



Refining the *Standards for Technology Education*

With comments and critiques in-hand, the Standards Team leaders and recorders and the Technology for All Americans Project (TfAAP) staff have embarked upon the important process of revising the *Standards for Technology Education (Standards)*.

"The Standards Team leaders and recorders appreciated the comments from the first draft review," said Brigitte Valesey, recorder, grades 6-8. "We are confident the next draft will be rich in the content and processes that will help prepare people to meet the technological demands of the twenty-first century."

Background

The goal of the International Technology Education Association's (ITEA) TfAAP is to promote excellence in technology education by defining the intellectual domain of technology, advancing the study of technology, and creating standards. TfAAP, funded by the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA), is creating a document entitled *Standards for Technology Education* in the second phase of the project.

The standards will specify what students from grades K-12 should know

and be able to do in technology and will identify the knowledge and processes essential to technology that should be taught and learned in school. Standards are not a federal policy or mandate, a test, or a curriculum; rather, standards are written statements about what is valued in a field of study that can be used for making a judgment of quality.

Consensus building

From October to December 1997, the first draft of the *Standards* was reviewed by more than 1,000 people. During the standards hearings, 222 participants at 12 regional and state conferences across the country, both individually and as a group, commented upon the strengths and weaknesses of the content standards and suggested revisions.

The entire document was mailed to 210 individuals (11 focus groups, the project's Advisory Group and Standards Team, and other selected individuals) for their input. In-depth meetings with the National Academy of Engineering (NAE) Review Committee, the Advisory Group, and the Standards Team leaders and recorders were also held.

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Finally, input was received from the project's World Wide Web home page where the entire draft was available for review and comment during November 1997. During the month, 653 individuals reviewed the draft and/or provided input.

The refining process

The Standards Team leaders and recorders met in St. Louis on January 15-18 to consider the comments and suggestions. After long discussions, the group unanimously decided to modify the structure of the *Standards* and refine the individual content standards for each benchmark grade level.

"The group worked diligently to respond to the concerns raised by the various reviewers," said Rod Custer, Standards Team leader, grades 9-12. "The easy approach would have been to simply correct the relatively minor, grammatical details. The group instead chose to take the more responsible approach of addressing the substantive issues, such as developmental age appropriateness of the standards at each benchmark level (K-2, 3-5, 6-8, and 9-12), the separation of knowledge base from process, and concerns about the contexts component of the universals."

The results of the revision process

Based upon the suggestions received, the Standards Team leaders and recorders refined the dimensions in order to more clearly identify the content to be covered in technology education.

The group incorporated the Technological Concepts and Principles dimension throughout the remaining dimensions. "A large number of reviewers suggested the value of interlacing the concepts and principles within each dimension," said Pam Newberry, senior research associate for

TfAAP. "The group recognized the strength in this approach and chose to modify the content standards accordingly."

A second major theme addressed throughout the comments received on the first draft was to ensure that the content standards built steadily starting in kindergarten and continuing through the twelfth grade and that the standards were developmentally appropriate for each grade. Several steps were taken to address these comments. The first was to change the titles of each dimension to reflect what the students should be learning at each benchmark level. As a result, in grades K-2 and 3-5, the Design dimension was combined with the Make dimension, and the Manage dimension being introduced in the third grade. The dimensions for each benchmark level are shown in Figure 1.

Each dimension was also charted by grade level to ensure that the major themes of each dimension progressed steadily throughout each grade level. The concern that certain topics and examples were too advanced for the various benchmark levels was also addressed. As a result, certain concepts, such as the interaction of technology with the environment, were not introduced until later grades. In addition, examples and wordings were simplified in the lower grades.

During the January 26, 1998 meeting in Washington, DC, the Advisory Group and the TfAAP staff discussed the phrasing of each content standard. It was decided that the content standards should not be behavioral statements, but declarative or action statements. In the second draft, the stems that introduce the process or knowledge standards reflect this decision. The knowledge stem in grades K-2 states, "As a result of learning experiences in grades K-2, students will know that . . .," and the process stem states, "As a result of

activities in grades K-2, students will be able to . . ."

Also discussed was the importance of each standard being the same level of importance and containing approximately the same amount of information. The staff referred to Project 2061's *Benchmarks for Science Literacy* (pp. 314-315) definition of 'grain size' for help in this area.

The written structure of each dimension also evolved into a new format. At the beginning of each benchmark level's dimension, there is an introduction that identifies what students should know coming into the benchmark level, what they will be learning at this particular level, what knowledge they will be leaving the benchmark level with, and why it is important for them to be learning this information. The introduction is followed by a listing of the process and knowledge content standards. The final section describes where and how this dimension should play out in students' laboratory experiences. Suggestions are given on how the standards may be implemented in the classroom and how they may be combined with other dimensions and other fields of study. Vignettes and examples are included in this section to give a snapshot of the classroom. Figure 2 illustrates a sample content standard.

The consensus building continues

For the review of the second draft, attention will be focused on receiving comments on the content standards for grades K-12. "During the first review process, the individuals who reviewed the entire document generally spent more time reading the first chapters and less on the content standards," said William Dugger, Jr., director of TfAAP. "The main core of the document is the content standards, and it is important that we devote all our

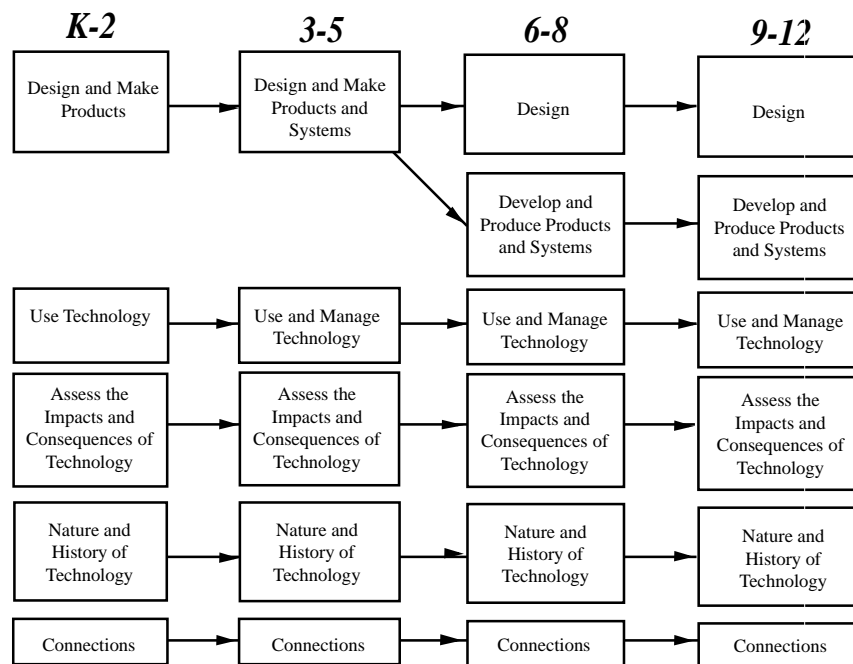


Figure 1. Dimensions of Technology

energies at this time on perfecting them during this second level of review.”

The second stage of the consensus building process concluded in early May 1998. During this process, standards hearings were conducted, and the document was mailed to selected individuals for review. In addition, the document was available during the month of April 1998 for electronic review on the Web.

After this input is analyzed and synthesized, the document will be further developed and refined into a third draft. In the fall of 1998, the entire document will be mailed to selected individuals one last time for their review and will be field tested in selected schools across the country. The goal of the field testing is to provide feedback from a variety of schools on the draft and how the standards fit into the school’s current technology education program. The schools will have approximately a

month for review and reply.

After revising the third draft in November and December 1998 and January 1999, the *Standards* will be printed in February. The *Standards* will then be released at the ITEA Conference in Indianapolis, Indiana in March 1999.

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References

Technology for All Americans Project.
(1996). *Technology for all Americans: A Rationale and Structure for the Study of Technology*. Reston, Virginia: International Technology Education Association.

American Association for the Advancement of Science. (1993). *Project 2061: Benchmarks for Science Literacy*. New York: Oxford University Press.

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Indianapolis Conference Presenters

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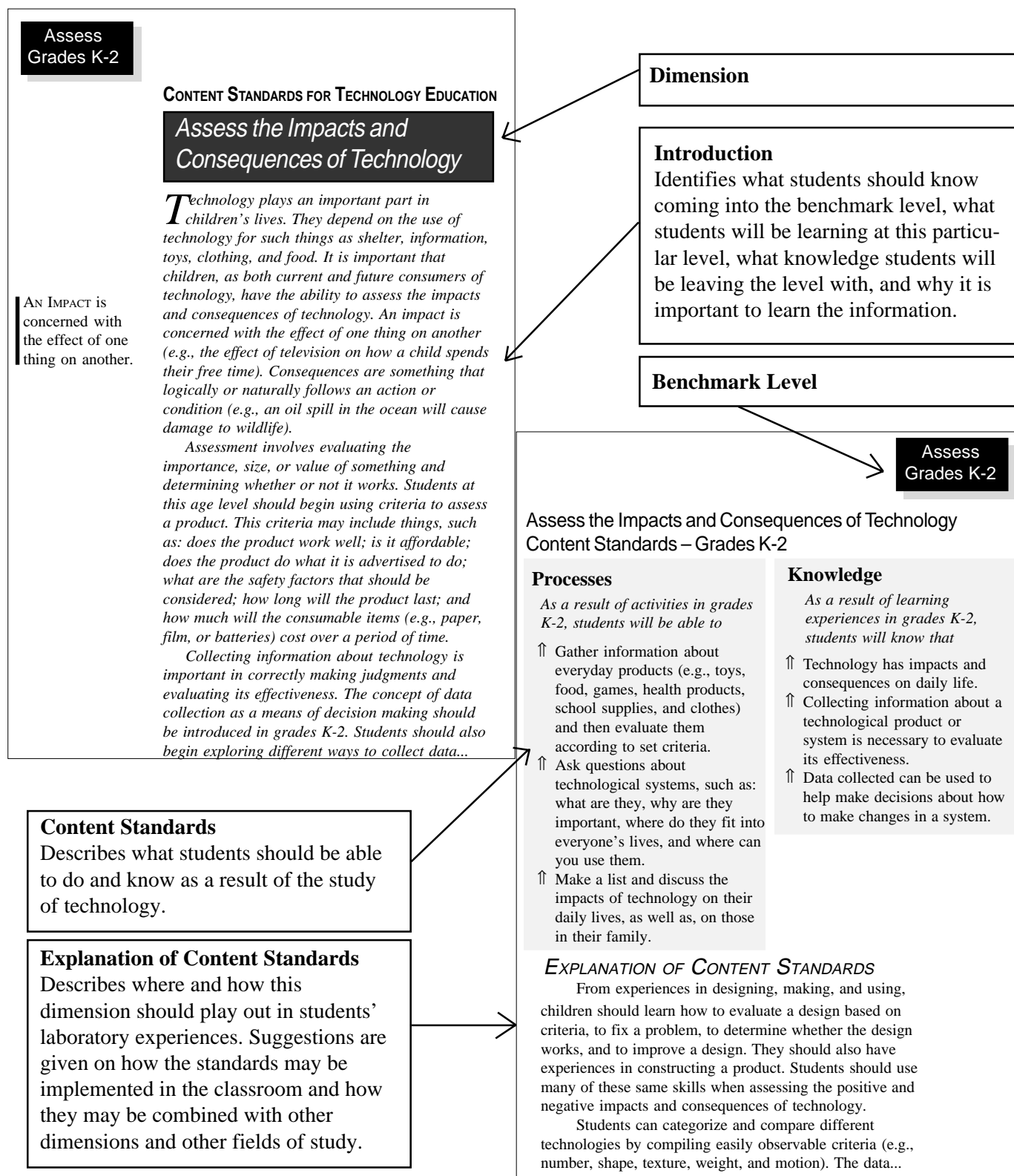


Figure 2. Sample Content Standards