

## Benefits of Thinking Tools

# Developing Tools to Prompt Thinking



### *Visual Ranking and Seeing Reason*

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What goes on in classrooms where students exercise their higher-order thinking skills? Plenty. These are active learning places where students engage in robust discussions, pursue investigations, analyze complex information, and solve problems. Teachers play a critical role, of course, facilitating learning activities and posing questions that take student thinking deeper.

To help teachers and students make the most of active learning experiences, Intel® Education developed a suite of online tools, available at no charge and accessible from any computer connected to the Internet. With three tools available, these online resources help teachers design, set up, and manage classroom projects across a wide range of grade levels and subject areas.

"Our tools are based on cognitive research that shows how kids think," explains Dr. Jim Pollard, Intel's lead researcher for developing online education tools. *Seeing Reason* prompts students to think about cause-and-effect relationships in complex systems and *Visual Ranking* involves making and comparing ordered lists. Both tools also offer teachers valuable insights into student understanding.

#### **Ranking and Comparing**

The newest online resource, *Visual Ranking*, offers an interactive workspace for ranking and comparing lists. *Visual Ranking* includes an easy-to-use tool that allows students to arrange factors in an ordered list, explain their reasoning through use of comment boxes, and compare their results with lists made by others.

What do students learn from making ordered lists? The process involves a wide range of cognitive skills, including analysis, evaluation, and decision making. For example, a social studies teacher might ask students to rank a list of U.S. presidents. As students arrange names in their list, they weigh what they know about the presidents against their own criteria for assessing "greatness."

*Visual Ranking* includes a correlation feature that enables students to compare their results with their classmates' lists. Whether a class project involves ranking the elements of a good mystery story or listing the steps involved in cell meiosis, the Visual Ranking tool helps students set priorities, debate differences, make correlations, reach consensus, and organize ideas.

*Visual Ranking* was introduced after nearly a year of behind-the-scenes development and field-testing with classroom teachers. The resource includes the online tool and teacher workspace, along with examples of projects from a variety of subject areas and grade levels. Related resources highlight strategies for using the tool in the classroom and recap research from the field of cognitive science.

#### **Creating Tools for Learning**

Pollard keeps a number of criteria in mind as he works with researchers and teachers to develop and adapt tools for online delivery. In his quest for "powerful, interactive cognitive tools," Pollard is looking for resources that meet key goals. Among them:

- **Students use the tool directly.** Teachers design effective learning projects and set up class workspaces, but students use the online tool themselves. Hands-on, dynamic, manipulative tools that students control help meet the needs of diverse learners.
- **Tool helps teachers find out what students are thinking.** By capturing a record of student thinking, a good tool gives teachers a window into student understanding. Knowing what students are thinking enables teachers to better address individual learners' needs. Teachers and students can see how understanding changes over time, with the introduction of new concepts and content.
- **Activities are generative.** Rather than using a tool for a one-time task, students go back and use the tool again after they have learned new information or gathered research data. Generative activities support student learning over time, as students build new understanding on what they already know.
- **Tools are open-ended, reusable, and not limited by content areas.** They can be integrated across disciplines and used at a wide range of grade levels.
- **Online resources scaffold best teaching practices.** In addition to delivering powerful tools for online learning, the Intel Education Web site also includes ideas for putting tools to use, strategies for effective instruction, and research to explain the value of the learning activities.

Making cognitive tools available online adds more advantages. "This is anywhere, anytime learning," Pollard explains. Both students and teachers appreciate being able to store and access class projects from any Internet connection.

The online learning environment also makes it possible for students to connect with resources beyond the classroom. Learning teams can be organized across distant locations, allowing students to exchange ideas with learners in other communities. Using the *Visual Ranking* tool, for example, students might compare their lists with those created by various audiences--students in the same class, students at other locations, or parents or other adults who are experts in a particular topic.

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