

The Intel® Innovator

Tools and Resources for Educators Summer

2005

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Meet Us at NECC



Attending the National Educational Computing Conference (NECC) this June in Philadelphia, Pennsylvania? Be sure to visit the Intel® Innovation in Education booth to learn about the latest free tools, resources, and workshops for educators.

[Read the article.](#)

Learning to Weigh the Evidence

Showing Evidence Tool, newest in the suite of thinking tools from Intel Innovation in Education, prompts students to evaluate evidence as they develop a well-constructed claim. [Read the article.](#)

Developing Deeper Thinkers

Looking for ways to engage your students in higher-order thinking? Our newest professional development offering, the Intel® Teach to the Future Workshop on Teaching Thinking with Technology, shows you how to take students' thinking deeper by using online thinking tools in classroom projects. [Read the article.](#)

Featured Resource Student Scientists Shine at Intel ISEF

Where in the world will the next great scientific breakthrough come from? If this year's [Intel International Science and Engineering Fair \(Intel ISEF\)](#) is any indicator, scientific discovery is thriving all around the globe. More than 1,400 young scientists, mathematicians, and engineers from 41 countries came together in Phoenix, Arizona, in May for Intel ISEF, the world's largest pre-college science competition. Student scientists shared more than \$3 million in awards and scholarships for projects that may some day change the world. [Learn more.](#)

World Year of Physics

In honor of the World Year of Physics, a global observation of the work of Albert Einstein, *An Innovation Odyssey* will showcase classrooms where technology helps students master their understanding of physics and build interest in science. [Read the article.](#)

Ask an Expert

What's the future of educational technology? We ask author and expert David Weinberger, who will be delivering the keynote address at the National Educational Computing Conference in June. [Read the article.](#)

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Meet Us at NECC

Visit the Intel® Innovation in Education Booth



Workshops, demonstrations, and other special events are among the many activities that Intel® Innovation in Education is planning for the National Educational Computing Conference (NECC), taking place June 26-30 in Philadelphia, Pennsylvania. Teachers, professional developers, technology specialists, administrators, and others will have a chance to learn about the latest free tools and resources

available from Intel Innovation in Education. Teachers who have participated in Intel® Teach to the Future programs are especially encouraged to stop by the Intel booth for a free gift and a chance to learn about the newest professional development offering. Intel, a sponsor of NECC, plans a wide range of conference activities:

Theater style presentations in the Intel Innovation in Education booth (No. 1323 in the exhibit hall) will showcase the latest professional development offering, the Intel® Teach to the Future Workshop on Teaching Thinking with Technology, as well as the new *Showing Evidence Tool*.

Participating teachers will be available to demonstrate the online thinking tools. Free workshops and seminars about classroom tools, resources, and offerings for administrators will be presented several times during the conference.

▶ **Lead by Example:** In this free forum, examine roles leaders play in supporting effective technology integration. Begin development of a personalized action plan to implement in your schools. Offered: SA107, Sunday, June 26, 8:30-11:30 a.m.; TA324, Tuesday, June 28, 8:30-11:30 a.m.

▶ **Teaching Thinking with Technology:** This free workshop focuses on enhancing effective technology integration skills using online tools that engage students and help them communicate their understanding of complex concepts. Offered: SP187, Sunday, June 26, 1:30-4:30 p.m.; MA207, Monday, June 27, 8:30-11:30 a.m.; TP370, Tuesday, June 28, 1:30-4:30 p.m.; WA415, Wednesday, June 29, 8:30-11:30 a.m.

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[Learn More](#)

- ▶ **Remarkable Rankings:** Improve students' critical thinking and collaboration skills with the *Visual Ranking Tool*. In this free workshop, learn about this online thinking tool from Intel Innovation in Education, and begin planning a classroom project. Offered: MP286, Monday, June 27, 1:30-4:30 p.m.; WP462, Wednesday, June 29, 1:30-4:30 p.m.

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Learning to Weigh the Evidence

Showing Evidence Tool Elevates Argument in the Classroom



Students encounter arguments everywhere they turn—from talk radio to television crime dramas to family discussions. But what makes an argument convincing? And how does evidence come into play to support a well-reasoned claim?

The *Showing Evidence Tool* is designed to help students construct an argument and

support it with evidence. The newest thinking tool from Intel® Innovation in Education, *Showing Evidence* provides an online, interactive tool and workspace, with supporting materials for teachers to use with their students.

Like the other thinking tools from Intel Innovation in Education, the *Showing Evidence Tool* is available for free, from any computer connected to the Internet. The suite of thinking tools has been designed to develop students' higher-order thinking skills by using technology to prompt evaluation, analysis, collaboration, and visual representation of ideas.

Showing Evidence is appropriate for classroom projects involving a wide range of ages and subject areas—from making and defending a scientific hypothesis to analyzing character traits in literature to arguing about the causes of events in history. It's an ideal resource for teachers looking to elevate argument in the classroom.

Grounded in Cognitive Science

The Web-based technology behind the *Showing Evidence Tool* was developed by cognitive scientists and grounded in research about how people learn. For example, visual representation of thinking is a research-based strategy to improve student learning. By making student thinking "visible," thinking tools like *Showing Evidence* give teachers a valuable window into student understanding.

How does the *Showing Evidence Tool* work? Basically, online prompts guide students through the process of stating a claim and evaluating evidence. Along the way, students are prompted to think about the reliability of evidence. Is it credible? How do they know? Is the source free of bias? Using a scale, they rate the reliability of the evidence. Similarly, students assess whether each piece of

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evidence supports or refutes their claim. Again, a scale prompts them to assess the degree of support. Students can also use a comment feature to explain their thinking or provide more details about a source of evidence. Once they reach a conclusion, students are ready to defend their argument with evidence. Finally, they use a rating scale of 1-5 stars to indicate whether or not their claim is fully supported and proven.

Teacher Insights

Experienced teachers have played a role in field-testing this new tool with their students and providing feedback to guide development.

For example, a high school biology teacher in Arizona has used the *Showing Evidence Tool* to prompt her students to investigate the controversial issues surrounding biotechnology. She asked them to make a well-supported argument about whether society should restrict technology that uses DNA. In the process, her students dug into research "and got a more in-depth look at some of the controversial issues surrounding biotechnology," she said.

A middle school teacher in Washington has used the *Showing Evidence Tool* in a literature project. His students argued about whether the title character in *Jack in the Beanstalk* was a hero. Before he asked students to write a persuasive essay, he had them use a simplified version of the tool where students state a claim, organize their thoughts, and use their evidence in favor of their claim or against it. As a result, he saw the quality of their arguments improve.

A teacher from Texas explains the power of the *Showing Evidence Tool* to support learning: "Could I do the same thing without the tool? Probably not—not to this level and not to this extent. If it was one-on-one with a child, we could go into that in-depth of a discussion," she said, "but not with 25 kids in the room. I am pleasantly surprised how deeply focused I can keep a large number of students."

Another teacher found that using the *Showing Evidence Tool* prompted students to think about both sides of an issue. "That's something they wouldn't necessarily have done otherwise. And deep discussion occurred between them as they were thinking about both sides."

All three thinking tools now available from Intel Innovation in Education encourage students to learn from their classmates. Teachers can set up the workspace so that student teams view one another's work, make comments, and discuss differences. Teachers can also view student work while it is underway—giving them a valuable glimpse into student understanding. Teachers can make comments online or engage students in discussions. As one teacher observed, "The real strength of the *Showing Evidence Tool* is the structure it provides to discussion. Teachers should assess by wandering around and joining conversations."

The *Showing Evidence Tool* gives teachers considerable latitude in deciding how to set up a project and guide student learning. For example, they can start with a claim and "pre-load" a bin full of evidence for students to evaluate. Or, they can leave the process more open-ended, asking students to state their own claim and locate evidence to support or refute it.

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More Ideas Online

To help teachers make effective use of the *Showing Evidence Tool*, the Web site includes a number of teacher-tested project ideas and more detailed unit plans for using the tool with students. In addition, the Web site includes a discussion of the benefits of teaching about argumentation along with strategies for effective implementation of projects using *Showing Evidence*.

In addition to *Showing Evidence*, the suite of thinking tools available from Intel Innovation in Education includes *Visual Ranking*, which prompts students to prioritize and compare items in a list, and *Seeing Reason*, which prompts students to investigate cause-and-effect relationships in complex systems. [Learn more.](#)

Teachers interested in an in-depth, hands-on introduction to the thinking tools may want to enroll in a free professional development offering, the Intel® Teach to the Future Workshop on Teaching Thinking with Technology. [Learn more.](#)



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Developing Deeper Thinkers

New Workshop Helps Teachers Engage Students in Thought-Provoking Projects



When Joel Lang plans a learning activity for his eighth-graders, he begins with a key goal in mind. "I feel strongly that my job as a teacher is to produce solid thinkers," says the language arts teacher from Washington. "The only way to do this is to engage them at a higher level than merely recalling facts and memorizing information. The thinking skills involved—analyzing, synthesizing, comparing—are transferable to all subject areas, indeed, to life in general."

A new professional development offering, the [Intel® Teach to the Future Workshop on Teaching Thinking with Technology](#), builds teachers' abilities to create classroom projects that engage students in higher-order thinking. Participants learn to use a suite of interactive thinking tools to meet their instructional goals. The tools are available at no charge on the [Intel® Innovation in Education Web site](#).

Teaching Thinking with Technology provides hands-on learning in a technology lab. The workshop is designed for those with intermediate technology integration skills. For teachers who have already taken part in the Intel® Teach to the Future Essentials Course, the new workshop provides an ideal next step in professional development. Master Teachers lead colleagues through the modular curriculum, which provides from 24-40 hours of professional development.

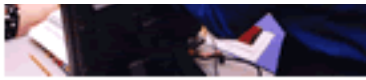
Thinking About Thinking

Why are thinking skills so important? Today's students are growing up in a time of rapid technological change, with instant access to massive amounts of information. That means basic skills of literacy and numeracy are no longer enough preparation for the future. Being able to analyze complex information, adapt to change, and collaborate with others to solve problems are increasingly important skills.



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Thinking about thinking is not a new concept.

Benjamin Bloom and his colleagues created a taxonomy of thinking skills half a century ago. Bloom's taxonomy shows thinking processes moving up the pyramid from lower-level mastery of knowledge to higher-level skills of analysis, synthesis, and evaluation. Nearly 50 years since Bloom's taxonomy was first published, however, most classroom activities continue to focus on the foundation skills of acquiring and comprehending knowledge.

*EnGauge**, an online resource that publishes a research-based framework for fostering Twenty-First Century skills, points out that, for more than a decade, researchers "have been calling for higher-order thinking and sound reasoning in the K-12 curricula." Similarly, the [National Educational Technology Standards for Students*](#), published by the International Society for Technology in Education, call for using technology to promote students' critical thinking, decision-making, and problem-solving skills.

The Workshop on Teaching Thinking with Technology begins by providing teachers with an understanding of what makes higher-order thinking essential for today's learners. Then, participants apply their understanding as they:

- ▶ Address and assess thinking skills
- ▶ Use technology to increase effective student collaboration, student-teacher interaction, and the inquiry process
- ▶ Create a standards-based instructional plan and sample projects
- ▶ Learn to use the interactive thinking tools from Intel Innovation in Education, including how to manage projects using the online environment and workspace

In the Classroom



How can teachers use interactive thinking tools to create higher-order learning opportunities in the classroom? Recently, Joel Lang taught a literature project using the *Showing Evidence Tool*, the newest thinking tool from Intel Innovation in Education. *Showing Evidence* prompts students to create a well-constructed argument, supported by evidence. (See related story, "[Learning to Weigh the Evidence.](#)")

Lang's students read the classic story, Jack and the Beanstalk, then had to decide whether Jack should be deemed a hero. The project asked students to do much more than simply read and comprehend the text. Instead, they had to analyze the actions of the story, assess what it means to be a hero, and evaluate Jack's actions.

Using the *Showing Evidence Tool*, Lang said, "allowed me to structure a lesson in which students were asked to take a stand on an issue and find evidence to support their claim." Lang used the features of the tool and online workspace to promote peer review and collaboration. "Students were able to build a case, write a conclusion, and review another team's work," he explained.

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The technology allowed Lang to monitor students' progress and get an idea of what they were thinking—all while they were still working on their projects. He could go into a student team's workspace, for example, and make suggestions or ask questions. Better classroom discourse and more open-ended questioning strategies also helped to promote higher-order thinking.

Students could see how using the tool helped improve their ability to craft a good argument. Observed one student, "It helped me think about what I wanted to say and organize how to say it."

As for Lang, the project helped him reach the goal of active, engaged learning. "When students leave my classroom," he said, "I feel accomplished only when they are able to think more critically about an issue or topic."

The Intel Teach to the Future Workshop on Teaching Thinking with Technology is currently available to teachers in the United States. [Learn more.](#)

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World Year of Physics

Odyssey Theme Dovetails With International Events



Today's young scientists will be launching their careers at a time "pregnant with possibilities" for new discoveries, according to Dr. Leon Lederman, a Nobel Laureate in Physics and longtime proponent of science education.

In honor of the World Year of Physics, a global observation of the work of Albert Einstein, *An Innovation Odyssey* will be showcasing classrooms where technology helps students master understanding of physics and build

interest in science. *An Innovation Odyssey* is an online collection of stories on the Intel® Innovation in Education Web site, about teachers around the world who make effective use of technology in the classroom.

Odyssey features a new classroom project every school day. The entire collection of nearly 400 stories is available for search by grade level, subject area, or type of technology used. To help teachers focus on big ideas in the classroom, *Odyssey* also groups stories in themes for learning. The newest theme, "In Einstein's Footsteps," will be showcased later in 2005, in honor of Einstein's so-called "Miraculous Year" of 1905. That was the year when the physicist published three of his most significant papers.

For many students, the spark of interest in science begins early in life. That was the case with Lederman, who spoke at a special event in connection with the World Year of Physics and the Intel Science Talent Search earlier this year on the University of Maryland campus. At about age 10, Lederman was recovering from the measles when his father brought home a children's book written by Einstein. The great physicist "compared science and a detective story. At the end, the detective puts together clues that lead to one logical explanation for the events." Einstein explained that in science, seemingly disconnected facts also come together into a logical explanation, "and the simpler the explanation, the better. That impressed me," Lederman said. As he learned more about physics, he said, "it became more beautiful and wonderful." He won the Nobel Prize in 1988.

Plenty of unknowns remain for today's scientists to discover, Lederman added.

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He explained that Twentieth Century physics was dominated by two theories: quantum mechanics and relativity. “If you try to put them together, they’re incompatible. Something is wrong with this combination,” he said, suggesting an area ripe for future research.

Teachers who have completed successful classroom projects that use technology to teach about physics—along with other engaging topics—are encouraged to submit their ideas for possible publication in *An Innovation Odyssey*. An online submission form explains the process for submitting an idea that could lead to a story. [Read more](#)

More information is available about worldwide activities taking place in connection with the World Year of Physics. [Learn more*](#).

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Ask an Expert

David Weinberger: The New Shape of Knowledge



When the National Educational Computing Conference (NECC) opens in Philadelphia Pennsylvania, David Weinberger will set the stage on June 27 with a keynote address, “The New Shape of Knowledge.” A widely published author and fellow at Harvard’s prestigious Berkman Institute for Internet and Society, Weinberger has been paying close attention to what it means to know, to teach, and to learn in an increasingly connected world. His own interests cut across diverse fields—from philosophy to mystery writing to technology. Recently, Weinberg offered The

Intel® Innovator a preview of the ideas he will be sharing at NECC.

What would you say is your vision for technology in education?

The biggest change which technology can help to bring about in education is a shift in the locus of authority and expertise. Technology can help to distribute expertise through a variety of avenues (the Web, other networks, individuals) in a way that an instructor lecturing from a textbook never could.

This isn’t just because students tend to be the early-adopters of technology, but because networked, social technologies are radically changing the way students and people interact. One need only look at an example like the [Wikipedia*](#) to see how a user-generated encyclopedia is uniquely different from all other encyclopedias.

What are some of the best examples of new technologies that you are keeping an eye on?

There are a number of examples of different free Web services that I think hold a lot of potential—and a lot of interest for me. However, one example I’d like to speak about is the change that has to occur in the model of teaching. For instance, teachers are typically evaluated (by national and state tests) based on how their individual students perform. However, when most students are given a large assignment—one that they work on from home—they use a computer to instant message friends while working on it.

So, students work collaboratively on a project (I know, some fear this is cheating,

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but the reality is this is how people work in the ‘real world’), and then students are graded based on their individual efforts when they worked within a group. Finally, a teacher is evaluated based on this misevaluation of student effort when, in fact, the student’s work (and his or her team) may have done everything correctly, but it just doesn’t show up on the tests.

What are the roadblocks and obstacles to implementation?

I believe we have to think differently about the way in which we organize knowledge. The Aristotelian model of knowledge being organized like the branches from the trunk of a tree doesn’t work in the digital model. That is, groups of users (which are called P2P, peer-to-peer, networks) can co-locate their organizational models. What that means is knowledge of one particular thing doesn’t have to fit into one category or one taxonomy. It can inhabit many different realms. And with the way digital networks operate, users never have to muddle with the connections, they just create them and they are there.

What do you see as the biggest changes on the horizon for education and the impact of technology?

There are a number of different tools which education needs to embrace to change the way students are taught—because they are learning differently. These include things like instant messaging, social software like [Flickr*](#) and [Delicious*](#). These tools are all emerging from the grassroots and are both informing and changing our knowledge base.

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Finalists From Around the World Share Whirlwind Week in Arizona

More than 1,400 of the world's brightest young minds gathered in Phoenix, Arizona, in May for the Intel International Science and Engineering Fair (Intel ISEF). Winning projects may someday improve life for the blind, expand our understanding of Mars, and unleash new pharmacology research by miniaturizing procedures to synthesize and analyze compounds.

Each of the three Intel Foundation Youth Scientist Award winners received a \$50,000 scholarship. Ameen Abdulrasool, 18, a senior from Lane Technical High School in Chicago, Illinois, developed a small, self-contained, portable navigation system to help the visually impaired travel without the need of a guide. Stephen Schulz, 19, a senior from Gesamtschule Buer-Mitte in Gelsenkirchen, Nordrhein-Westfalen, Germany, developed new electrochemical methods to analyze compounds that can protect against cancer and other diseases. Gabrielle Gianelli, 17, a junior from Lake Highland Preparatory School in Orlando, Florida, used fractals and statistics to prove that there were once oceans on Mars.

Although Intel ISEF awards \$3 million in scholarships, benefits extend to all participants. Finalists get a chance to share ideas and their passion for science with other student researchers from around the world. In addition, students get the chance to learn from leading scientists and technologists. At this year's event, astronaut Sally Ride predicted that one of the students attending Intel ISEF could someday be the first human to set foot on Mars. In a special panel presentation, nine Nobel Laureates and other esteemed scientists and technologists spent two hours answering students' questions.

For more highlights about Intel ISEF 2005, including examples of student projects and an online photo album, visit the Intel® Innovation in Education Web site. [Learn more.](#)

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