

Assessment Standards for Technological Literacy

The focus of the Assessment Standards will be on students.

The release of *Standards for Technological Literacy: Content for the Study of Technology (STL)* in April 2000 represented an important and exciting step forward for the technology education field. In the document, the content for the study of technology is identified, organized, and described. However, as the leadership of the International Technology Education Association's Technology for All Americans Project (ITEA-TfAAP) has been careful to note, the release of *STL* is not the end of the process. A series of activities is under-

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way to implement *STL*. This article will describe one key implementation activity, the development of Assessment Standards for technological literacy. The Assessment Standards are one of a three-part set of standards being developed during Phase III of ITEA-TfAAP. The other two (Professional Development Standards and Program Standards) will be described in future *The Technology Teacher* articles.

Over the past decade, with the emphasis on educational reform, a variety of issues surrounding student assessment has come to the forefront. What are the best practices and assessment tools? How should assessment be connected to content standards? How much of assessment should focus on what students know and are able to do *after* instruction? How can assessment be used to form student learning *during* and *throughout* instruction? What should be the role of assessment in the curriculum development process? How should assessment and assessment outcomes be used to inform instruction and enhance learning?

These are key questions. The good news is that technology educators, largely due to the active and applied nature of the field, have historically been remarkably up-to-date with our assessment practices for years. We have assessed student activity while it is in process and also have evaluated completed projects. Other academic fields are using tools, such as rubrics, portfolios, and peer assessments to shift the emphasis away from paper and pencil testing at the end of instruction (summative assessment). Other disciplines are discovering the value of rich information about student learning that is woven throughout the process of learning (formative assessment). Technology educators have a long history of using a variety of assessment techniques for both

summative and formative purposes. We have observed students during instruction as they use equipment and are engaged in a variety of active processes. In addition to looking for evidence of what students know, we have also been concerned with such things as technique, attitudes, product quality, and learning processes.

Technology educators have had their problems as well. One key component of good student assessment that has tended to be more problematic for many technology educators has to do with learning goals and criteria. Unlike many other academic disciplines that have traditionally focused on a rather clearly defined set of knowledge content (often facts), until now the technology education field has worked without a comprehensive set of clearly defined learning goals and criteria. In a discipline such as technology education, where activity and process have been emphasized over cognitive content and where students typically enjoy their learning activities, there is the assumption that *something of value* is occurring. However, in many cases, the question of what students have learned goes unanswered. Good student assessment demands more. Sound assessment practices demand that we be able to clearly identify what students are learning. In the absence of clearly specified learning goals, student assessment is difficult if not impossible to achieve.

With the release of *STL*, this lack of goal clarity has been addressed. Technology educators now have a set of clearly articulated criteria spanning K-12 that are targeted on what students *know* and *are able to do*. These standards and benchmarks represent vital points of connection for good student assessment. Good assessment practices in technology education provide evidence and information about the extent to which students are in alignment with the vision detailed in

STL. Good assessment is impossible without clearly defined goals. Similarly, clear goals and objectives are of little value unless evidence is generated to indicate what students have actually learned and whether students have attained the targets.

The Purpose of the Assessment Standards

It is useful to briefly describe what the Assessment Standards encompass, as well as what they are not intended to be. The Assessment Standards are being designed to "provide criteria to judge the progress toward the vision that all students should be technologically literate" (Dugger, 2001, p. 28). The standards will not consist of a set of instruments, tools, or templates that can be adapted or used directly in classrooms or laboratories. Teachers

and others engaged in assessment will find the criteria and recommendations provided in the Assessment Standards valuable as they develop and adapt the tools needed to assess student learning and performance.

It is also important to note that the focus of the Assessment Standards will be squarely on student learning rather than on evaluating the quality of technology education programs. The purpose of *program evaluation* is to examine a variety of indicators of program quality, such as the qualifications of the faculty, adequacy of funding, marketing effectiveness, accreditation, facilities, etc. By contrast, *student assessment* is "the systematic, multi-step process of collecting information on student learning, understanding, and capability and using that information to inform

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Figure 1. Assessment Standards Team

Draft Assessment Standard:

The assessment of student learning should have clarity of purpose, specify whether the measures are for formative, summative, or evaluative ends, and should be explicitly matched to the intended purpose.

Guidelines for meeting this standard require:

- A. a statement of purpose for the assessment to include the portion of *Standards for Technological Literacy* that is addressed,
- B. a description of the decisions to be made, including who will make the decisions and by what procedures (e.g., instructional decisions, parental reports, program decisions),
- C. formative assessments that occur routinely, are woven throughout instruction, provide information on how well students have learned, and reveal the progress students are making with their ongoing work,
- E. summative assessments occurring at prescribed intervals that provide information on the level of attainment and are both cumulative and formalized,
- F. student assessments for evaluative purposes to monitor and enhance such topics and ideas as equity, instruction, program, school, state/province, and *Standards for Technological Literacy*.

Figure 2. Draft Assessment Standard with related requirements

instruction” (ITEA-TfAAP, 2001). Simply stated, the focus of the Assessment Standards will be on students, assessing the extent to which their knowledge and performance align with *STL*.

The Development Process

The process of developing the Assessment Standards is well underway. When Phase III of ITEA-TfAAP was funded, the project staff began an intensive research effort. This included an extensive review of the assessment standards developed by other disciplines (i.e., those developed for science by the National Research Council (NRC) and those for mathematics by the National Council of Teachers of Mathematics (NCTM)). The research also examined a comprehensive body of literature on contemporary assessment practices. Based on this work, the staff prepared a draft set of standards and recommendations.

In late June 2001, three teams of professionals were convened for three

days to develop the standards (one team each for the assessment standards, professional development standards, and program standards). Each team was comprised of a leader, a recorder, and seven members. It is also important to note that every attempt was made to include a variety of individuals with diverse backgrounds and expertise, including technology teachers and teacher educators, representatives from key professional organizations, and non-technology educators. The names and institutional affiliations of the Assessment Team members are presented in Figure 1.

Each team engaged in a discrepancy analysis process where core concepts and ideas were brainstormed, refined, and categorized. The purpose of this process was to compare the best thinking of the team with the research conducted prior to the meeting by the project staff. Since the team’s work was conducted independently from the project staff’s, the

process provided a mechanism for validating the core concepts that eventually emerged from the process.

In order to identify the core concepts, the assessment team began by focusing on the question, “What are the key elements that should drive student assessment for technological literacy?” The professional development and program standards teams focused on similar questions appropriate for their work. This process yielded a set of five to seven core ideas per team. These core ideas were then compared with those that had been gleaned from the research by the project staff during the past year. Each team then engaged in intensive dialog designed to reconcile the discrepancies. The work was both difficult and stimulating and yielded remarkable consistency with the preliminary work that had been developed by the project staff. At periodic intervals during the three days, the work of each team was presented to the entire group for critique, suggestions, and refinement. The resulting core ideas for the Assessment Standards consisted of (a) aligning assessment practices with *Standards for Technological Literacy*, (b) basing assessment on clearly defined goals and objectives, (c) using assessment principles that are based on demonstrated best practices, including issues such as test management and security, (d) grounding assessment in a variety of practical, active, performance-based contexts, and (e) using assessment results for developing information useful for school personnel, policy makers and other decision makers.

After the core ideas were phrased in the form of standards, the Assessment team developed sets of *requirements* (approximately 3-7) for each standard. These requirements serve a function similar to the benchmarks in the content standards — providing additional detail for each standard. Basically, the requirements are designed to *unpack*

and provide additional detail for each of the core ideas presented in the standards in order to enable and facilitate implementation. A draft sample standard, including requirements, is presented in Figure 2 (NOTE: All standards will be subjected to a rigorous consensus-building process, consisting of a series of hearings and input from a wide variety of audiences prior to being finalized. For current information regarding a schedule of review hearings and related information about the standards, visit ITEA's website: <http://www.iteawww.org/>.)

As indicated earlier, it is important to note that the purpose of the Assessment Standards will be to provide teachers, administrators and other decision makers with a set of criteria to use as they assess student knowledge and performance. They will represent a window into *best practices* and will provide a solid base to guide teachers and curriculum developers as they develop actual assessment instruments, tools, and protocols.

Future articles will present information on the development of the Professional Development Standards and the Program Standards. Collectively, these three articles are designed to stimulate and encourage participation and input of technology educators as Phase III of the standards moves through the refinement and consensus-building process. Please check the ITEA website frequently for updated information and status reports on the development of the standards.

References

- Dugger, W. E., Jr. (2001). Phase III technology for all Americans project: Creating assessment, professional development, and program standards for technological literacy. *The Technology Teacher*, 60, 27-31.
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