Feature

# Raising the Bar for Student Performance and Assessment

*By Bernajean Porter*

**Subject:** Assessment of student

work, program evaluation

**Audience:** Teachers, teacher educators, library media specialists, administrators, program evaluators

**Grade Level:** K–12 (Ages 5–18)

**Standards:** NETS•S 2–4; NETS•T II, IV; NETS•A IV, V (www.iste.org/standards)

Scoring guides for student's digital products raise the bar for student performance and deepen the evaluation of technology's effects on learning.



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Students in classrooms are embracing multimedia, presentations, products, products everywhere! tion, and Web tools, which give them even more power to use in developing their communication skills. Most adults are used to working on paper and certainly are not prepared to assess these dynamic information products. This brings a new challenge to our classrooms as national studies and organizations work to define 21st-century skills deemed essential for students to thrive in a digital economy. (***Editor's note:*** For more on 21st-century skills and URLs for any sites mentioned in this article, see Resources on p. 41.)

Student work has traditionally been topical research that asked students to "go look up and tell me back" to demonstrate being good consumers of information. This approach limits student products—both text and electronic—to being mostly summary reports: a slide show on weather terminology, a Web product showing the history of Abraham Lincoln, or a hypermedia product on dinosaurs. However, a true knowledge-building environment facilitates inquiry research. This enables learning to be centered around critical questions, deeper levels of understanding, and original thinking that goes beyond existing information and patching together facts. Meeting the demand for 21st-century skills will require shifting student work tise as community property in the form of a knowledge product that is expected to be useful and beneficial to others. Their audience broadens and the value of their work increases when their products are published on Web sites, local school servers, electronic mailing lists, in magazines or newspapers, or given as electronic presentations. With the exponential growth of information, we can no longer rely solely on our own individual learning. Learning communities that share their expertise increase our own capacity to deal with the exponential growth of information in meaningful ways.

### Working at the Top of Bloom's Taxonomy

The need for 21st-century skills creates an urgent demand on learners to acquire and practice the higher-order thinking skills from the top of Bloom's taxonomy: analyzing, synthesizing, and evaluating. (***Editor's note:*** Read more about Bloom's taxonomy under Resources on p. 41, in Sharon Anne O'Connor-Petruso's article on p. 32, and in Walter McKenzie's article on p. 54.) This article is not just about creating and assessing computer-based student work; rather, it is about the opportunity to increase overall student performance by reorganizing classrooms to be environments of sustained inquiry, cognitive apprenticeships, authentic work, and production of

## Creating the Guides

As a consultant and author of Illinois' NextSteps Project, a comprehensive technology assessment toolkit constructed for statewide use, I worked with the leadership team on how to deepen the evaluation of technology's effects on student performance beyond surveys, interviews, and quantitative data from state tests. One idea we generated was to use computer-based student products as instructional artifacts much like we currently use student writing. Student work seemed a natural vehicle to extend the evaluation of individual student skills and provide a valid process for assessing technology's effects on student performance. In the beginning, we were think-ing we would create perhaps one or two scoring guides. But all good ideas seem to develop into lots of work, which was evident as we went from developing a couple of scoring guides to developing 28.

I formed a partnership with NCRTEC/NCREL to develop, prototype, and validate a comprehensive set of scoring tools and processes for evaluating computer-based student work. We began with a two-day meeting with national consultants who helped establish a framework of indicators and terminology that focused assessment on content first and technology second. After two years of developing, rapid prototyping, fieldtesting, and finally under-going NCRTEC's quality review, we completed the Student Scoring Guides. To allow users to customize the guides, we made them available on the NCRTEC Web site and on my Web site. (*Editor's note:* You'll find sample guides on Bernajean's site under Evaluating Student Computer-Based Products and Training

into higher gear from activities that use knowledge to activities that help students become information seekers, analyzers, evaluators, innovative thinkers, problem solvers, decision makers, and producers of knowledge.

As important as learning and knowing specific information is in our schools, it is not enough for students to be able to recap existing information. Learners also need to acquire exemplary skills in communicating or demonstrating to others what they have learned beyond existing information. Students need to be able to develop their experiences with technology that focus on what you want students to know and understand as products are produced through field-testing: participatory environments. The key element that sets participatory communication apart from higher gear from activities that use knowledge to activities that help students become information seekers, analyzers, evaluators, innovative thinkers, problem solvers, decision makers, and producers of knowledge.

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### Tools for Assessing Higher-Order Skills

I worked in conjunction with the North Central Regional Technology in Education Consortium (NCRTEC), operated by the North Central Regional Education Laboratory (NCREL), on Illinois' NextSteps Project to develop a set of scoring guides for computer-based student work. (For more on the development, read Creating the Guides on this page.) Here is our premise for the Student Digital Products Scoring Guides: Because students must do some kind of work to learn, why not let that work original thinking.

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Resource Book.)

The tools and processes we developed are based on the research and successes of California (Bay Area) Writing Project, Six Trait Scoring, Bloom's taxonomy, Coalition of Essential Schools' Tuning Protocol, Looking at Students Work, and Harvard Project Zero's Collaborative Assessment. The final scoring guides are validated for Grades 4–12. K–3 teachers are certainly able to select descriptors from the scoring guides they feel developmentally appropriate to the tasks given, but the national literature review could not validate the descriptors to be used holistically for young learners at this time.





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## Using the Guides for a System Evaluation

External and internal evaluators can use a collaborative assessment process as described below to evaluate the effects of technology on student learning. Reflecting on student work and generating group conclusions can reveal overall patterns of what's working and what could work better. The collaborative processes developed are used to create learning and understanding throughout the community in order for members to reach higher levels of success. Collaborative reflection and examination of student work is an authentic performance assessment process used for a variety of purposes:

- to support new learning needed by teachers and students as they practice to become facile with new tools of communication
- to help raise the collective expectations for high performance use of technology for learning standards
- to hold schools responsible for student content performance rather than settling for low-level activities or using technology as an end in itself
- to give schools a common language and set of standards that will encourage reflective habits needed for continuous improvement

Groups of evaluators first individually score a strategic sampling of student products. The strategic sampling follows a process similar to the one for collecting student writing for assessment in a school district; that is, the sampling should be a purposive, representative sample based on social economics, geography, ethnic groups, grade levels, content areas, and resource distribution. In a formal evaluation, the group determines, through consensus, the overall ranking for each trait, calculates total points for both communication of content and craftsmanship of expression, and makes a list of what actions are needed to move to higher levels of achievement. Finally, they use what they heard or learned to draw conclusions about what the product reveals about instructional practices, learning uses, student performance, and overall value of technology use, focusing on finding the answers to the following questions:

1. What is the role of state content standards or learning objectives in the use of technology resources?
2. How effective is the curriculum design in aligning content with effective uses of technology resources?
3. What is the cognitive level of the learning task?
4. What is the focus of the assessment?
5. What is the demonstration of the student's learning of the topic/subject?
6. What is the craftsmanship of communication of content standards/learning objectives?
7. What value does the information/learning generated from the student work have for others?
8. What is the added value of technology use for content learning?

An informal evaluation used only for reflection and learning would rely more on the narrative comments than on quantifying the scoring process. Though the tools and processes are developed to create a valid school report using student digital products, many groups will want to learn and practice scoring products informally a few times before completing a formal public document. See the Sample Evaluation of Student Work Report at my Web site.

be the construction of knowledge useful and beneficial to others? Find a sample guide online at the NCRTEC site or my site.

Scoring student digital products can provide individual grades for students. However, the scoring process can also deepen the evaluation of the use of technology in instructional practices, learning uses, and demonstrating student performance. The final student scoring guides have four uses:

- external/internal evaluators using student products as a tool to conduct a system assessment (Read more about this in Using the Guides for a System Evaluation on this page.)
- professional development programs to introduce and guide effective uses
- student and teacher groups evaluating the quality of products for peer review and reflection
- finally, individual teachers grading student work

**Types of Scoring Guides**

We determined four categories of scoring guides for 14 types of communication based on national benchmarks of writing and design principles (Table 1, on p. 17). By choosing a type of communication, students declare a format, structure, and organizational style for their products that allows more rigorous evaluation of content communication. Though we borrowed many of the types of communication from the genres of traditional writing assignments, we discovered a new one from an interactive product is user content contribution. The student's work is intentionally structured for users to make their own contributions that add value and evolve the content or concepts of the learning experience beyond the author's work. For example, a Web site with an interactive story about dinosaurs allows users to make new choices by contributing their own page or includes a voting booth that gives users the option of designing a question of their own to submit to voters. By organizing around types of communication, teachers and students can now begin their project knowing the purpose of their technology-based product rather than finding a way to fit a technology project into an existing project. This simple first step increases



**Table 1. Types of Communication**

| *Narrative* | *Information/Expository* | *Persuasive* | *Environments* |
|---|---|---|---|
| 1. Personal Expression | 4. Summary Reports | 8. Advertising | 14. Participatory Environment |
| 2. Myths/Folktales | 5. Book Reports | 9. Describe/Conclude | |
| 3. Short Story | 6. How-to Directions | 10. Analyze/Conclude | |
| | 7. Biographies | 11. Analyze/Persuade | |
| | | 12. Compare/Contrast | |
| | | 13. Cause/Effect | |

attention on the content, which drives the use of technology.

Each of the 14 types of communication has both an analytical (detailed descriptors) scoring guide and a holistic (general descriptors) scoring guide. Therefore, a total of 28 scoring guides were generated. Generally, analytical descriptors are used with new users who need to learn or practice concepts unfamiliar to them. Holistic scoring guides condense the specific elements into a short brief statement considered more useful once the details of the concepts have been learned. Teachers and students build all of them at once. Teachers and students select the scope and focus for each piece of work.

**Table 2. Nine Traits of Scoring Guides**

| *Part I: Content Communication* | *Part II: Craftsmanship of Communication* |
|---|---|
| Preparation Process | Text Communication |
| Content Knowledge | Image Communication |
| Format and Structure | Voice/Sound Communication |
| | Design of Communication |
| | Presentation Communication |
| | Interactivity of Communication |

*The Participatory Environment scoring guide includes a further trait: User Content Contribution.*

## Using the Scoring Guides in the Classroom

Each of the nine traits can receive a score of one to five. The numbers are used to sort the levels of success dem-

Though the descriptors in Part 1 will vary depending on the purposes

dents may want to combine some analytical and holistic descriptors, depending on the lesson focus and targeted experience to be mastered. Primary scoring guides have project-specific or customized descriptors.

Each scoring guide has nine traits and is divided into two parts: Content Communication and Craftsmanship of Communication (Table 2). Each part carries equal weight in scoring, much like writing grades are divided between content and mechanical usage grades. The traits and detailed elements used in Content Communication were constructed using national benchmarks for genres of writing. Rather than having rubrics focused on such technologies as Web tools, multimedia, or presentation products, the traits in Craftsmanship of Communication were developed to represent the functions of technologies in developing a powerful, effective type of communication.

onstrated with all traits. Only levels one, three, and five have actual text descriptors (labeled as limited, developed, and exemplary, respectively). Levels two and four are used when some but not quite all of the elements in levels three and five are met. Each trait has essential elements identified. For example, the Interactivity of Communication trait offers six elements to assess: user control, user layout orientation, navigation, resource links, repetitive participation, and interactive technical quality. The scoring guides are comprehensive enough to provide common descriptors across grade levels, content areas, and varied tool uses. Along with the numerical scoring, the scorers (whether they are teachers, other students, or community members) should collect narrative comments of what worked and what could work better. The goal is to build student skills over time in all traits, not necessarily to

of student communication, the descriptors in Part 2 remain consistent and are used for each type of communication. For example, rating whether the amount of text used is appropriate can be applied across varied technologies. Though many have heard of the 6 6 rule (no more than 6 words by 6 lines per screen), the guideline to determine the amount of text is actually connected to the amount of user control. If the product is a presentation where the audience has no control over the method of receiving information, then the 6 6 rule determines the rating. If the product is a stand-alone piece with significant user control (e.g., multiple methods of navigation, a choice of receiving the information visually or aurally), then more text can be placed on a screen. Including these concepts in guides for scoring student's digital work supports students in increasing the quality of their products.

*Scoring Guides continued on page 41.*





*Scoring Guides continued from page 17.*

Teachers and/or students customizing the guides on the NCRTEC site will first select either an analytical or holistic scoring guide for Part 1 based on the purpose of the communication and then select either an analytical or holistic scoring guide for Part 2. It is important to note that the number of traits in the Craftsmanship of Communication used by students will vary depending on the type of technology tools used for their product. For example, desktop publishing will likely only use the Text Communication, Image Communication, and Design of Communication traits. Presentation of Communication would be used in conjunction with other traits of Craftsmanship of Communication when oral communication is part of the student work.

into a product that demonstrates what they know and understand.

If teachers and schools are looking to both increase the quality of student work and extend their evaluation of technology's effects, these scoring guides provide a means to collectively shift results into higher gear. Having given many training workshops in these tools as well as guiding groups to conduct districtwide assessments, it has been my experience that teachers become excited at using a structure that feels familiar and makes sense. They had great ideas on how to shift assignments into higher gear with more rigorous expectations and concrete assessments for their students' work. For example, instead of assigning a report to develop a PowerPoint presentation on one battle of the Civil War (Summary Report type of communication), teachers designed a challenge for stu-

recognition to Kristin Ciesemeir, director, of NCRTEC, for her vision and support in this project.

## Resources

***Web Sites***

21st Century Skills: www.ncrel.org/engauge/skills/21skills.htm

Bernajean Porter's site: www.bjpconsulting.com

Bloom's Taxonomy: http://faculty.washington.edu/krumme/guides/bloom.html

California (Bay Area) Writing Project: www.nsdc.org/midbook/write.pdf

Harvard Project Zero Collaborative Assessment: www.news.harvard.edu/gazette/2001/12.13/10-projectzero.html

Illinois' NextSteps Project: www.nextsteps.lth5.k12.il.us/default_info.asp

NRTEC Scoring Guides for Student Products: www.ncrtec.org/tl/sgsp/

Six Trait Scoring: www.nsdc.org/midbook/trait.pdf

***Articles***

Bereiter, C., & Scardamalia, M. (1996). Rethinking learning. In D. R. Olson & N.

## Conclusion

Many of the students' products we first gathered for field-testing, received low scores because the role of the product in the learning unit was either about having a fun and motivating culminating experience (e.g., making sugar cube pyramids) or developing a topic for learning or practicing technology skills. Bright students involved in dynamic classroom lessons were diverted either by the novelty of the tools or by the lack of expectations to develop a type of content communication with rigorous thinking. Many teacher-prepared rubrics to assess content learning that we reviewed were mostly about technical elements with only token criteria, such as "subject knowledge evident" or "student demonstrates full knowledge."

But teachers and students are now ready to go beyond the "go do a PowerPoint presentation" type of assignment. These student scoring guides were found useful in giving teachers an organized scaffolding that helps students translate their learning dents to design a monument to commemorate the greatest single event in the Civil War. Which event would you commemorate and what would your monument look like? You must design a 3-D model of the monument into a virtual reality display along with supporting your opinion with facts and cite your sources (Analyze and Conclude type of communication). The student scoring guides help organize everyone with a common database of expectations to develop more rigorous student uses of technology resources. You are invited to begin the journey today using one or more of the *ExplorITorium* activities developed on my Web site to practice the student scoring guides. Have fun—the kids do!


## Acknowledgements

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Bereiter, C. (1997). *Education in a knowledge society* [Online]. Available: www.bjpconsulting.com/creating-knowledge.html.

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*Bernajean Porter's work reflects her belief that technology can accelerate all students in rediscovering their joy and personal success as learners. She is the author of* Evaluating Student Computer-Based Products; Grappling with Accountability 2002: MAPPing Tools for Organizing and Assessing Technology for Student Results; *and* Nutz and Boltz for Engaging Large Groups. *Learn more at www.bjpconsulting.com/. Twenty years ago, Bernajean was found wandering in a daze at her first Comdex Conference asking, "Now tell me again, what is the difference between hardware and software?"*