Dec/Jan 2000-2001 "Mining the Internet" column in Learning and Leading with Technology
© 2001, International Society for Technology in Education, Eugene, Oregon
Do not reproduce without prior permission.
Obtain redistribution permission from Anita McAnear, amcanear@iste.org .

Structuring Internet-Enriched Learning Spaces

By Judi Harris

Teachers create spaces for their students' learning. Like interior designers, who can suggest furniture choices and placements. teachers plan learning activities aimed at helping their students achieve curriculum-related goals. The structures of these learning activities are like the furniture and its arrangement in a particular room. When doing either kind of design, people-centered but goals-oriented decisions must be made. What functions will the furniture/activities serve? What preferences do their eventual users have? How well-suited are the choices to those functions and preferences? How well do the choices fit together in the space? How well do they fit the larger environment of which this space will be a part?

Skillful, student-centered teachers create spaces for learning that accommodate multiple possibilities for student action. Like interior designers, we can predict a range of probable actions within a particular furnished/structured space, but we can't predict minute-to-minute movements of the people who will use the space. Rather, since we will be present within the learning spaces we design for students, we plan to use careful observation of learners, tempered by awareness of curriculum requirements, informed by past experience, and heightened by present sensibility, to shape emerging learning experiences. We structure learning spaces, like we furnish rooms, to facilitate and encourage desired processes and outcomes.

Spaces for Understanding Performances

Student-centered learning activities, unlike traditional "lesson plans," are *structured* more than they are *scripted.* How do we go about structuring a flexible, but focused, learning activity? According to a powerful model developed by Stone Wiske (1998), we must first decide what our students should *understand* as a result of engaging in a learning activity. What is "understanding?" According to Wiske,

> Understanding is being able to carry out a variety of actions or "performances" that show one's grasp of a topic and at the same time advance it. It is being able to take knowledge and use it in new ways.
>
> http://learnweb.harvard.edu/alps/tfu/about1.cfm

Wiske and her colleagues suggest that we "teach for understanding." Wiske's "Teaching for Understanding" framework is built upon four questions that undergird what we must consider as we design and function within learning spaces:

- What topics are worth understanding?
- What about these topics needs to be understood?
- How can we foster understanding?
- How can we tell what students understand?

http://learnweb.harvard.edu/alps/tfu/about2.cfm

When we design learning activities, we are addressing all four questions, but primarily the third. Wiske calls learning activities "performances of understanding:"

> Performances of understanding are activities that require students to use what they know in new ways or situations to build their understanding of unit topics. In performances of understanding students reshape, expand on, extrapolate from, and apply what they already know.…Performances of understanding help students build and demonstrate their understanding, Although a "performance" might sound like a final event, performances of understanding are principally learning activities. They give both you and your students a chance to see their understanding develop in new and challenging situations over time.…Performances of understanding require students to show their understanding in an observable way. They make students' thinking visible.
>
> http://learnweb.harvard.edu/alps/tfu/info3e.cfm

Once we are clear about what students need to understand as a result of engaging in a learning activity, how do we go about designing that activity, or "learning space?"

Structures for Learning Spaces

There are many possibilities for structuring performances of understanding or learning activities. When we brainstorm these possibilities, we unconsciously use models of learning activities with which we are already familiar. Many times, these

familiar activity structures serve our students' understanding needs well. Yet when we are attempting to integrate use of online tools and resources into students' curriculum-based, understanding-focused learning activities, familiar models don't seem that powerful. They don't often exploit new tools' distinctive attributes. If traditional tools could support a learning activity just as well or better than new tools could, there seems to be no advantage in taking the time and effort necessary to learn to use, then implement instructionally, the new tools.

From a shortsighted perspective, this could be used as an argument against designing curriculum-based learning activities in which students make powerful use of online tools and resources. "Students have been learning just fine in my class with the activity structures that I already know how to use," a teacher might think. While probably true, this way of thinking can inadvertently limit what and how students *can* learn. Wouldn't they be best served if we were familiar with *more,* rather than *fewer,* ways to structure learning experiences? From this better-informed perspective, the learning spaces that we configure for our students to bring to life could only be more powerful and more appropriate to their needs and preferences.

What's needed are new, flexible frameworks that we can use to structure understanding-focused learning activities that help students make powerful, worthwhile use of online tools and resources. I have proposed these as telecollaborative activity structures, teleresearch activity purposes, and sequences of student actions (Harris, 1998 & 2001). How can these combine to help us to design students' learning spaces?

Choosing Structures, Purposes, and Sequences

Once we decide what our students should understand after engaging in one or more learning activities, we can decide how these activities could best be structured. Using our students' content and process needs and preferences as criteria, how do we select from many options which combination of structures, purposes, and sequences to use to students' maximum benefit?

The answer: by focusing now upon what we would like students to *do* to build understanding while they are engaged in the learning activities that we are planning. In essence, telecollaborative activity structures, teleresearch purposes, and student action sequences are mental design tools that help us to think concretely about students' learning *processes.* These structures, purposes, and

sequences can be used to configure the ways in which we will ask students to engage with content and with each other in learning space designs that we sketch and they bring to life.

The process emphasis of these design tools--structures, purposes, and sequences--is immediately apparent when reviewing the range of action sequences evident in curriculum-based telecomputing activities that teachers have created and used successfully in their classrooms:

- **Correspond:** Prepare a communication locally then send it to others. They respond, and the process continues.

- **Compete:** Register to participate, then do an activity locally. Submit completed work by a deadline, then receive feedback.

- **Comprehend:** Locate online resources, then make primarily local use of them.

- **Collect, Share & Compare:** Create something locally, then add it to a group of similarly-created works, combined to form a centrally-located collection.

- **Chain:** Do an activity locally, create records of that activity, then send something on so that the next group can do something similar.

- **Come Along:** Shadow others as they travel either physically or cognitively, perhaps communicating briefly in the process.

- **Collaborate:** Work with remotely-located others to realize a common goal.

The process emphasis of curriculum-based teleresearch work is also apparent. Teleresearch is not a learning activity unto itself. It serves different purposes for students' learning, based upon the ways in which information is located and used. Stated according to what learners do when engaged in teleresearch, these purposes include:

- Practicing information-seeking and information-evaluating skills.
- Exploring a topic of inquiry or finding answers to a particular question.
- Reviewing multiple perspectives upon a topic.
- Collecting data remotely.

• Assisting authentic problem-solving.
• Publishing information syntheses or critiques for others to use.

Telecollaborative activity structures characterize a learning activity's framework, or "skeleton." In the interior design metaphor mentioned above, activity structures are like the range of room types available (e.g., kitchen, den, bedroom, office). Yet within each structure are implied activity characteristics that are clearly process-related.

Genre	**Activity Structure**	**Learning Process Emphases**
INTERPERSONAL EXCHANGE	Keypals	Longer-term, interest-driven, one-to-one communication-by-writing is based upon emergent topics of conversation. Can be used to motivate students to communicate in writing.
	Global Classrooms	Longer-term, group-to-group discussion-by-writing of structured or semi-structured topics. Can be used to help students research and hone their assertions and arguments.
	Electronic Appearances	Short-term communication "event" with someone special by virtue of reputation and/or expertise. Good way to pique interest in a particular topic or event.
	Telementoring	Longer-term commiunication-by-writing in a mentor-protégé format. Rich possibilities for long-term professional/personal relationships/modeling.
	Question & Answer	Very short-term communication-by writing to clarify or complete understanding of a complex topic.
	Impersonations	Variable-term communication-by-writing necessitating deep-level, actively applied understanding of an historical period or literary work. Impersonation format is usually quite motivating.
INFORMATION COLLECTION AND ANALYSIS	Information Exchanges	Variable-term communication in which similar information is compared and contrasted. Especially effective when students are comparing locally-generated information that differs across collection sites.
	Database Creation	Previously-accumulated information is analyzed deeply enough so that it can be classified and organized for others to use to form higher-level understanding.
	Electronic Publishing	Fruits of learning efforts are formatted so that others can benefit from perusing them. Good for both learning closure and public relations.
	Telefieldtrips	People (and less frequently, animals) are shadowed while they are active so that their experiences can be vicariously apperceived.
	Pooled Data Analysis	Similar information is pooled from multiple sites so that overarching patterns can be discerned. Higher-level than information exchanges.

PROBLEM SOLVING	Information Searches	Information-searching skills are honed.
	Peer Feedback Activities	Multiple sources of feedback are provided and received so that successive drafts of students' works can be prepared.
	Parallel Problem Solving	Different problem-solving strategies applied to the same challenge are compared, contrasted, and appreciated. Good for helping students realize that there are "many right answers" to a problem.
	Sequential Creations	Collaboration on a common product that occurs sequentially, rather than simultaneously. Deeper-level understanding of what has been created before is necessary if the work is to continue in a consistent manner.
	Telepresent Problem Solving	Realtime brainstorming and problem-solving skills are exercised via text chat and/or videoconferencing. Good vehicle for use of previously-researched information and/or -prepared questions.
	Simulations	Immersion in a content-rich, individualized or collaborative context for learning produces in-depth, experiential understanding of the problem situation being explored.
	Social Action Projects	Authentic commitment to assisting others is coupled with authentic learning about a current, often global problem.

Considering these characteristics of each activity structure can further help us to focus on the learning *processes* necessary to help students reach true understanding of curriculum-required content. When learning activities encompass use of online tools and resources, it is these learning processes, operationalized through activity structures, teleresearch purposes, and student action sequences, that we combine to form a design for a particular learning space, or "project."

Combinations of Structures

From this process-focused design perspective, let's take a look at several student-centered projects that help learners make particularly powerful, curriculum-based use of Internet tools and resources.

Project Atmosphere Australia On-line <http://www.schools.ash.org.au/paa/student_activities.htm> offers a veritable virtual smorgasbord of meteorology-related resources and activities, from which participating teachers can select one or more, thereby building customized weather projects for their classes. The "Weather Recording" information exchange activity, for example, brings daily weather observation data via an e-mail distribution list from many classes around the world. Each participating class measures and reports the following at approximately 1 pm local time:

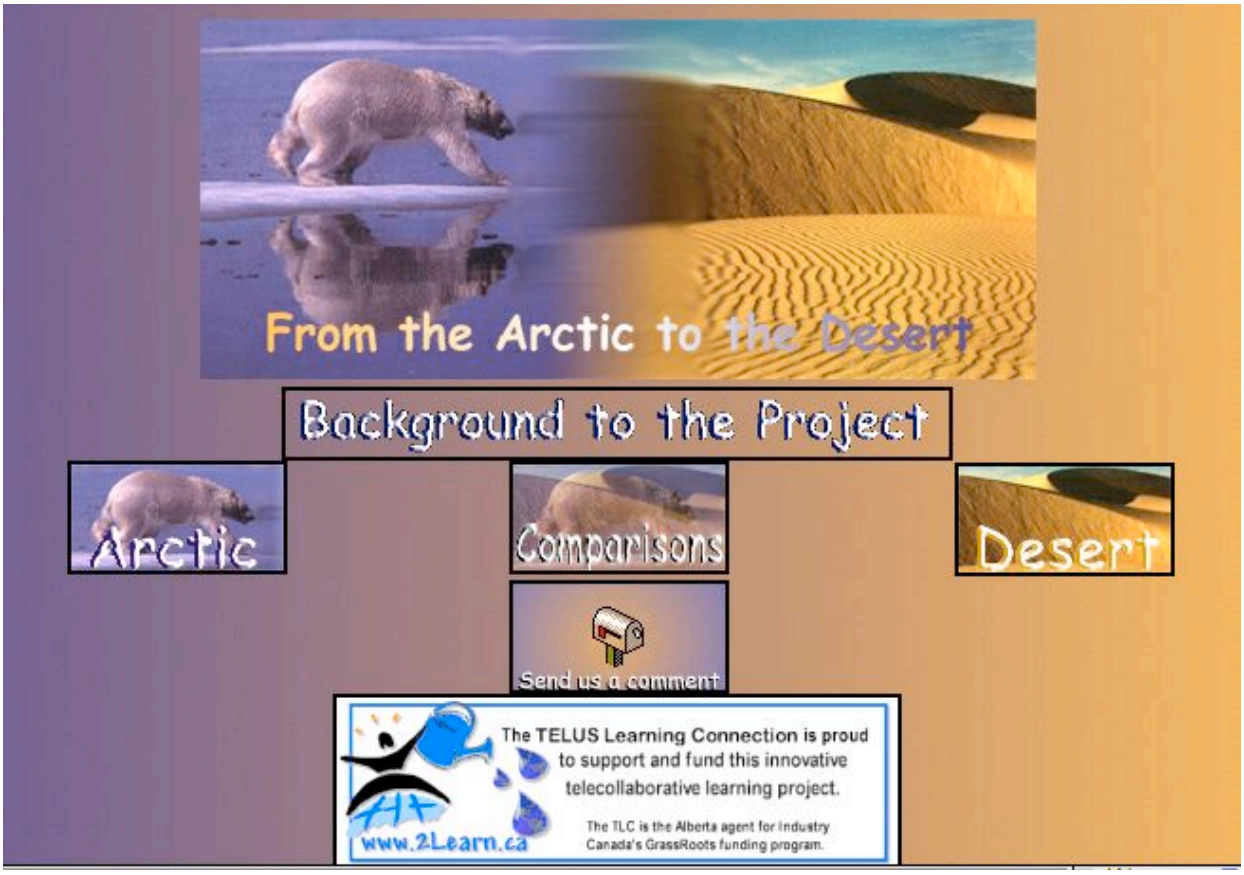
- Current temperature
- Percentage cloud cover
- Cloud type(s) evident
- Rainfall for last 24 hours
- Wind direction
- Wind speed
- Relative humidity (if possible)
- Barometric pressure trend
- Recent weather conditions
- Outlook for next 24 hours

http://www.schools.ash.org.au/paa/recording.htm

"Weather Experts On-line" offers question-and-answer services by professional meteorologists in Australia and the U.S.A. "Weather Folklore" is a global (classroom) information exchange of stories and proverbs that are weather-related. "Weather Headlines" and "Weather Writing" are information exchanges in which students report, respectively, on significant local weather events and how the weather affects daily activities and moods. More than a dozen such simple, yet potentially powerful activities are facilitated through this well-organized site. Students enact the action sequences "correspond," "collaborate," and "collect, share, and compare" while actively learning about the weather.

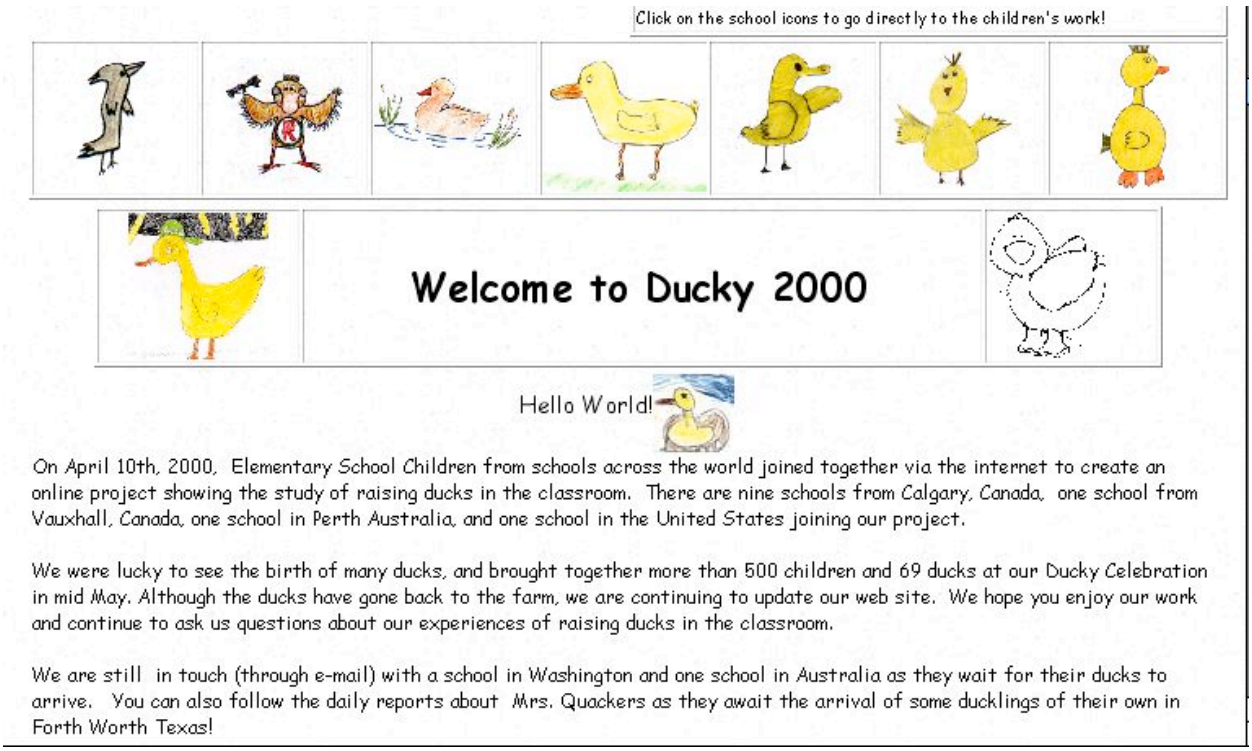
"From the Arctic to the Desert" <http://www.2learn.ca/projects/projectcentre/pages/Nunavut/MainPage.html> was a multidisciplinary project planned for 3rd and 4th grade students in Alberta, Canada. Combining the telecollaborative activity structures of keypals, global classrooms, telefieldtrips, question & answer activities, and electronic publishing with teleresearch for exploring topics of interest and publishing information syntheses, students used the action sequences of "correspond," "comprehend," and "come along" to, in their teachers' own words:

> …learn about the lifestyle of the people who lived in our icy Canadian northern desert and in the hot, sand desert of Arabia . We also wanted to learn about how animals adapt to these two environments. We hoped to make connections with people who live in these two harsh environments to learn more about the animals and landscapes of these two types of deserts.



"Ducky 2000," <http://www.cadvision.com/nlbrown/ducky2000.htm>, another project from Alberta, helped elementary students in 9 classes across Canada, plus one class each in Australia and in the U.S. have rich learning experiences centered around hatching duck eggs. This student-inspired, emergent project used global

classroom, information exchange (e.g., duck/chick comparison charts: <http://www.horizon.ab.ca/ves/duck&chickcharts.htm>), and electronic publishing activity structures, plus teleresearch to find out more about ducks and solve authentic duck care problems. Students in participating classes comprehended, corresponded, and collected/shared/compared all kinds of duck-related information, experiences, and reflections. A visit to this delightful site is definitely recommended.



Primary Focus: Process or Content?

These example projects demonstrate that, as learning space/activity designers, like interior decorators, we combine and arrange components primarily according to how we think a space's inhabitants will behave in satisfaction of their needs. We create the space to ease and support such needs satisfaction, in accordance with known learner preferences, when possible. Yet although the satisfaction of needs is the ultimate goal of any plan for the configuration of a space (whether for learning or for living), most of our time and effort as designers is spent considering the "within-the-space" processes that will assist the space's occupants. Though as educational designers we are responsible for ensuring the learning of content, we do so only through the awareness of educational processes that can help our students develop true understanding.

Thus, as teachers, and as learners along with our students, we are reminded again of what Thomas Huxley said years ago: "The great end of life is not knowledge but action." It is in our roles as designers of spaces for students' actions that we express, through our own actions, what is most valuable and unique about our art and our craft.

References

Harris, J. (1998, 2001). *Virtual architecture: Designing and directing curriculum-based telecomputing* (1st & 2nd eds.). Eugene, OR: International Society for Technology in Education.

Wiske, M. S. (Ed.). (1998). *Teaching for understanding: Linking research with practice.* San Francisco, CA: Jossey-Bass Publishers.