CILT2000: Using Technology to Support Ongoing Formative Assessment in the Classroom

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Running Head: CILT2000: Using Technology to Support Formative Assessment in the

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Researchers in the Center for Innovative Learning Technologies (CILT) have been developing studies around the use of technology to identify under what conditions — who, what, where, when and how — technologies can be used to support learning. A key purpose of CILT has been to help define a trajectory for the evolution of technology and its application in classrooms (Roschelle & Pea, 1999). One way that technology can be a substantial help to teachers and learners is by improving the ability to offer formative assessments of a learner's knowledge and skills, assessments that can support teachers and learners in the classroom. The workshop we hosted on "Assessments for Learning" under the auspices of the NSF-funded Center for Innovative Learning Technologies (CILT) brought together over 50 researchers to address this and related issues.

WHY ASSESSMENT?

Assessment is an important aspect of any educational innovation or reform. Often when another complex innovation is introduced assessment is used to help guide the teaching and learning process, shaping student self-monitoring and opportunities for learning. In fact, providing formative feedback to the learner that is tied to learning outcomes in a direct way may alone have a greater impact on learning outcomes than many of the interventions themselves. "Strengthening the practice(s) of formative assessment produce significant and often substantial learning gains . . . effect sizes are larger than most of those found for educational interventions" (Black & Wiliam, 1998, pp. 140-141).

Greater emphasis on formative assessment, where feedback is given in time to make a difference, can also help learning for *all students*, particularly those who require the most support. Black and Wiliam show that formative assessments can help low performers most, while benefiting all students: "Improved formative assessment helps low achievers more than other students . . . while raising achievement overall" (p. 141). In contrast, high stakes assessments provide little direct performance support for individual learners or their teachers.

WHY TECHNOLOGY?

Advancements in educational theories and practices are often linked to new technologies becoming available. Given the rapid pace of technology-driven change, some see emerging technologies and workplace requirements as converging with new theories of learning to support sweeping educational reforms (Trilling & Hood, 1999). With the wide variety of technology innovation taking place in schools, assessment remains one of the outstanding challenges that teachers and researchers face. New forms of teaching and learning and new forms of assessments are required to accomplish the types of technology-supported reforms that are often envisioned.

The Assessments for Learning workshop we hosted at our annual conference was intended to address challenges and to highlight opportunities for new technology-supported assessments. Several demonstrations offered assessment strategies that would not have been possible without the technology. We saw examples from researchers at the

Educational Testing Service of a scaffolded learning environment developed for AP

Statistics and assessments of metacognitive skills in such an environment (Bauer, 2000;

Irvin, 2000). Tanimoto (2000) presented work on "assessment-intensive pedagogy"

which calls for a renewed focus on educational practices being directly informed by

assessments of learning. This view is also reflected in the work of Minstrell et al. (2000)

and in reports from CILT's research panel (Culp et al., 2000; Haertel & Means, 2000;

Quellmalz et al., 2001).

RAISING EQUITY CONCERNS

In keeping with the theme of the conference our colleagues discussed a variety of equity

issues related to assessment. One equity concern involved the use of assessments for

tracking students in a way that focuses on punishing poor-performing students rather than

providing support for teachers and helping students improve their learning. High-stakes

assessments are often used for summative judgements about students, teachers, and

schools, rather than for feedback to teachers and students about how to improve the

quality of learning that is occurring in the classroom on a day-to-day basis (e.g., see

Stiggins, 1997). This places those who are not learning well and who need the most help

at risk of not receiving the support they need in time to make a difference.

Another issue concerns the preparedness of teachers to adopt assessments of complex

learning. There may be a "pedagogical divide" so that teachers of high achieving students

are more likely to offer opportunities for innovative technology assessments, while

prescriptions for routine assessments are offered to those who are less able to pursue

innovative pedagogical uses of technology (Becker et al., 1999).

FUTURE DIRECTIONS

1) Providing easily accessible high-quality assessments with technology

Developing the usability of technologies is one strategy that was envisioned to improve

the equity of assessment practices. Tools could be provided that support reforms by

providing broader access to quality assessments that are easier for teachers and students

to use. The ability to offer such assessments routinely as a part of instructional reforms

would allow researchers to work with a broader range of teachers and schools.

2) Developing teacher capacity for performance assessment

If we used technology to help build teachers' capacity in performance assessment, then

they would perhaps use the assessments more, and it would help push the technology

curriculum towards more meaningful technology uses. If teachers' capacities for

performance assessments are not improved, then the use of more traditional tests may

result in a more rudimentary approach to using technology, rather than a more project-

based approach — for example, greater and greater emphasis on automated scoring

without an instructional feedback component. In many locales, curriculum standards for

technology use are in place, but assessments that address worthwhile uses of technology

are not. Performance assessments that can be used to address technology curriculum

standards and other standards can be placed online, within a supportive context. One

such effort is documented by Quellmalz and Schank (1998).

3) Improving communications: Turning lemons into high-tech lemonade

Another way to influence practice is by finding ways to communicate better and make

better use of existing assessments. In today's climate of standardized testing, a major

challenge is to communicate in a way that highlights promising and emerging practices

and makes it easier for assessments to inform instructional practices. A yet unrealized

goal for standardized testing is to use data to drive planning and instructional decision-

making. Some researchers envision using technology to put high-stakes data into a more

useable format, so teachers can use it to inform classroom practice, translating existing

high stakes testing data into meaningful, useable information. Minstrell (2000) has

focused on "a new style of pedagogy in which the instructor is primarily occupied with

diagnostic assessment of students' understanding" that includes use of traditional

multiple choice assessments. Baker (1998) provides a "dashboard" approach to viewing

results from these kinds of assessments at the school-wide level. These approaches can

inform instruction by adding a technology component to existing assessment practices.

4) Creating new assessments of "21st Century Skills"

New assessments are needed to address "21st Century Skills," including thinking skills,

teamwork skills, ability to use resources and information, and understanding of the

system and technology (Secretary's Commission on Achieving Necessary Skills

[SCANS], 1991). Because business concerns as represented in the SCANS (1991) and the

annual CEO Forum (2001) reports have helped energize technology-supported reforms, it was thought that CILT might work to inform and energize business leaders around the now critical issue of assessment: obtaining support that would enable researchers and educators to better document progress, encouraging and giving credit for the work that has been done, and highlighting the continued challenges that threaten to reverse the progress that has been made.

One focus for assessments of 21st Century Skills concerns the development of collaboration skills. Because standards that call for collaborative skills often do not have accompanying assessments, it is important to provide examples and rubrics of different aspects of collaboration. In addition, there could be specific instructional strategies accompanying each assessment of students' skills. CILT work on the TeamLab project (Yarnall et al., 2001) as well as work funded for Hickey (2001) and Duschl & Ellenbogen (2001) have used CILT seed grant money to take up these challenges to help identify dimensions of group participation and the "fate of ideas" in group settings. These projects address the difficulty teachers have in assessing not only the extent of student participation in groups, but also the quality of that participation. This work might also seek to address equity of participation of students in groups by helping them observe the extent to which groups honor different perspectives and allow all students to participate.

SUMMARY

The CILT2000 conference addressed a range of issues in assessment and new ideas for technologies that might better support ongoing and formative assessment of learning in

the classroom. Teacher qualifications to implement new techniques are an important issue, as are pressures for test scores and policies that promote a focus on test outcomes, rather than supporting the process of teaching and learning in a way that leads to better results.

Participants in our annual meeting discussed a variety of demonstration projects that utilize technology for ongoing feedback and assessment One challenge is to communicate ideas from these assessments to administrators, the public, and journalists, and to encourage the use of test scores to better inform instructional practices. We also need to discover how to provide greater student and teacher ownership over the assessments that guide their work. Ongoing debates about student accountability and standards for teaching and learning have raised serious questions about the role of assessment in school reform. The types of assessments that we envision are not the high-stakes assessments that come after one is supposed to have learned something, but embedded ongoing assessments that can support the teaching and learning process. We want assessment to be viewed as a "gift" to students and teachers so they can improve teaching and learning, not as a "punishment" for those who do not succeed. The use of technologies that can help provide teachers and students with more useful assessments is a primary goal to be pursued.

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