

Travels in Teaching and Learning with the Internet

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Introduction

Dr. Jennifer James, renowned cultural anthropologist, entranced Ohio educators as she paced the stage at the 1999 Ohio SchoolNET Conference, detailing the corner pieces of a jigsaw puzzle depicting her vision of the future – demography, culture, economics and technology. Technology, she stressed, is a major corner piece because it drives the tremendous change that society is experiencing. Teachers, she urged, by the very nature of their jobs as influencers, should be at the forefront of that change, embracing the chance to transform learning and teaching with technology.¹ Her optimistic vision of the future reinforced my firm belief in technology as a tool of change in teaching and learning. It is a belief nurtured as I continue to travel the road of my career as an educator, and a belief now bolstered constantly by my association with the Alliance+ project.

In this nationally recognized model for the professional development of K-12 teachers, I have learned, practiced and refined key critical technical and pedagogical skills necessary for the integration of the Internet in the classroom. My Alliance+ experience has challenged me to initiate a transformation in learning in my classroom and in teaching as I inserviced teachers across our district. After witnessing the engagement of my students and the excitement in my classroom, I have become an enthusiastic crusader for the effective use of the Internet in the classroom. At every opportunity, I excitedly share changes in pedagogy I have made, and improvements in student attitudes and learning outcomes with any educator who savors that same desire to improve teaching and learning for all children.

In this paper, I attempt to communicate the tremendous joy and excitement in my travels with teaching and learning with the Internet as I describe not only my personal classroom experience but my experience as a resource technology teacher as well. Concluding personal thoughts examine the systemic obstacles in education which, if not resolved, may hinder the tremendous potential of technology to change teaching and learning for the future.

The Alliance+ Project

The Alliance+ Project is a U.S. Department of Education program with emphasis on science and math that enables K-12 teachers to integrate the Internet into their curriculum. The project was developed and is managed by the Center for Improved Engineering and Science Education (CIESE) at Stevens Institute of Technology in Hoboken, New Jersey, and is implemented through Cuyahoga Community College in Ohio, Miami-Dade Community College in Florida, and Maricopa Community College in Arizona. Core trainers at the community colleges train and work with mentor teachers in neighboring school districts to train teacher trainees (called mentee teachers) to integrate resources on the Internet into their teaching.

The core curriculum of the Alliance+ project is the *Savvy Cyber Teacher* course, which consists of 10 three-hour sessions of instruction on the Internet, with plenty of time for questions

¹ James, J. (1999). Address, Ohio SchoolNet Conference. Dayton, OH.

and practice. Teachers learn compelling educational uses of Internet technology in the classroom that are not available in the library or other existing sources of media. Some of the compelling uses include: participation in collaborative projects, communication with others, student publishing, and access to real-time databases. Detailed information about the Alliance+ Project's framework, implementation, and evaluation is provided in the references cited below.²

My Experience as a Classroom Teacher

My travels commenced from my classroom at Jane Addams High School, Cleveland Municipal Schools, a large urban district. I attended the *Savvy Cyber Teacher* course (hereafter, referred to as the *Savvy* course) from 4 to 7 PM after a long day at school. Despite an hour commute home after class, my husband noted that I always returned rejuvenated and animated. That excitement was contagious. The morning following each *Savvy* class, my students would ask, "What did you learn? What can we do now?" That excitement was fueled by a *Savvy* curriculum that engages even the veteran user of the Internet. I had done "Internet training" for teachers in our district and felt fairly comfortable with classroom integration. The focus upon the unique and compelling uses of the Internet in the *Savvy* curriculum, accompanied by the incredible collection of resources, immediately captivated me. As a teacher of students labeled learning disabled, I provided instruction in all content areas and my repertoire of sites and strategies to use in all areas was greatly augmented with the resources of the *Savvy* curriculum.

I was fortunate to have on loan a laptop computer for use in my classroom. My personal account with my Internet service provider became our gateway to the Internet. My students and I were ecstatic to have this access which transformed our learning experiences. As my high school students and I embraced the concept of the unique and compelling uses of the Internet, the excitement, motivation, and mastery in my classroom soared. We participated in many types of activities: communicating with experts, participating in collaborative projects, accessing real-time data and learning from unique resources available to us only through the Internet.

In our communication with experts, Josh Baron, creator of this curriculum, answered student questions as he traveled to New York and Washington, and they in turn replied to him as he asked them to find the area of the Mall in Washington, DC and the weather in Phoenix. We followed Dr. Eileen Cotton's cross-country trip via e-mail with photos as she asked students to identify wildlife and historic monuments in various parts of the country. Many of these activities were extra-curricular or completed during the reading class.

My at-risk urban kids, with histories of failure in school, wrote superb descriptive essays after studying former slaves' narratives on the Web, unique resources unavailable in other

²Friedman, E.A. (2000). *Conceptual framework and organizational structure of Alliance+: A national model for Internet-in-education professional development*. Hoboken, NJ: Center for Improved Engineering and Science Education, Stevens Institute for Technology.

Baron, J.D., & McKay, M. (2000). *Alliance+ project: Lessons learned from the development and implementation of an Internet-in-education professional development program*. Hoboken, NJ: Center for Improved Engineering and Science Education, Stevens Institute for Technology.

Yepes-Baraya, M. (2000). *Lessons learned from the evaluation of Alliance+: An Internet-in-education professional development program*. Princeton, NJ: Educational Testing Service.

media. The total silence in the classroom as my students listened to an audio file of Fountain Hughes, a former slave, describe his experiences being sold, his using a pass and his desire to die rather than live as a slave again, reflected their total engagement in that learning experience.

Our study of the changes in the earth's crust through the *Musical Plates* lesson on the Savvy Web site, brought real-time data to our classroom. With daily amazement, for two weeks students plotted earthquakes on a map. They had not realized the frequency of the world's earthquakes. When asked to describe any similarities they might see between a tectonic plate's map and the plotted quakes, my students understanding of tectonic theory, increased significantly.

Of the many collaborative projects in which we participated, our favorite was the CIESE *Global Sun/Temperature Project*, which helps students to understand the relationship of latitude, minutes of daylight and temperature. This project's description can be found in the Appendix at the end of this paper.

At the end of the year we evaluated our learning experiences together. By far, the travels with Josh, and the Internet projects were at the top of everyone's' "best" list. When I return to my former high school, my students approach me in the hall, asking when we can learn with the Internet again.

My Experience Helping Teachers Integrate Technology in the Classroom

Our district currently provides Alliance+ professional development to elementary and middle school teachers in our district. Teachers attend after-school sessions in classes of 20 to 25 participants. A team of two instructors provide expert direction for participants as they discover the unique and compelling uses of the Internet in the classroom. When participants publish their websites to the district server in session 9, I am present to troubleshoot and offer assistance, and when they share presentations during the session 10 celebration, I eagerly listen for new ideas for Internet-enriched learning experiences.

Currently E-rate grant funding has recently enabled our district to wire every classroom. Schoolnet Plus funding from the state of Ohio has equipped every elementary classroom in the district with 3 computers and a printer. Each elementary computer is now part of the district network which provides T1 access to the Internet. Seventy middle school classrooms are currently similarly equipped as those faculty participate in Savvy training.

As an itinerant advocate for Internet use in the classroom, I find that many classroom teachers, although excited by the Savvy curriculum, experience difficulty crossing the bridge to classroom integration. Their concerns range from classroom management to time management, to addressing standards. The current focus of the school district is the improvement of Ohio proficiency test scores. This focus discourages many teachers from attempting technology integration. The use of technology to enhance and extend proficiency-focused lessons is not clear to many faculty. It appears that some teachers use the Internet in the classroom to access unique resources. However, the use of real-time data and collaborative projects appears to be much more infrequent.

Funding from the Joyce Foundation provides additional professional development that has been designed to assist middle school faculty in jumping the hurdle that is presented when teachers are confronted with 30 students and 3 computers. That program assists teachers with strategies for developing instruction for cooperative group work, including honing classroom management strategies and developing proficiency-focused activities that integrate Internet resources in the classroom. Continued support provided through on site visitations and "chats" with colleagues appears to encourage and enable effective technology integration. More faculty are sharing activities and strategies for group work. These faculty are reporting more on-task behavior by engaged students. One faculty member stated in a chat: "There is no turning back. I have to have computers in my classroom or I won't teach." With additional support, many more Savvy teachers will revel in the new culture, new ways of learning, and new ways of communicating. This cultural transformation will enable this community of users to transform teaching and learning much as I experienced it in my own classroom.

Summary and Conclusions

How did these travels with the Internet affect my students? My students found participation in global experiences provided engaging learning activities. They developed collegial relationships with students around the world. They remained on task with greater frequency and attended school more regularly. Their participation in collaborative projects supported proficiency-focused learning activities which fostered greater mastery of learning outcomes. They discovered strengths of their classmates as they worked in collaborative groups on projects in the classroom. They co-constructed much of their newfound knowledge as they became more active learners. They came to nurture each other in other situations, having discovered the power of support in the collaborative work. This group of learners became a "community of learners" who could interpret, apply, and explain what they were learning. In addition, they could see in perspective, and with empathy. Lastly, they came to be more reflective in their learning. Their travels with technology and learning changed the face of the how they learned, what they learned, and how they showed me what they knew.

What did I learn from my travels in teaching with the Internet? My mindset as an educator has been profoundly altered. In my classroom, my role was dramatically adjusted from "sage on the stage" to a "guide on the side," from "giver of information" to designer of learning experiences. As my youngsters eagerly anticipated the new learning experiences I designed, I implemented more authentic, project-based assessment. I discovered that an Internet-enriched classroom offers teacher and students a special environment that enhances learning, promotes on-task behavior, improves attendance, and challenges both the teacher and the learner to use the resources available. My travels with technology and learning changed the face of the how I taught, what I taught, and how I requested evidence of student mastery.

What have I learned from teachers participating in the inservices I provide on Internet integration in the K-12 classroom? Many teachers feel uncomfortable with the technology. Acquisition of technical skills does not mean competence with classroom integration. Many teachers lack the classroom management skills required for working with students in cooperative groups. Many teachers see technology as an add-on, as a means to automate. They look to prescriptive learning labs and CD Roms to provide individualized lessons and supplementary materials. Many teachers feel pressured by the district's push to address standards and don't envision the role of technology in the proficiency-focused classroom. Many teachers don't feel they can 'risk' the implementation of a new teaching tool, especially one that is sometimes unreliable. These teachers have confronted me with some of the many obstacles

to technology integration in the classroom. There are teachers, however, who have taught me of the unselfish, willingness of educators to adopt new technologies for their students. I have learned from seasoned teachers that "proficiency teaching – and I am good at it – has withered my soul". I have observed them embrace the technology of the Internet to design again real-world projects with a strong proficiency focus. Those educators also see the change in our society driven by technology and contribute to facilitation of the corresponding transformation in education. I thank those teachers for allowing me membership in their community of learners as they share their experiences, as they support each other in challenging times, and as they work to transform learning and teaching with technology in the classroom.

The Alliance+ program and its many Savvy teachers face substantial challenges if indeed teaching and learning are to be transformed by use of the compelling applications of the Internet in the classroom. The digital divide increases as poor urban districts lack monies for hardware for classrooms. E-rate-funded wiring and switch boxes hum in every classroom in our district, but in middle and high schools there is no hardware to connect to this wiring. Districts which often turn to packaged software, prescriptive learning labs and the use of technology for drill and practice need to dramatically shift paradigms and actions. The issue of the "technology lab" versus workstations in the classroom, available for teachable moments and daily collaborative projects, needs to be resolved. Reliance on "technology coordinators" who know the software and the network, but not technology integration should be addressed. These challenges require the endless energies of those of us that have experienced the transformation and recognize the power of the technology in the classroom. As the community of Savvy Internet users in the classroom grows, resistance will begin to crumble but only as we can begin to share with the reluctant adopters more user-friendly products like the *Global Sun/ Temperature Project* as well as evidence of student learning in technology-enriched classrooms.

Issues of technology are not the only challenge to this transformation of teaching and learning with the Internet. A paradigm change is needed in the use of technology in the classroom: from "technology as an add-on for drill and practice" to "technology as tool to teach understanding and higher-order skills." Administrative recognition of the potential of technology integration coupled with a significant commitment to professional development is essential in transforming teaching and assessment practices for the benefit of all students.

A nurturing environment, one that recognizes and addresses the fears of those resistant to change, one that shapes new behaviors, one that provides significant, meaningful and effective professional development, one that supports with suggestions and "Teflon lessons,"³ one that sends the message to educators 'you are valued, you are an educator', will empower educators becoming the wind beneath their wings as they then seek to change the way children learn, what children learn, and how children share what they know using technology. A nurturing environment leads to community, a vast community of Savvy educators dedicated to technology integration who support each other in the transformation of learning and teaching in classrooms across America.

³ McKenzie, J. (1999). Reaching the Reluctants. [<http://fno.org>]

Appendix: The Global Sun/Temperature Project
[\[http://k12science.stevens-tech.edu/curriculum/tempproj/\]](http://k12science.stevens-tech.edu/curriculum/tempproj/)

Subjects: General Science, Mathematics, and Language Arts
Grade Level: Ages 9-12 (any age may participate)

Description

This collaborative project allows students to gather local temperature and sunlight data during a specific week each semester. This information, accompanying specific latitude and longitude descriptors of the location, is submitted to the Web site. The data from all participants is compiled into a database from which the students may explore relationships between average temperature and amount of sunlight and proximity to the equator. Students' final reports are posted on the project Web site.

Learning goals

- Students will compose a descriptive paragraph using the writing process.
- Students will find locations on a map using latitude and longitude coordinates.
- Students will construct meaning from non fiction reading by noting main ideas and details
- Students will demonstrate an understanding of the relationship of latitude and temperature through the use of graphs and summary paragraphs.

Standards Addressed

National Science Education Standards

Content Standards A, D-G:

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry
- Understanding of Earth in the solar system
- Understanding about science and technology
- Understanding of science and technology in society.
- Understanding of the nature of science.

NCTM Curriculum and Evaluation Standards for School Mathematics

Problem Solving

- Pursuing open-ended problems and extended problem solving projects
- Investigating and formulating questions from problem situations
- Representing situations verbally, numerically, graphically, geometrically, or symbolically

Communication

- Discussing, writing, reading, and listening to mathematical ideas

Reasoning

- Reasoning with proportions
- Reasoning from graphs

Connections

- Connecting mathematics to other subjects and to the world outside the classroom
- Connecting topics within mathematics
- Applying mathematics

Number/Operations?computation

- Using estimation both in solving problems and in checking the reasonableness of results

Patterns and Functions

- Identifying and using functional relationships
- Developing and using tables, graphs, and rules to describe situations
- Interpreting among different mathematical representations

Statistics and Probability

- Using statistical methods to describe, analyze, evaluate, and make decisions
- Creating experimental and theoretical models of situations involving probabilities

Ohio Proficiency Outcomes

- Select instruments to make observations and/or organize observations of an event, object, or organism.
- Evaluate conclusions based on scientific data.
- Organize data, identify patterns and trends.
- Draw conclusions and/or recognize a conceptual model based on a given set of data.
- Select a device and report data in appropriate units for a specific measurement.
- Make inferences about the causes of variation in experimental results.
- Apply laws, conceptual and mathematical models, and theories to explain and predict the interactions of components in systems.
- Analyze data to identify patterns and trends and draw appropriate conclusions.
- Identify needed information to solve a problem.
- Explain or illustrate why a solution is correct.
- Make or use table to record and sort information
- Identify needed and given information in a problem situation
- Validate and/or generalize solutions and problem solving strategies.
- Collect data, create a table, picture graph, bar graph, circle graph, or line graph, and use them to solve application problems.
- Read, interpret, and use tables, charts, maps, and graphs to identify patterns, note trends, and draw conclusions.
- Read the scale on a measurement device to the nearest mark and make interpolations where appropriate.
- Organize data into tables, charts, and graphs.
- Read, interpret, and use tables and graphs to identify patterns, note trends, draw conclusions, and make predictions.

Email postings required to complete the project:

- An introductory message
- An summary of temperature for the week
- An evaluation of the data posted

Time Management The project ran for 3 weeks in the spring:

- Introductory message 3 class periods
- Locating participating schools and reading introductory messages 10 minutes daily for 5 days
- Temperature measurement 10 minutes daily for 5 days
- Analysis of data 3 class periods

Resources required

- Thermometer
- Wall map and temporary sticker dots to identify locations of participating schools
- Word Processor Application
- Spreadsheet Application
- Netscape Navigator and Internet connection

Activities

We posted our introductory message giving our latitude and information about our school and ourselves. Groups of students were responsible for different components of the message. The writing process helped students focus on the intent of the message and the appropriate language.

As each e-mail arrived from the other participating schools, we reinforced map-reading skills by finding the location on a large wall map and marking it with a circle. From those introductory messages, my students learned from students in Australia that El Nino, which they conceived as a local phenomena that contributed to our warm winter in Cleveland, OH, affected others around the world. A flood, caused by El Nino, had destroyed all the books in the Australian school's library.

My students recorded the temperature every day for a week. We practiced reading the thermometer. Different groups went outside each day to read the thermometer. They posted our average temperature, minutes of daylight and latitude again, as did each participating school.

In our ancient computer lab, as we graphed the latitudes and temperatures reported by participating schools, students began to form hypotheses about these relationships. A previously difficult concept came to life as they saw that Australia was moving to winter, and that the minutes of daylight and temperature were far less in northern Canada. The student team responsible for composing our final analysis that was to be posted carefully crafted a logical conclusion.

Assessment

Rubrics evaluated the writing products submitted (the introductory message and the final conclusions) for content, language, and organization.

The temporary sticker dots were removed before the participating schools' conclusions arrived. As these conclusions arrived, students marked the locations of the reporting schools without assistance. This activity served to assess mastery of latitude and longitude skills..

In a performance task, students were assigned the role of travel agent. Their task was to evaluate given data and draw conclusions on possible weather and potential activities at hypothetical vacation sites. The data supplied included latitude and temperatures for several cities. They were asked to present to clients in writing a list of activities at the vacation sites. The rubric evaluated their use of prior knowledge, their reasons for the selection of vacation activities, and the logic and sequence in their answer.