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Under Review: Tech Tally: Approaches to Assessing Technological Literacy by E. Garmire and G. Pearson (Eds.)

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BOOK REVIEW

Garmire, E., & Pearson, G. (Eds.). (2006).
Tech tally: Approaches to assessing technological literacy.
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Executive summary available: www.nap.edu

Since the 1980s, national organizations such as the National Science Foundation (NSF), the American Association for the Advancement of Science (AAAS), and the International Technology Education Association (ITEA) have strived to raise awareness for the understanding of technology and in more recent times, developing technological literacy. Although these organizations have had success in their efforts to an extent, there has been little, if any means of assessing the technological literacy of the American public. In hopes of developing a means of assessing technological literacy, the National Research Council (NRC) and the National Academy of Engineering (NAE) commissioned a panel of experts from across the country. This panel, known as the Committee on Assessing Technological Literacy was charged to "determine the most viable approach or approaches to assessing technological literacy in three distinct populations in the United States: K-12 students, K-12 teachers, and out-of school adults" (Garmire & Pearson, 2006, p. 25).

Tech Tally: Approaches to Assessing Technological Literacy offers a comprehensive report detailing how technological literacy assessments can be developed. Additionally, twelve recommendations, addressing five critical areas for technological literacy assessment are presented.

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Assessing Technological Literacy and its Benefits

The committee adopted an earlier construct of technological literacy in a document first published by the National Research Council. In *Technically Speaking: Why All Americans Need to Know More About Technology*, Pearson and Young (2002) defines technological literacy as having three major dimensions:

- Knowledge—both factual and conceptual understandings of technology;
- Capabilities—how well a person can use technology—problem solving;
- Critical thinking and decision-making—one's approach to a technological issue.

(p. 36-37).

The benefits of assessing technological literacy greatly outweigh the negative connotations. Perhaps the most important benefit of assessing technological literacy may also be the ultimate reason for the National Academies involvement in this research study—fostering and enriching the global economy. By determining how technologically literate a population is, business enterprise can develop and market new technologically innovative products and resources which in turn grows that population's economy. Other benefits of assessing technological literacy include: developing an informed society, increasing citizen participation in discussion of technological developments, and helping to support a modern workforce, among others. The book also notes benefits to the assessment process. These benefits include: raising awareness and understanding the importance of technological literacy to its citizenry, and perhaps most important – assessing technological literacy in a rigorous way will help legislators and policy makers to become aware of the critical importance of technological literacy (Garmire & Pearson, 2006, p. 22).

Part of the research the committee undertook was to identify and critique a number of assessments already developed, both nationally and internationally. Twenty-eight instruments were identified that had direct pertinence to the study. Roughly two-thirds of the existing

sets of assessments were geared towards K-12 students while the remaining third were designed for out-of-school adults. Only two of the assessments were targeted at assessing technological literacy among teachers. The committee concluded that no single assessment could identify all three dimensions of technology. However, the committee believed that some of the instruments that assessed a specific technological dimension could be combined and edited to produce an instrument that would be a comprehensive assessment of technological literacy (Garmire & Pearson, 2006, p. 39).

The Recommendations

After a thorough examination of two commissioned literature reviews—learning related to technology and learning related to engineering (Petrina et al. and 2004, Waller, 2004, as cited in Garmire & Pearson, 2006)—it was apparent to the committee that the assessment of technological literacy in the United States was in its infancy. The committee concluded that this may be due to the fact that relatively few students can take technology education courses, either due to choice or because the courses were not offered. In addition, the number of technology teachers is relatively small nationwide and little research has been conducted on understanding attitudes that people have towards technology. For these reasons, communication with other governmental, national, and international organizations to solicit research opportunities in assessing technological literacy should commence. The committee made twelve recommendations which address five critical areas (Garmire & Pearson, 2006). These critical areas and subsequent recommendations are:

Critical Area: Opportunities for Assessment

1. The National Assessment Governing Board (NAGP) should authorize studies of technological literacy along with other science and mathematics assessments.
2. The U.S. Department of Education (USDOE) and National Science Foundation (NSF) should encourage the International Association for the Evaluation of

Education Achievement and the Trends in Mathematics and Science Study (TIMSS) to include technological literacy items on their assessments.

3. NSF should commission and fund a series of sample-based studies of technological literacy in K-12 students.
4. The No Child Left Behind Act (NCLB) should be used as a vehicle to help make teachers more technologically literate.
5. NSF and USDOE should fund the development of and pilot test sample-based technological literacy assessments among pre-service and in-service teachers of science, mathematics, technology, English, and social studies.
6. The International Technology Education Association (ITEA) should continue to conduct research by polling adults on their technological literacy being certain to include the three dimensions of technological literacy.

Critical Area: Research on Learning

7. NSF or USDOE should fund a synthesis study focused on how children learn technological concepts.
8. NSF and USDOE should support a research-capacity-building initiative related to the assessment of technological literacy.
9. NSF should take the lead in organizing an interagency federal research initiative to investigate technological learning in adults.

Critical Area: Explaining Innovative Measurement Techniques

10. The National Institute of Standards and Technology should plan a major national meeting to explore the potential of innovative, computer-based techniques for assessing technological literacy in students, teachers, and out-of-school adults.

Critical Area: Framework Development

11. Assessments of technological literacy in K-12 students, K-12 teachers, and out-of-school adults should be guided by rigorously developed assessment frameworks, as described in the text.
    a. The National Assessment Governing Board should commission the development of a framework to guide the development of national and state-level assessments of technological literacy in K-12 students.
    b. NSF and USDOE should fund research to develop a framework for an assessment of technological literacy in K-12 teachers.
    c. NSF and USDOE should fund research to develop a framework for the assessment of technological literacy in out-of-school adults.

Critical Area: Expanding the Definition of Technology

12. USDOE, state education departments, private education testing companies, and education-related accreditation organizations should broaden the definition of technological literacy to include the study of technology. (p. 180-193).

Relevance to Career and Technology Education

One does not need to look far to understand the relevance this text has on career and technology education. Technological literacy is considered by many to be the essence of technology education. The reality that *Tech Tally* uses our discipline and professional organization to argue the need for technological literacy should certainly be encouraging and humbling to our profession. Career and technology educators at all levels should embrace the text and promote its recommendations to the fullest extent. Legislators who embrace career and technology education could see to it that *Tech Tally*'s recommendations are implemented at the state and national levels. Career and technology teacher educators could develop

research projects to design and develop meaningful assessments of technological literacy by using research funding. Career and technology education teachers could use the assessments of the teacher educator's research to assess their student's technological literacy aptitude. Student assessment data could be synthesized to describe any deficiencies and/or disparities in the teaching of technological literacy which would drive curriculum and school reform that would ultimately foster a potent technologically literate society.

References

Pearson, G., & Young, A. T. (Eds.). (2002). *Technically speaking: Why all Americans need to know more about technology*. Washington, DC: National Academy Press.