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TECHNOLOGY AND GLOBAL EDUCATION

This edition of* Issues in Global Education *is devoted to the topic of Technology and Global Education. It is produced in cooperation with iEARN and with the encouragement of the White House Office of Science and Technology Policy in celebration of Global Science and Technology Week.

For the first time in history, educators have the opportunity to engage students in meaningful collaboration with anyone on the globe through the use of technology. Rather than just studying about another society and its people, students have the potential for learning with the individuals in those societies.

The issue begins with an article describing the role that global telecommunications projects can play in the classroom. This is followed by a project highlight, describing one teacher's pedagogical approach in using technology to advance her students' literacy skills as well as their understanding of environmental science. This example is followed by useful tips on how to integrate technology into the classroom. Also included are brief descriptions of global telecollaborative projects in various curriculum areas, and a listing of organizations that support teachers engaging in cross-cultural online project work.

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Director Emeritus

Dear Friends:

My career in science has allowed me to help people communicate with each other via the power of the Internet. This has given me an extraordinary "global perspective," and I wish to recognize the American Forum for Global Education as it endeavors to globalize the perspective of American youth. For thirty years, it has helped U.S. students understand the importance of global issues in their daily lives. Now, with the unprecedented opportunity for instantaneous communication, it is imperative that today's young Internet generation understand that problems such as poverty, disease, and environmental degradation are the concerns of all people—not just Americans. Teams of international scientists are increasingly transcending national boundaries to work together, answering shared global questions through partnerships such as the Human Genome Project, the International Space Station, and the particle accelerators in Batavia, Illinois, and Geneva, Switzerland. As we become increasingly interconnected, we must make certain that American youth understand the impact of science and technology on our world, and ensure that every U.S. student receives quality math and science education.

Most Americans have confidence that scientists and engineers can cure diseases, explore space, and develop ever-faster modes of communication. However, this optimism is not coupled with general understanding of basic scientific concepts. A 1999 study revealed that only 13 percent of Americans understood the term "molecule"; less than 29 percent were able to provide a minimally acceptable definition of DNA; only 16 percent could define the term "Internet"; and, less than half of all Americans knew that the earth revolves around the sun once each year.

While math and science education has always been crucial for training America's future scientists and engineers, in the twenty-first century quality math and science education is imperative to enable students to understand and evaluate today's headlines—an essential component of responsible citizenship.

By highlighting the many ways our lives are enhanced by scientific and technological advances, educators will excite our young people about math and science, and help them to evolve into informed global citizens. I call upon you to help your students recognize that mathematics provides a universal language, and that science is our planet's common ground. I commend you for your contributions and want to thank each of you for helping prepare for a better America, and most importantly, a better world.

Leon M. Lederman

Sincerely,
Leon M. Lederman
Nobel Laureate, Physics 1988

GLOBAL SCIENCE AND TECHNOLOGY WEEK • MAY 6-12, 2001
http://www.ostp.gov/html/gstw.html

(International Education and Resource Network)

To effectively tap the power of the Internet as an interactive discovery tool, students must have a compelling reason for communicating with others and for searching out new information. iEARN (the International Education and Resource Network, <http://www.iearn.org>) presents a framework in which students work collaboratively to find solutions to common problems shared by others in their communities both locally and globally. Through action-based project work, iEARN creates global learning communities for collaborative problem solving. The combination of iEARN's global human infrastructure and flexible technological requirements has proven to have a dramatic impact in addressing problems such as teacher isolation and access to rich and substantive resources, and has demonstrated significant impact on literacy skills, critical thinking and problem-solving in areas such as science and social studies, citizenship and global education, language acquisition, research skills, and cultural awareness. Because of its size and reach as the largest, most experienced online K-12 network in the world, iEARN will serve as a backdrop for much of the material in this edition of *Issues in Global Education*.

Launched in 1988 as a pioneering online program among schools in the US and former Soviet Union, iEARN currently serves nearly 100 countries. An estimated 400,000 participants interact in 29 languages through iEARN's unique project-based learning network.

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URL: <http://www.iearn.org>

Global Online Projects Across the Curriculum

■ Foreign/Second Language

The Monster Exchange Project <http://www.monsterexchange.org>

Monster Exchange is designed to encourage the development of reading and writing skills while integrating Internet technology into the classroom curriculum. Students try to communicate an original monster image into another child's mind by using writing skills and technology. In turn, their peers are challenged to use reading comprehension skills to read the descriptions and translate them into a monster picture.

■ Graphic Arts

First Peoples' Project <http://www.iearn.org.au/fp>

This project links indigenous students around the world with an exchange of ideas, culture and art. Students from indigenous groups in Argentina, Australia, Canada, Guatemala, Hungary, Mexico, Thailand, and the US are currently involved.

■ Language Arts

Laws of Life <http://www.iearn.org/projects/lawsoflife.html>

An essay project in which students write about their personal values. Participants submit and respond to essays about their "laws of life" in which they describe the rules, ideals, and principles by which they live, and explain the sources of their laws of life (reading, life experience, religion, culture, role models etc.).

■ Science/Environment

GLOBE: Global Learning and Observation to Benefit the Environment <http://www.globe.gov>

GLOBE is a worldwide network of students, teachers and scientists working together to study and understand the global environment. Students share environmental science data worldwide with one another through the GLOBE website and by doing so develop awareness, respect and appreciation for one another's cultures and environmental habitats.

Journey North: A Global Study of Wildlife Migration <http://www.learner.org/jnorth>

As the spring season sweeps across the hemisphere, students share field observations on changes in daylight, temperature and all living things as the food chain comes back to life. The journeys of a dozen migratory species are tracked each spring.

■ Math

Connecting Math to Our Lives <http://equity4.clmer.csulb.edu/netshare/gdeklerk/ConnectingMathto>

This project helps students see how they can use math to analyze issues of importance to society and take action to promote greater equity in their school or community.

■ Social Studies

Peace Corps World Wise Schools Program <http://www.peacecorps.gov/wws>

World Wise Schools (WWS) engages learners in an inquiry about the world, themselves and others in order to broaden perspectives, promote cultural awareness, promote global connections, and encourage service.

The Holocaust/Genocide Project <http://www.iearn.org/hgp>

The Holocaust/Genocide Project offers an interdisciplinary project encompassing history, language arts, fine art, music, modern and classical languages and critical thinking.

Global Science and Technology Week • May 6-12, 2001

http://www.ostp.gov/html/gstw.html

Global Science and Technology Week will highlight the international nature of science and underscore the importance of math and science education in today's era of globalization.

It Takes Many Villages to Make a World: iEARN

By Edwin Gragert

> ***"Giving our students a global exposure and enhancing their communication skills . . . will make a world of difference to their academic life and interest in the subject."***
>
> ***An iEARN teacher in Pakistan***

For this teacher, as for everyone involved in iEARN, the objective is to prepare students to be motivated and active participants in their world.

And the objective is increasingly being met. Students in Belarus post their folk tales on the Internet and in turn are treated to student interpretations of local folk tales from their own countries, providing a unique window into new cultures, customs, traditions, and beliefs. Middle-school-age students in Australia research existing conditions in their wetlands, post them on the Internet as part of iEARN's Wetlands Project, and then reap the benefits of similar research done by students in Uganda, the United States, and Romania.

Students involved in a project to clear landmines not only learn about the deadly remains of war, they are able to talk—via e-mail—with experts in Mozambique and Afghanistan who do the clearing. The students also hear the stories of their peers across the world who must live with the landmines. And many then take the next step to raise money or write to policymakers to help end this horrible threat.

Support Across Continents

iEARN is a network of teachers and students who use the Internet, e-mail and videoconferencing to carry out collaborative projects that embody activist teaching and learning. iEARN educators seek to prepare the youth of today for living in a multicultural and interdependent world that is being redefined every few years as technology and economics change.

In just 13 years of operation, iEARN has linked schools from Tucson, Arizona, to Paramaribo, Suriname, to Novosibirsk, Russia. iEARN currently works with approximately 400,000 students at 4,000 schools in more than 90 countries. Twenty-nine languages are represented. Global projects are based on interactive discussions, or forums, in which students and teachers debate, research, and share opinions.

The projects run the gamut: global arts and music, city art videos, environmental action, the power of math, hunger, local birds, flowers and symbols, faces of war, indigenous peoples, the Holocaust and genocide, child labor, world religions, ending violence, international foods and cultural patterns, local history, solstice holidays, democracy in schools, and youth volunteerism and service.

The Importance of Collaboration

Through international collaboration, problems get solved. But the individual student benefits as well. We see heightened motivation in class. We see improved reading and writing skills. We see excited students taking one aspect of a project and expanding it to another that they created on their own.

But to create these motivated, internationally aware and connected students requires teachers with the technical skills and support to guide them. iEARN does not dictate what people should do but is a partner working with teachers, both new and experienced, to offer training, curriculum resources, inspiration, and human interaction around areas of mutual interest.

One of the central ideas behind the iEARN network is that by working together we can maximize our potential to enhance the quality of life on the planet. Every activity of iEARN stems from this vision. iEARN projects are intended to improve the health and well-being of the world through collaboration. All aspects, from curriculum projects to professional development workshops, build on collaborative approaches.

Teachers from Senegal and Puerto Rico come together at the 2000 iEARN Global Conference in Beijing.

Romani Gypsy participants from Hungary contribute to the iEARN Indigenous Global Art Project.

For example, iEARN educators developed three- and five-day sets of workshops for a World Bank program called "WorLD" (World Links for Development). The workshops, titled "It Takes Many Villages to Make the World: Honoring People and Learning," emphasize community-building, respect for others, and a focus on methods by which teachers can empower students to use technology to make a difference in their lives and the lives of the 6 billion inhabitants of our planet.

In the first session of the program, typical of the kinds of approaches used throughout, each participant learns a different skill, such as bookmarking on the Web, and then teaches that skill to another participant, creating a "community of learners." They go on to learn about integrating curriculum into their classrooms, but the methods of learning remain collaborative, and the focus is on learning the technology for what it can accomplish with students.

Technology Not an End in Itself

There is an ocean of difference between a workshop whose purpose is to familiarize teachers with a particular piece of software or hardware and one with the purpose of teaching how educators can prepare students to address racism or school conflict using technology. As educators, it is our responsibility to demonstrate how education can prepare students to address the issues facing the society in which they will be living.

Changing the focus of professional development to teaching and learning with a community purpose is only the first step. The next and ongoing component is interactive support when teachers return to their schools and their own computers. As the research of University of California education professor Hank Becker and others has shown, less than 10 percent of teachers with access to the technology actually engage in collaborative projects.

Significant support is imperative. Toward this end, newly-trained iEARN teachers are able immediately and meaningfully to interact online with peers through online support communities. To be sustainable, responsibility for this support structure is primarily in the hands of the teachers themselves.

It Won't Be Easy

But much more must be done, as evinced by complaints from students who move from a school in which global interaction is an integral part of the academic program to one in which it is not. Young men and women write back to us from college and say, "We're so disappointed. We got to college, and they don't even interact with native speakers in my Spanish class. In high school in iEARN, that's all we did."

The goal of iEARN is to have people go to the source in dealing with the problems we face—locally, regionally, nationally, and internationally. If iEARN students learn when they are children that they can go directly to real people in China to learn about an issue, they will carry that knowledge with them to adulthood. They won't have to rely on a 30-minute sound bite when they hear about a crisis on the other side of the world. They will be encouraged to think collaboration, not confrontation.

People, languages, cultures, and social structures in this global environment are in constant interaction. It is our hope that an increase in technology-facilitated collaboration will result in a lessening of ignorance about other cultures and realities and therefore result in a reduction in conflict. Our purpose as educators is to facilitate and nurture the powerful curiosity and natural enthusiasm for learning that all people have.

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The Water Habitat Project:
Local to Global Environmental Education Via the Internet

When first and second graders in Kristi Rennebohm Franz's class in Pullman, Washington, began writing to peers in Russia, Australia, Argentina, the Netherlands, South Africa, New York City, and Zuni, New Mexico, about restoring the pond habitat behind their school, they were creating an online documentary about the problem; and youngsters in other schools were doing the same. But a simple question from New York students changed all that. The young New Yorkers said, "You need a lot more people to care about the pond," and asked, "What are you going to do about it?" Since then Kristi's classes have collected data, collaborated with city hall, garnered funding, restored the pond island, and cleaned up the pond water.

Since 1993-94, Kristi and her colleagues at Sunnyside Elementary have been building on the energetic voices of primary school children. These children are innately using language to make sense of their world, to launch their literacy, and to communicate their essential learnings which make up content standards in Washington State.

By using new technologies in the classroom for e-mail, websites, video editing, and videoconferencing, Sunnyside teachers are generating opportunities for children to write, read, and communicate on meaningful curricular content with local and global school peers around the world.

The immediacy of e-mail and website publishing and response enables primary students to have a cohesive cognitive hold on the connections of content between the ideas they send and the ideas they receive. The social context of learning to read and write for the purpose of sharing what they think and know with global peers provides the essential ingredients of empowering literacy skills. These skills include writing

- for a purpose;
- on a well-known topic;
- to a known audience;
- with an expectation of timely reply; and
- with the hope of learning more through collaborative communication.

Kristi's pedagogical approach in using the Internet and technology to advance her primary students' literacy was further informed by Teaching for Understanding (TfU) Framework (Wiske 1997) as well as works by Perkins (1995), and Kohl (1998). Kristi and her colleagues are now using the Harvard University Graduate School of Education with the New Technologies/Teaching for Understanding Framework curricular design tool to frame their iEARN local-to-global curricular projects.

This TfU framework provides an excellent tool for articulating the following components of their local-to-global curricula. (Only one example is noted for each of the components. For a complete illustration of using TfU framework with the Water Habitat Project see <http://learnweb.harvard.edu/ent/gallery/pop3/pop3_1.cfm>.)

• Overarching Goals

For example: Understanding that dynamic systems of change in water habitats can be documented, analyzed, and understood through longitudinal observations and data collection.

• Generative Topics

For example: Using non-fiction science books, websites, and e-mail, along with real time videoconferencing, in-person, and telephone conversation and communication with resource people and collaborating school peers, students will learn to:

a. research reasons for changes in the local pond habitat; and

b. determine if the changes are beneficial or detrimental.

• Understanding Goals
(What students come to understand)

For example: Students will understand how to do collaborative scientific inquiry with local-to-global school peers/teachers, communities, government agencies, and science experts on observations/data/issues of water habitats using e-mail, websites, videoconferencing, and in-person face-to-face conversations/discussions.

• Performances of Understanding including Introductory Performances

(How students develop and demonstrate their understanding)

For example: Back in the classroom students will learn to effectively use tools of technology to create collaborative photo journals with digital-images of the pond, and narrative that describes the

"E-mail is awesome because we get to send messages and get messages and send a response! It helps you learn a lot because you read new words and learn about new places."

images and their observations. Using the tool of a digital images slide show coupled with prior pond observation experiences, they will contribute to discussion on the reasons/explanations for their most recent observations and make connections between those recent observations and prior observations. In this process, they will use the present and past year's photo journals in reading groups for the purposes of "learning to read" and "reading to learn" about the water habitat. Reading past journals is a way of researching prior data. Performances of Understanding will include explaining how they use the technology tools and the understandings they have from the photo journal content.

- Guided Inquiry Performances and Culminating Performances

For example: Students will prepare and give presentations/workshops for other school classes and district school board to share and educate others about their learning progress and understandings from their Water Habitat Project. Performances of Understanding will include assessment of preparation and presentation of their water habitat project.

- Ongoing Assessment

(How teachers and learners monitor progress and plan for further learning Science Assessment)

For example: On whole-class field trips, students will be assessed on performance and understanding of taking and recording data for water temperature, pH, and measurements of pond dimensions. Students will be assessed by:

a. checking accuracy of their data at the field site and

b. anecdotal notes on their engagement, participation, contributions and learning while doing the data collection as well as their verbal presentation of the data to the whole class at the site.

Why is this worth learning?

Students are motivated to develop skills and use science, literacy, visual arts, and communication tools when experiences with these tools are embedded in meaningful, hands-on lessons. The local pond water habitat near the school provides an excellent environmental education site where they can integrate science, literacy, visual arts, and communication disciplines. Because students often visit this site after school, during weekend and vacation times with families and friends, Teaching for Understanding Curricular Water Habitat work in the classroom can be connected to students' ongoing outdoor recreational experiences. Because this site is a familiar recreational location with which students have experiential ownership outside of school as well as in school, they are motivated to study it and become active participants in caring for the site.

Because changes in the water habitat are ongoing and students continue to visit the pond throughout their school years, this is a generative curricular project that provides them useful understandings for ongoing interest and care about a local water habitat even after they have left their primary classroom.

Meaningful uses of new technologies to launch literacy and communication essential learning are continually transforming Kristi Rennebohm Franz's primary classroom. To learn more about it, see their class site at <http://www.psd267.wednet.edu/~kfranz>.

Developed by Kristi Rennebohm Franz, Sunnyside School, Pullman, Washington. Adapted with permission from the North Central Regional Educational Laboratory. All rights reserved.<http://www.ncrel.org/ engauge/highlite.htm>.

Portions of this edition of *Issues in Global Education* were originally published as *The Teacher's Guide to International Collaboration on the Internet* developed to help teachers use the Internet to "reach out" globally <http://www.ed.gov/Technology/guide/international/index.html>. This document was developed under contract order ED-00-PO-4392 between iEARN, Inc., and the Office of Educational Technology (OET), US Department of Education. The contents of this document do not necessarily reflect the views of OET or the US Department of Education, and no official endorsement should be inferred.

Tips for Integrating Online Projects into Your Classroom

Build collaborative support at your school.

Learning to use new tools of technology (e-mail, website publishing, videotaping, and videoconferencing) for online global collaborative projects requires professional development support and technical support. Teachers who have been successful in doing international collaborations have found that building a support community is essential. Start by building collaborative support at your local school level. For professional development, partner with several other teachers in your building who are also interested in international collaborations. Start by using e-mail among teachers within your school so that you can get together face-to-face to reflect on how Internet skills are developing, to ask each other questions, and to give each other support. Together you can look to resources for international collaborations to enhance your curricular goals.

Include your school or district support personnel in your collaborative effort so that they can provide technical

expertise. Many parents are developing Internet skills at their places of work and can also become valued mentors for you and your teaching colleagues.

Start by getting involved in an existing project.

Experienced teachers will advise that you and your classroom start by getting involved in an existing project online, rather than trying to start a project of your own. Participating in other projects is a great way to meet potential partners and learn about the many different projects initiated by teachers and students throughout the world. It can be a great way to develop ideas for how to integrate collaborative projects into your classroom without having to take on the role of facilitating the involvement of other classes right away. As you begin participating in other projects, you will soon find that you have global colleagues and peers to turn to should you wish to coordinate a project of your own in the future. In this way, your classroom truly becomes a global community member that can draw on the breadth of a network as your classroom develops throughout the year. And you will certainly develop ideas about how you would want to structure a project as a facilitator after experiencing at least one yourself.

Build collaborations among several schools.

Having more than two schools involved in a project ensures greater student participation and greater viability. If one of two schools is unable to continue participation, the project folds, whereas with more schools involved, the project can continue even if one school drops out.

Start with a topic that your students know well.

It isn't always necessary to generate a new curricular topic in order to do online international collaboration. There are many common topics among classrooms around the world that can be the focus of local-to-global collaborations. A valuable place to start is to have your students communicate with global peers on topics they already know well so that the content is something they are familiar with and are eager to share. Children can write best when they are writing about that which they know well. Provide plenty of in-class learning experiences around the curricular topic your class has chosen to share online so that all your students can be included as participants in the global conversations. Your students will be better able to contribute meaningful content in their online collaborations if they are communicating from classroom learning that is rich in content and experience.

iEARN students from around the world come together to learn about each other, and plan for upcoming project collaborations.

Clearly articulate goals, timelines and expectations.

Designing projects with clearly articulated goals, timelines and commitments from participating schools helps everyone prepare and plan for the project, generates valuable learning experiences, and allows the project participants to produce and share valued student products of the work.

Encourage ongoing dialogues.

When communicating online, have your students include not only the topic content they are sharing but also questions of inquiry to their global peers that invite ongoing dialogues. It is important to mentor students in appropriate content for global communication that generates positive interactions. Likewise, as they receive communication from global peers, it is important to respond with an affirmative appreciation for what they are learning from one another. The purpose of local-to-global communication is to build dialogues of understanding.

Build a community of teachers.

A key to successful project work is developing effective relationships with other educators. Many teachers have found that as they build a community of teachers with whom they can collaborate, they continue to do projects with these same teachers. You and your global teaching peers can develop an ongoing collaborative community of teaching and learning together. As you gain new students each year, you and your online colleagues can repeat the projects you have been doing together in previous years and continue to build your local-to-global collaborative curricular teaching and learning expertise. As we build communities of teachers and students who collaborate globally to learn within real-world contexts and issues of importance, we have the greatest hope of making this world a better and more positively sustainable place now and in the future.

Resources for Cross-Cultural Interaction and Project Work

Alliance for Global Learning - A partnership between iEARN, Schools Online, and WorLD to provide technology, professional development, and collaborative project work among schools in nine countries. <http://www.global-learning.org>

ePALS Classroom Exchange - Connects users from around the globe, providing the tools and meeting places to create a worldwide community of learners. <http://www.epals.com>

Global Junior Challenge - The Global Junior Challenge is a worldwide competition launched by the City of Rome to award prizes to the best projects using new technologies for education training purposes. Their webpage has a service to find new partners for your project. <http://www.gjc.comune.roma.it>

Global SchoolHouse/Lightspan - GSH has a registry of collaborative projects organized by topic, grade, and project date. <http://www.lightspan.com>

iEARN - A global, non-profit organization, iEARN has been facilitating student- and teacher-designed online collaborative projects and face-to-face meetings since 1988. iEARN is now active in over 90 countries. <http://www.iearn.org>

IECC - Operates a number of listserves and web sites to assist teachers to distribute their project ideas among teachers throughout the world. <http://www.iecc.org/>

A youth delegate from Cleveland visits students at a local suburban school in Beijing at the iEARN International Youth Summit in July, 2000.

ISPT - If your international collaboration allows for real-time chat interaction, the International School Partnerships through Technology provides a guide <http://www.ga.unc.edu/NCCIU/ispt/resources/chat.html>

Kidlink - A global, non-profit organization that has rendered free services to youth through the Internet for more than ten years.<http://www.kidlink.org>

Schools Online - A public benefit organization whose mission is to help ensure that all schools have effective access to the communication and information resources of the Internet. The organization donates Internet equipment to schools and facilitates professional development and support for teachers. <http://www.schoolsonline.org>

ThinkQuest - A not-for-profit organization that offers programs designed to advance education through the use of technology. <http://www.thinkquest.org>

Windows on the World - A database for schools and colleges (5-19 age range) looking for partner schools anywhere on the planet to develop international education projects. It is managed by the Central Bureau for Educational Visits and Exchanges in the UK, but is open to all schools. <http://www.wotw.org.uk>

WorLD - creates pilot projects in 14-20 countries to demonstrate that technology-based collaborative project-based learning can enhance learning in less-developed countries. <http://www.worldbank.org/worldlinks>