

## Best Practices in Using Technology

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What constitutes “best practice” when it comes to educational technology? In 2000, a group of experts selected by the U.S. Department of Education developed one answer to that question in the process of establishing criteria for identifying “exemplary” and “promising” educational technology programs. Today’s panelists advocate three contrasting approaches to using technology in the service of educational goals. Using the Department of Education criteria as a reference point, each panelist will share a brief overview of his program with special emphasis on how it embodies best practice.

## WebQuests

Bernie Dodge, San Diego State University

A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet, optionally supplemented with videoconferencing. There are at least two levels of WebQuests that should be distinguished from one another. In *Short Term WebQuests*, the goal is knowledge acquisition and integration. In a *Long Term WebQuest*, the goal is extending and refining knowledge.

WebQuests of either short or long duration are deliberately designed to make the best use of a learner's time. There is questionable educational benefit in having learners surfing the net without a clear task in mind, and most schools must ration student connect time severely. To achieve that efficiency and clarity of purpose, WebQuests should contain at least the following parts:

1. An **introduction** that sets the stage and provides some background information.
2. A **task** that is doable and interesting.
3. A set of **information sources** needed to complete the task. Many (though not necessarily all) of the resources are embedded in the WebQuest document itself as anchors pointing to information on the World Wide Web. Information sources might include web documents, experts available via e-mail or realtime conferencing, searchable databases on the net, and books and other documents physically available in the learner's setting. Because pointers to resources are included, the learner is not left to wander through webspace completely adrift.
4. A description of the **process** the learners should go through in accomplishing the task. The process should be broken out into clearly described steps.
5. Some **guidance** on how to organize the information acquired. This can take the form of guiding questions, or directions to complete organizational frameworks such as timelines, concept maps, or cause-and-effect diagrams as described by Marzano (1988, 1992) and Clarke (1990).
6. A **conclusion** that brings closure to the quest, reminds the learners about what they've learned, and perhaps encourages them to extend the experience into other domains

### References

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StarLogo and Adventures in Modeling  
Eric Klopfer, Massachusetts Institute of Technology

StarLogo is a computer modeling tool that empowers students to understand the world through the design and creation of complex systems models. StarLogo enables students to program software creatures to interact with one another and their environment, and study the emergent patterns from these interactions (Resnick, 1994). In StarLogo, one writes simple rules for individual behaviors of agents that “live” and move in a two-dimensional environment. For instance, a student might create a model of an epidemic by defining rules for healthy and sick people that describe how they should move, how they interact, and how they become healthy or sick. Because StarLogo makes use of graphical output, when the student watches many people simultaneously following those rules, she can observe how patterns in the system, like the spread of a disease, arise out of the individual behaviors.

StarLogo has been available for many years and been adopted into classroom use around the world. However, for many teachers and students, it had a high barrier to entry. To help alleviate this problem we crafted an introduction to modeling complex dynamic systems using StarLogo (Klopfer & Colella, 1999; Klopfer & Colella, 2000). The Adventures in Modeling (Colella et al. 2001) curriculum is designed to introduce participants to the computational and cognitive aspects of modeling complex, dynamic systems. To provide a balance between structure and exploration, we organize Adventures in Modeling around a set of open-ended StarLogo design Challenges on the computer and a series of off-computer Activities in which participants enact and analyze a simulation.

Each Challenge is a problem statement that is meant to guide participants’ explorations and spark their creative thinking. For example, one Challenge asks participants to build a model in which creatures react to their environment. In response to this Challenge one might create a model of a ball bouncing off of a wall, a car following road signs, or a bee navigating to its hive. The Challenges and accompanying sample projects facilitate model design and construction, build familiarity with the StarLogo environment, and introduce the principles of complex systems.

Though “on-screen” computer modeling is one focus of our workshops, “off-screen” Activities provide another way to connect abstract notions of scientific systems to personal experience (Colella 2001). These Activities allow participants to think about concepts like exponential growth, local versus global information, and group decision-making from a personal perspective. For instance, in one Activity, participants become members of a growing population as they follow simple birth/death rules that can easily be altered and understood.

Recently, we have captured the essentials of the Adventures in Modeling approach in a book entitled, *Adventures in Modeling: Exploring Complex, Dynamic Systems with StarLogo* (Colella et al. 2001) published by Teachers College Press. This material can be

used in conjunction with the StarLogo Design Discussion Area, an online forum for posting and discussing solutions to the Design Challenges based on the Design Discussion Area (Kolodner and Nagel 1999).

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EAST – Environmental and Spatial Technology  
Rowland Baker, EAST, Inc.

The EAST (Environmental and Spatial Technology) initiative is the result of strong relationships between business, government, and education. These relationships provide awareness and access to necessary and relevant resources normally not available to educators. The underlying philosophy for these partnerships is the educational model that is EAST.

EAST Philosophy is based on the following educational principles:

- All students have value and deserve the opportunity to demonstrate their value to their school and community.
- Educational experiences must be relevant, challenging, purposeful, and Student Centered.
- The physical educational environment must include state of the art, real-world tools and reflect a work-like setting.
- Educators should serve as resource guides, managers, and learner facilitators.
- Learning should be self-directed as much as possible and oriented towards real-world projects that engage students in independent and interdependent roles.
- High expectations must be individually established for all students and must drive their efforts to achieve their potential.

Based on these principles, the EAST model has been recognized nationally as an innovative, relevant, and successful approach to education. EAST students are experiencing an individualized self-directed, service-oriented project-based curriculum that is providing value to local schools and communities.

The EAST Initiative is helping educators recognize, create, and maintain a learning environment, which requires students to take the initiative in creating project solutions that produce measurable and tangible results. Students are exposed to strategies that help them move from the traditional self-centered approaches of learning into a more realistic (and more relevant) interdependent environment that stress understanding, collaboration, and team approaches to problem resolution.

Through an extensive professional development process, EAST teachers (facilitators) develop the capacity to stay focused on the intellectual development of their students and learn to evaluate student progress on actual performance in creative and problem solving areas. Teachers provide students with opportunities to experiment while using relevant tools. They allow students to make and profit from mistakes, which fosters the students' ability to become self-reliant problem-solvers.

Originating and driven from within the education system, EAST began and has sustained its integrity as a dynamic grassroots collaboration between education and business. The Initiative began in 1995 at the Greenbrier High School with twenty at-risk students. By the 2001–2002 school year, over 15,000 students in five states were participating in the program.