to mention steady improvements in the English language proficiency of all of the students mentioned here, as well as others. One Expedition student brought his math grade up from a C- to a B during the year, and his math teacher attributes his increased effort to his participation in and devotion to the Expedition program. She described him as a “quick learner, with a very short attention span.” Another Expedition student was described as having made great progress in English, in writing, and in computer skills. Two Expedition students were given their own computers by their mothers during the year in recognition of their intense interest in computers and their dedication to the after-school activities.

Throughout the year the Expedition staff and Roosevelt teachers noticed gains in self-confidence, cooperative problem-solving, reading and writing skills, content knowledge of ancient history, and computer skills. In summary, we found that the Expedition after school program stimulated confidence and learning in many children, but most notably among youth who are shy and silent in larger groups. These are often students who need extra patience and attention with their emerging English skills. They are students who have difficulty sitting still and listening all day. They are young people who do their best “work” and their best learning in a small group. This supportive environment is created with a wide and rich array of activities, a very small adult to child ratio, a purposefully non-hierarchical role structure, and an overall goal of fun.

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<sup>15</sup> Field notes of Sheila Bock, February 20, 2001.

<sup>16</sup> Field notes of Danielle Zika, October 10, 2000.

<sup>17</sup> Field notes of Sergio Serna, October 10, 2000.

<sup>18</sup> Field notes of Arian Schulze, February 20, 2001.

## **Challenges and Opportunities**

Our model of “plugging in” the after school program to the larger program of the Roosevelt Village Collaborative (RVC) has proven successful, sustainable, and efficient for UC participants. The RVC has institutionalized the after-school relationship with the school district, Principal, teachers, and parents. They provide the administrative framework and data collection for our activities. They staff the school site, provide security, screening, and structure. They save us innumerable hours in accessing student data and interfacing with parents. They have provided transportation for our field trips. This collaboration has been a win-win situation for everyone involved.

A major challenge to the quality of our work at this site has been the lack of Internet access in the computer labs, and in fact, in most of the school. The infrastructural access has been “close to completion” many times over the past two years. Our staying power with this program, though, has led to a major breakthrough in this area. In the spring of 2001 several UC Berkeley Information Systems & Technology (IS&T) staff offered to help finish the network at Roosevelt. They went to their managers, and all agreed that this project was important enough to IS&T that staff would be granted release time to complete the network wiring and connectivity at Roosevelt. A retired UC network design expert stepped forward to assume the lead technical role.

As of June 2001, IS&T’s Roosevelt networking group has done most of the work to completing the Internet link to Roosevelt Middle School. It is impossible to relate in the context of this report the amount of good will this has generated toward UCB at this school and in this community. Furthermore, the teachers have a renewed enthusiasm for using the computer labs in their future teaching practices. And the availability of the Internet will enable us to more readily expand computer lab access to families. This story validates that a small amount of effort and expertise, with a significant amount of coordination, can take school-university-community partnerships to unprecedented heights.

### **3. SAN FRANCISCO UNIFIED SCHOOL DISTRICT'S URBAN SYSTEMIC PROGRAM: INFORMATION TECHNOLOGY PATHWAY PROJECT**

PREPARED BY DEBORAH MCKOY, PHD, INTERACTIVE UNIVERSITY

#### **Background:**

The San Francisco Unified School District's (SFUSD) Urban Systemic Program (USP) Information Technology (IT) Pathway, funded by the National Science Foundation, is designed to improve K-12 math, science and technology education and prepare students for college and careers. The goal of creating career pathways in urban schools is to provide students with a more contextualized and meaningful education by offering a series of courses around a particular career theme, e.g., technology. The goals of the IT Pathway closely align to those of the UCB outreach efforts to prepare San Francisco students to attend college and have successful futures.

The IU is currently entering its third year of work as the USP technology curriculum partner providing a range of expertise and research assistance to the district and teachers. In year one (1999-2000), the IU worked closely with SFUSD to identify curriculum and staff development training to enable schools to create IT Pathways. The work of this partnership includes a great deal of collaboration with SFUSD teachers to develop IT curriculum, internet tools, and a set of work-based learning activities for teachers in the SFUSF USP to develop and adapt in their classrooms. The overall mission of the IT Pathway is to enable students to successfully transition from high school, through college and into high-skill, high wage information technology careers.

In year two (2000-2001), the partnership successfully piloted the IT Pathway introductory course at one high school, John O'Connell, conducted a series of staff development workshops and completed an extensive formative evaluation. The goal of this evaluation was to inform and support the future expansion of this program to other schools throughout the district seeking to develop IT Pathways. During this initial year, ten 9<sup>th</sup> grade Introduction to Technology courses were offered to 218 freshmen. In the remaining three years, the focus of this partnership will be to continue to build and expand IT Pathways with other high schools, including but not limited to Mission, Burton, and Marshall. Conducting a summative evaluation of this program will be a major aspect of this work for the next three years of this partnership.

#### **Key ways this program links to the UC Outreach:**

##### **(a) Teacher Professional Development**

Development and implementation of an IT Pathway required a range of on-going professional development activities. Prior to the start of this initial implementation year,

two week-long summer institutes were held at UC Berkeley for teachers from John O'Connell and Mission High Schools (which is also in the process of developing an IT Pathway). The institute's goals were two-fold: (1) prepare teachers to teach the new IT curriculum and (2) create a community among teachers to work collaboratively with each other, the District, and UCB to implement the IT Pathway. Six additional IT curriculum workshops were conducted throughout the year to build on what was learned during this summer institute. In addition to this, the IU hired three undergraduate students, with an education minor and technology background, to work in the classroom, providing one-on-one technical assistance to the teachers and their students.

### **(b) Coordination and collaboration across UC and school sites and work with partnership schools**

The USP IT Pathway program provides a good model to demonstrate how the IU works in close collaboration with local schools and other UC departments. IU staff has reached out to the Graduate School of Education and other departments to recruit undergraduate and graduate students to serve as in class coaches for Pathway students and to develop innovative IT curriculum and integration materials. The IU is also in the process of working with a range of UC Berkeley departments to develop web-based curriculum for the more advanced Pathway courses.

At the local school level, IU staff has sought to work directly with USP teachers and administrators throughout the creation and implementation of the program. By working so closely with teachers, the USP program model is developed from the "ground up" avoiding significant implementation issues when top down programs are imposed on classroom teachers. This "ground up" approach will also ensure greater ease and ability to expand the IT Pathway model to other schools achieving the USP goal of systemic, not marginal, reform.

### **(c) Disseminating info to teachers, families and communities**

The IT Pathway program focuses on a project-based learning methodology which lends itself very well to public exhibitions of student work thus exposing parents and the community to the impressive work created through this partnership. For example, John O'Connell High School took advantage of the development of multi-media Internet projects to demonstrate students' knowledge and abilities in technology by holding several community gatherings over the year. This not only provided an opportunity to engage parents in learning what their children were doing in the classroom but to demonstrate to the community and school evaluators how technology can be a powerful tool for learning across curriculum.

Students' Internet projects were integrated with a wide-range of other courses including math, English, social studies and science. During end of the year exit interviews, all participating teachers stated how surprised they were that their students' other teachers

had them use skills they learned in the IT Pathway course for final projects and other assignments. This demonstrated the ability of the IT Pathway to affect the work and classroom activities throughout the school.

#### **(d) Evaluation Program**

Evaluation research is a major focus of the USP and includes a one-year formative evaluation and three year summative evaluation, collecting qualitative and quantitative data. While formal, or traditional, achievement measures will be utilized, the IT Pathway evaluation is framed from an action research perspective particularly important in partnership programs such as the USP. This requires the participation and involvement of all stakeholders, e.g., the teachers, students, parents, administrators, and the community.

The formative evaluation conducted this past year, was designed to collect and share with program managers, planners and staff information that will lead to the modification and/or improvement of the IT Pathway program. Four stages of this process included: (1) setting the boundaries of the summative evaluation; (2) selecting appropriate evaluation methods; (3) collecting and analyzing information; and (4) reporting findings about changes to be made in the program for its future implementation.

As there was only one high school participating in the first implementation year, this lent itself to a case study methodology. Data collection included: pre-post interviews with students, teachers and administrators; observations of classes and final presentations, and review of student work. By working collaboratively with participating teachers, students and administrators over the year, three areas were identified for research during the formal, summative evaluation: (a) what are students' learning outcomes e.g., are students able to use the technology they learn in an introductory Pathway course to other academic classes; (b) what is the effectiveness of the staff development training e.g., are teachers able to work collaboratively and integrate technology across subject areas thus preparing students for the demands of college and professional work; and (c) what is the responsiveness of the school administration to restructuring its organization around an IT Pathway, e.g., are high schools able to break from traditional subject organization integrating courses around a career theme.

The IU evaluator will continue to work closely with teachers and the SFUSD research department to collect multiple forms of quantitative data during the summative evaluation period. This will include formal, or traditional measures of student achievement e.g., testing scores, attendance rates, and grade point averages (GPAs). The evaluation overall will be aimed at determining whether there was any change over time among USP IT Pathway students and others not participating in the program.

#### **Key successes (reflections from teachers and students):**

As the IT Pathway partnership with SFUSD enters into its third year, many accomplishments have been seen. These include:

- The implementation of ten 9<sup>th</sup> grade Introduction to IT courses by teachers at the initial, or pilot, high school. This course will provide a solid foundation to continue to build this and future courses in the IT Pathway, e.g., web design and development.
- IT curriculum was adapted and built on by incorporating authentic project-based learning opportunities providing motivating and challenging academic work for students. This methodology was particularly effective at teaching students about “SCANS Skills” – e.g., problem-solving, critical thinking, and team work.
- The IT Pathway Course provided curriculum integration opportunities among teachers both participating in the USP initiative and at least five core academic teachers. As the USP is intended to create systemic reform, the use of IT skills in developing web based projects by teachers across academic subjects and departments demonstrated the potential to create transformative rather than incremental change in how a school integrates technology to teach math and science. Boundaries between these and other academic subjects become blurred as students engage in exciting project where they put these skills to “work” rather than simply apply them to a test.

### **Key Challenges and Future Work**

**1. The IT Pathway curriculum will be supplemented with additional digital curriculum and resources created by the IU.** The IT Pathway teachers had to do a lot of additional research to prepare challenging and interesting lesson plans for their students. This additional web based materials will provide an important supplement to the prescribed technology curriculum provided by SFUSD during this first year.

**2. The IU has created an undergraduate course in the Graduate School of Education providing field placement opportunities with IT Pathway teachers.** This was done in response to the need for more one-on-one technical support in IT Pathway classrooms. The UCB students will learn about how technology is being most effectively implemented in urban high schools by actually creating web-based projects with IT Pathway teachers.

**3. The SFUSD School-to-Career Office is collaborating with the IU to provide greater connections and linkages to high tech businesses necessary to teach youth about future technology careers.** In the first year, there was little support to teach career related content in the 9<sup>th</sup> grade class. A key reason was that the school to career office was not staffed as well as had been intended when the IT Pathway program was initially designed. By working more directly with businesses the real world application of IT skills will made visible to students.

## 4. BAY AREA WRITING PROJECT (BAWP)

Prepared by BAWP and IU staff

BAWP, one of 12 Interactive University Internet Learning Community Projects (ILCP), works in collaboration with the UCB Graduate School of Education Bay Area schools, using expository writing in social studies and language arts curriculum to improve students' historical thinking and writing skills. BAWP is a collaborative program of the UC Berkeley and Bay Area schools, dedicated to improving writing and the teaching of writing at all grade levels and in all disciplines. The Project includes an expanding network of exemplary classroom teachers, kindergarten through university, who, throughout the summer and school year, conduct professional development programs for teachers and administrators. The Bay Area Writing Project operates on a teacher-teaching-teachers model. Successful teachers of writing attend Invitational Summer Institutes on the University of California, Berkeley campus. During the school-year, these teachers provide professional development for other teachers in schools. The Bay Area Writing Project was established in 1974 in the Graduate School of Education on the Berkeley campus. Each year close to 4,000 teachers participate in BAWP summer and school-year programs. For many, BAWP remains a resource throughout their teaching careers. BAWP's commitment to the professional growth of teachers is key to the high-level of interest by classroom teachers and to their enduring support. BAWP overall goals:

- To increase the academic achievement of the Bay Area's diverse student population.
- To improve student writing abilities by improving the teaching and learning of writing in Bay Area schools.
- To provide professional development programs for classroom teachers.
- To expand the professional roles of teachers.

As the flagship site of the National Writing Project; BAWP's program model and design are replicated at 160 colleges and universities throughout the country and five sites internationally.

### *BAWP's IU/OUSD Foundations Program*

In 2000/2001, BAWP's 5<sup>th</sup> Grade Foundations Program was the focus of its IU work. The goal of the this year's Foundations Series was for teachers, supported by technology, to improve student achievement in writing. To reach that goal, teachers learned strategies to teach writing, learned and practiced technology skills, and used technology to support relationships and collaborate in the teacher and classroom communities.

Participation in the series ranged from 40 at sessions to 12 at a session. Eventually, a core group of about 15 teachers surfaced and participated in almost every session. A sense of community developed for this group, and ease in discussion was formed.

At the first workshop meeting, the Foundations Program was reviewed, and aligned with the OUSD writing and technology standards. It was emphasized that the focus was on writing achievement as supported by technology. The district social studies curriculum was to be tied in along the way. The participants would also be researchers—testing and learning new technologies, and in turn using them, just as they would in their classrooms.

The year-long workshops were designed to model one way of setting up a writing community. Each month focused on a specific aspect of building a writing community. The sessions were designed to include: writing standards, the social studies Williamsburg curriculum, literature,

student work and technology strategies. The workshop titles and brief summaries follow a note about the use of *blackboard.com*.

*blackboard.com:*

A backbone technology component of the workshops, a *blackboard.com* site was used as an instruction tool for this year (<http://courses.berkeley.edu:8000/courses/BAWP21>) (password required). *blackboard.com* provided teachers with easy access to all of the course materials and to on-going communication in the form of on-line conversation between the participants. By using *blackboard.com*, teachers saw how a web-based tool might increase student access to information, to the school and to other students. The *blackboard.com* site also allowed teachers to be receivers and senders of information; it was the medium for the teachers to write literature logs to each other, post struggles and successes, and house monthly reflections about the sessions. As we have discovered before, our how-to's and understandings paralleled those of the students we teach.

*Professional Development in writing assisted by technology:*

- Who Are We? Introductions and expectations of the year-long series. Teachers created a homepage using *blackboard.com* after a session on memoir writing. *Tech strategies: blackboard.com navigation Writing strategies: memoir, feedback*
- Relationships: How to use literature logs to get to know students and to deepen reading comprehension through writing letters. Teachers looked at student literature logs. Created teacher reading and literature log groups. Used *blackboard.com* for the dialogue log. *Tech strategies: discussion board in blackboard Writing strategies: literature logs and point of view, looking at student work (This covered two sessions.)*
- Interactive Report Writing: How can we use multiple sources of data and technology to create an informative and engaging piece of "report" writing? Teachers collected data from multiple sources and used author Mary Blocksma as a model for report writing. Methods of feedback were discussed and student work was presented. An interactive tutorial was used to show how to make a text interactive by including URL's, images, sound and hypertext links and how to turn it into a web page. *Tech strategies: Web search, Apple works text to html Writing Strategies: authors as models, feedback methods, "report writing," use of prompts, social studies curriculum*
- Studio Time: To develop a tech embedded assignment and or materials for the classroom
- What do you see? Point of view writing presented in a multimedia format. Teachers practiced one strategy for point of view writing. We responded to a prompt, shared characteristics of point of view writing, and read and wrote continuation pieces from Bull Run by Fleishmann. We discussed how to develop a rubric and the practice needed to teach this genre. *Tech strategies: intro to Hyperstudio Writing Strategies: quick writes, small group discussion, unpacking our own writing and the writing of authors, creating a rubric and identifying practice*
- Just Tech: How to create a hyperstudio stack. This session focused only on Hyperstudio software. We worked through a tutorial and covered the following tools: stacks, cards, objects, buttons, NBA's, clip art, background, sound, voices and Extras.

## **Evaluation**

At the final workshop session for the academic year, participating teachers were asked to characterize their experience in the Foundations Program. The responses were analyzed by the workshop leaders, who used the trends or themes they saw to develop strategic plans for future

similar or supplementary workshops, as well as to think about to target the core group of participants for support in the future.

While participant answers were open ended, they were asked to respond to four key questions:

- What I expected
- What I got
- What I valued
- What I need now

In general, teacher expectations were unfocused or “low.” What they most often said they got was information and knowledge about computers, tech support, and exposure to or mastery of software programs and techniques. What was most valued was face to face contact and help—both from the workshop leaders and from the community of participants. What they say they most need now is continued support and access to more hardware and software.

### **Challenges and Lessons Learned**

Despite reviewing the overall goals and focus of the workshop a number of times, there was a tendency for some teachers to separate the technology from the writing, and often at a distance from student learning. Some teachers greatly appreciated the writing strategies while others expressed satisfaction with the straight technology tutorials and explicit handouts. Technology was seen as a thing rather than one of the tools in a classroom and school community.

There was a wide range of teacher knowledge in technology and writing strategies. The two-hour time frame did not lend itself to unearthing the knowledge of the group, and we often skimmed the surface of the potential group knowledge. In-depth discussion and sharing would happen during reflection time and through the discussion board, in a very limited way. Rarely was the blackboard site used outside of the workshop. There was a desire from some teachers to discuss current issues that were affecting them at their school sites: It was proposed they start a discussion in *blackboard*; it never materialized.

The session on literature logs had a great impact on many of the teachers. They got a true sense of what it was like by reading the letters between students and teacher. They were able to see a student change over time and how the teacher used the logs to create relationships and connect classroom practice to the individual. Teachers were able to connect to their own classrooms—one teacher realized how web-based email could create these kinds of relationships in his classroom; he had a community that wanted to participate in the classroom, but he didn’t know how or where to use them. Relationships through email became a possibility for him; thus the use of technology became viable and real.

It was important to make these sessions not just a showcase of lessons, but an opportunity to lift the veil and look inside to the making of the practice. When technology was involved in this loop, more time was needed to cover the technology nuts and bolts plus the how’s and why’s of instruction linked to student needs. Time, then, was needed for teachers to create their own lessons. We were only able to dig that deep once or twice.

One month, we made changes in the agenda and designated the next session to be Studio Time for teachers to apply what they had learned. Studio Time was good in that there was more time to practice what they had learned and to work on their practice. Teachers also shared what they were

working on and how they were using the technology. One teacher designed an interactive report writing assignment tied in to Black History month.

As mentioned, the course was housed in *blackboard.com* and teachers early on learned how to get to their site, navigate, create text and participate in the discussion board. This was a struggle to start because the workshop was on a drop-in basis and some of the teacher information was incorrect. Even though names were entered prior to the course, there would always be a few teachers who were not on the list and had to be enrolled during workshop time. As we learned and used blackboard during the first few sessions, some teachers thought that this was a course on *blackboard.com* (teachers who had not attended the first session). They lost sight of the writing component as they worked to learn *blackboard.com*. This back and forth swinging between learning the tech skills and applying them to writing prevailed throughout the series. In time, we accepted it and knew it would be a constant factor in our teaching. There was an interest by one or two teachers to use workshop time to create *blackboard* sites for their classrooms.

When technology was the focus, instructions had to be presented in numerous ways. There were handouts, tutorials, one-on-one assistance, visuals and verbal instructions. In addition to posting the handouts on the *blackboard* site, teachers wanted a hard copy. (An indication that they were not using the site?) Teachers especially appreciated the hyperstudio tutorial where we created a stack together and used a detailed instruction sheet as backup.

The teachers greatly benefited from the presence of the OUSD Technology Support team. They were able to load software, get the lab ready, troubleshoot during workshop time and assist in one-on-one support. The support team knew the equipment in the lab, the teachers, and the equipment the teachers had in their classrooms. Teachers were able to communicate with them their on-going tech support needs.

In the final analysis, the core group of 15 teachers who attended most of the series learned a number of writing strategies and ways technology can support that writing. They took on the challenge and were willing to experiment and try new techniques with enthusiasm and collegiality.

Outside the workshop, teachers rarely used *blackboard*, though there was an interest to use it within their classrooms to facilitate dialogue. Perhaps the content of the workshop and the reflection questions seemed too distant from the immediate needs of the classroom. The dependency on hardcopy might suggest lack of access to technology inside and outside of their classrooms, lack of time to get to the site, or not knowing how to use the site.

A tendency exists to look at technology as a separate entity rather than looking at student needs and then evaluating the possible solutions, one of which may be technology supported. This could be true because of the learning curve for most software and equipment. It does raise the issue of who holds the knowledge? What happens when tech savvy students work in an un-tech savvy classroom? Might these students not have a means to show what they know? Can students and teachers share the knowledge?

## **The Future**

It might prove useful to look at teaching and learning by focusing on student knowledge first (standard), then assessment followed by practice. Technology naturally becomes one of many

tools teachers can use to meet and evaluate what students know and can do. We can also ask how technology can improve or create classroom and school wide structures and systems.

Each teacher represented a unique school site configuration of technology, support and skills, therefore, in addition to providing generalized instruction, it might be beneficial to allow time for teachers to customize to their specific classroom needs.

A number of teachers re-visioned the role of technology in their classrooms and might be ready, with time and support, to bring these ideas into fruition. This journey could be beneficial for not only the teachers and their schools but for the larger educational community.

## 5. CONNECTING STUDENTS TO THE WORLD

Harry Kreisler: Executive Producer  
Nanou Matteson: Program Coordinator  
Letitia Carper: Web Manager

Started in the fall of 1996, Connecting Students to the World (CSW) is an educational program developed and produced by the Institute of International Studies at the University of California, Berkeley. Established in 1955, the Institute of International Studies promotes interdisciplinary research in international, comparative, and policy studies. Professor of Geography [Michael Watts](#) is its Director, and [Harry Kreisler](#) is the Executive Director. The current emphasis is on the following intellectual themes:

[Peace and security after the Cold War](#)  
[Environment, demography, and sustainable development](#)  
[Development and comparative modernities across regions](#)  
[Globalization and the transformation of the global economy](#)

To implement this research and training agenda, the Institute has several major [research programs](#), and provides support to Berkeley faculty and fellowships to Berkeley graduate students. Ongoing research colloquia bring together faculty, advanced graduate students, and visiting scholars for discussions. The Institute hosts distinguished visiting fellows who participate in Institute programs while in residence at Berkeley. Its [public outreach](#) programs include lectures, forums, and conferences. The Institute also produces videotaped interviews with distinguished international figures, and these are a regular feature on UCTV. The Institute's award winning web site at <http://globetrotter.berkeley.edu> is a pioneer in using the World Wide Web to link academic research in global affairs to policymakers and the general public.

Because of these resources, the Connecting Students to the World (CSW) program is a unique effort to translate academic research on international/global issues into a form useable by high school students throughout the world.

The site has been recognized for its outstanding achievement by the National Endowment for the Humanities, the New York Times, the Scout Report, Cal Monthly, MSNBC, USA Today, Netscape, and Lycos. Globetrotter, the server for the Institute's site, which houses the K-12 outreach program, receives on the average 160,000 hits per week. K-12 sites throughout the country have linked to our site.

The (CSW) program uses the Internet and the World Wide Web to further collaboration between the university and K-12 educators. At the heart of the program is Conversations with History, <http://globetrotter.berkeley.edu/conversations/> which features interviews with distinguished men and women from all over the world who talk about their lives and their work. There are 200 one -hour video taped interviews in the archive and approximately twenty to thirty are added each academic year. Close to one hundred have been posted on the world wide web in text with images and video.

Connecting Students has worked closely with teachers from over 10 different schools. In addition to Oakland and San Francisco School Districts, we are working with Monterey and Mendocino School Districts and several private schools. We have also made presentations at Columbia University, NYU, and the California State Library Convention and to Educause conferences in Orlando and Long Beach.

As part of our collaboration with teachers we have created a K-12 portal on the home page of our site. <http://globetrotter.berkeley.edu/>

This entry point guides teachers to the many resources available to them through the Connecting Students to the World program. Working with teachers, we have produced and organized resources especially for educators.

Compiled and grouped materials are helpful for both teachers, in creating their lesson plans, and students, for conducting research on a topic. So we created research galleries, <http://globetrotter.berkeley.edu/PubEd/research/> where interviews and other links are organized by topic for high school or college-level students, and K-12 themes that cut across topics <http://globetrotter.berkeley.edu/PubEd/CSW/themes/>

The teachers we've worked with have told us that their students are eager to attend UC Berkeley, but often are unclear as to what is taught here. So we produced interviews with Berkeley faculty, in which UC Berkeley faculty talk about their lives and work <http://globetrotter.berkeley.edu/PubEd/CBF.html>

Interviews with Berkeley alumni, where Berkeley alumni from a wide variety of professions talk about their lives and the impact of their years at Berkeley, give students the opportunity to get a glimpse at where an education at Berkeley can lead. <http://globetrotter.berkeley.edu/PubEd/CBA.html>

Teachers across the United States build their curriculum based on National and State Standards. In order to best assist teachers in their task, we are working on identifying the intersection of our resources with these Standards. <http://globetrotter.berkeley.edu/PubEd/CSW/standards/SFstandards.html>

Learning how to interview teaches students research skills, organization, social skills, and an ability to write. Our site takes a student through the steps necessary to be able to conduct a successful interview. <http://globetrotter.berkeley.edu/PubEd/interviewing2/>

To help teachers utilize our resources, we have developed a teacher-planning guide, where they can create a teaching unit using our resources. <http://globetrotter.berkeley.edu/PubEd/CSW/worksheet.html>

Hearing from teachers what their needs and challenges are, helps us to adapt our material so they might most easily use it. We interviewed teachers from SFUSD to hear what they have to say. <http://globetrotter.berkeley.edu/PubEd/CSW/SFteachers-00.html>

In order to maximize enrichment provided by the Conversations with History archive, the Institute of International Studies occasionally arranges chats or email exchanges between students and distinguished Berkeley faculty or visitors who have participated in the archive. The program has conducted 13 chats or e-mail exchanges with more than 500 students. <http://globetrotter.berkeley.edu/PubEd/CSW/chat-list.html>

The basic elements of a chat or email exchange are as follows:

- teachers plan a unit that meets state standards and which incorporates the use of a Conversations with History interview,
- students prepare by studying the interview and other relevant material,
- questions and answers are sent and received electronically between students and guest, and
- the Institute puts the exchange up on the web as part of the Conversations archive.

Demonstrating how a teacher has successfully interfaced with our resources defines a path that others can follow. We have shown the steps one teacher took in Connecting Students to the World. <http://globetrotter.berkeley.edu/PubEd/CSW/casestudy1.html>

This past academic year we have added 23 interviews and eight new research galleries. We are in the process of building web sites on women's rights, in consultation with teachers, and a site on DNA and Human Rights. Since the beginning of the project, there has been an emphasis on collaboration with other units and this effort continues to grow. Units that have worked with CSW include the Human Rights Center, the Townsend Center for the Humanities, the Institute of Governmental Studies and faculty from political science, sociology, biological sciences, philosophy, public health journalism, English, physics, engineering, and optometry

*Comments from Students and Teachers on CSW:*

**Tim Jollymore, Oakland School District teacher:**

“If you could arrange at your school a convention hosting 175 of the most important thinkers and creators of recent years, including Nobel laureates, top scientists, political leaders and shapers of world policy, and, further, have some of these eminent folk hold breakout sessions with your students, would you so arrange? If all that were required was the push of a button to accomplish this world symposium within the walls of your classroom, would you do it?

‘Please don't ask what is it./ Let us make our visit.’

‘Mr. Watson, come here, I want you,’ can easily, 124 years after, become, ‘Mr. (Oliver) Stone, come here, we want to question you!’ How?

That little invention called the internet and the long time efforts and developments of Mr. Harry Kreisler of UC Berkeley's Institute of International Studies have conspired with OUSD's Urban Dreams to bring important thinkers and doers of our world into

classrooms in an intimate, useable way, <http://globetrotter.berkeley.edu>. A student who seeks perspective on the Viet Nam War, wonders about the relation of Power to Truth, or searches for advice on the work of writing can find ample supply from the wisdom stores of Daniel Ellsberg or John Kenneth Galbraith; Nigeria's Wole Soyinka or South Africa's Albie Sachs; and Japan's Kenzaburo Oe or Brooklyn born Norman Podhoretz. The good news is that the required reading is compelling and authentic! It challenges the student mind and sensibilities.”

**Thais DaRosa, San Francisco Public School District:**

“My students worked individually, accessing current contemporary events of the area in which we were studying. We generally work six to eight weeks on a particular area or region of the world. They were already connected to the Web in their search for relevant news, contemporary news. Then we tried a couple of sample interviews from *Conversations with History*. I gave them some practice locating the site, bookmarking it, and looking at the focus topic, which was the values or the motivations that led the person to the action which they were primarily being interviewed about. And then subsequently after the interview focus, which was Wei Jingsheng's interview, <http://globetrotter.berkeley.edu/people/Wei/wei-con0.html>

I had the students create their own interview with their relative or other person who had been meaningful to their lives.”

**Erin and Trisha, high school civic students at Lowell High School, San Francisco:**

“Hello! We enjoyed reading the email chat with (former United States Senator) Alan Cranston on the globetrotter website.

<http://globetrotter.berkeley.edu/people/Cranston/cranston-email.intro.html>

We were pleased to see our email questions answered by Mr. Cranston on the website. Thank you for helping youth get involved in politics and world issues.”

**Barbara Brewer, San Francisco Public School District teacher:**

Commenting on the Conversations Interviews with your Berkeley Faculty site.

<http://globetrotter.berkeley.edu/PubEd/CBF.html>

“Everybody wants to go to Berkeley, but they don't know exactly why they want to go to Berkeley and here's a way that they could really be introduced.”

**Gale Ow, San Francisco Public School District teacher.**

“I searched through the Globetrotter websites and I looked for different people who have worked in Asia or are from Asia and got their sense of what is important to them in life. Part of my course is to have these students help to define what it is to be Asian. So, using the website gave lots of possibilities to broaden this definition. It was a very organic work in progress, and it generated a lot of discussion because of the diversity of the people that we found on the sites -- for the students themselves to say, ‘I didn't know someone Indian spoke English this well!’ -- it really broadened their world.”

**Thomas Chen, high school student, Thurgood Marshall High School:**

"I am honored to have been able to take part in this discussion.

<http://globetrotter.berkeley.edu/people/Goldstone/gold-chat1.html>

I relished this experience very much, despite the fact that it was the second Internet chat I participated in. I thought that everything worked really well and smoothly. Justice Goldstone was a very unique gentleman, and I gained some valuable information from chatting with him. I hope to be able to take part in future chat sessions. Keep me informed about Justice Goldstone and important events that I can participate in again."

## 6. CITY BUGS

Prepared by CityBugs and IU staff

The College of Natural Resource's (CNR) City Bugs Projects is also sometimes known more formally as Exploring Urban Biodiversity. Early goals of this project included developing an on-line insect taxonomy field guide and classroom lessons and activities that will support teachers in the standards-based exploration of their local ecology while gaining an appreciation for biodiversity, learning scientific classification, and integrating science education with technology literacy skills. The project has extended its work by continuing to build web-based digital materials, working with teachers who build content knowledge and develop curriculum, and running its first undergraduate course.

The City Bugs web site (<http://www.cnr.berkeley.edu/citybugs/>) continues to grow with both new content and new features. Besides a rich searchable database and virtual bug collection, and the on-line field guide, new features include separate sections of specialized content for students and teachers, and such catchy and appealing components as Bug Trivia, Top Bug News, and Ask the Expert. In spring 2001 City Bugs produced an on-line contest for Oakland middle schools. Sixteen students from four middle schools were the lucky winners. CNR rented a van to bring them to Berkeley for the day on June 7, during which the students were treated to a campus tour, insect collecting in Strawberry Creek, lunch, and lab work at CNR.

Led by Don Dahlsten, Associate Dean, College of Natural Resources and City Bugs Director, the project has a four-year history in the Oakland schools. Over the past year, beginning in March 2000, the project has hired a new part-time coordinator, Debbie Lenz, a former Oakland teacher. Working with CNR staff and Oakland Science Specialist Dale Koistinen and Norman Brooks, Debbie has recruited seven middle school teachers who have met monthly since last March to work as a group both in the district and at CNR. Represented Oakland middle schools include Frick, King Estates, Carter, and John Swett. This group has worked to develop content knowledge, familiarity with CNR digitized content, and to write curriculum using this content that has been classroom tested during the 2000-01 school year. The teachers are supported in this work by the expert advice and make classroom visits of Berkeley entomologists. This curriculum will be reviewed and refined during the summer, with the fall 2001 goal of publishing this material on the web and disseminating it to all Oakland middle school science teachers using strategies that involve the City Bugs teachers as key leaders. In addition new work is being piloted at Lafayette Elementary School, and the CNR Outreach Course is working with another teacher at Havenscourt Middle School.

City Bugs hosted a "Science Walkabout," a monthly informal gathering of Oakland middle school science teachers to share ideas for science lessons. Titled "Going Buggy with City Bugs," the City Bugs teachers discussed ideas for lessons about different insects and raising insects in the classroom, and how to use the City Bugs web site to study and teach about insects. Attendees received a starter kit of supplies to catch and raise insects in their classrooms

City Bugs ran its first undergraduate course titled the “City Bugs Education Outreach Seminar”. During this course students observed City Bugs teachers, studied learning styles and teaching methods, researched and designed lessons and activities to teach insect curriculum to children in a specific grade level, taught these lessons in one or more classrooms, and made a web page for the lesson to be added to the City Bugs web site. This outreach course is being offered again in fall 2001.

Debbie Lenz is working with two teachers in a comprehensive assessment of the impact of the City Bugs project on their science instruction. City Bugs teacher lessons include built-in student assessments. The UC Berkeley students’ lessons include assessments about student achievement related to these lessons.

City Bugs is working to make connections with other organizations that may form into partnerships in the future (the Audubon Society of Alameda, Tech Bridge Week, the Insect Zoo in SF, etc.), and has begun meeting with representatives from other outreach agencies with the hope of forming partnerships in the future (Audubon Society of Alameda, Insect Zoo of San Francisco, Tech Bridge).

City Bugs received the Chancellor’s Award last year, and was featured in the College of Natural Resources monthly newsletter. City Bugs received an award from the Exploratorium as one of February, 2001’s ten cool websites.

