Int J Technol Des Educ (2008) 18:217–220
DOI 10.1007/s10798-008-9053-9

Book reviews

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Published online: 8 February 2008

Elsa Garmire and Greg Pearson (eds): Tech Tally. Approaches to Assessing Technological Literacy. The National Academies Press, Washington, DC, 2006, 358 pp, $47.95, ISBN 0-309-10183-2

Assessment in technology education is still by no means a simple matter. Even after some decades of experience in teaching technology education, we still struggle with the question how to assess its outcomes in a proper way. A lot of good work has been done, not in the least by the APU group, led by Richard Kimbell, in the UK. But in the USA educational practice as far as teaching about technology is concerned, is different from UK practice. In the USA, the term 'technological literacy' has gained strongly in popularity. A major effort in this country to construct a conceptual basis for teaching about technology was given the name: Standards for Technological Literacy. For that reason it is not surprising that the National Academy of Engineering in the USA felt the need to put together a Committee of experts with the assignment to search for approaches to assessing technological literacy. By appointing Kimbell as one of the members of this committee the UK experience was drawn from. I myself was also appointed on the basis of my experience in the international PATT research (PATT = Pupils' Attitudes Towards Technology). All other members of the Committee were USA experts, and the group was chaired by Elsa Garmire from Darthmouth College. Greg Pearson, a NAE staff member, served as its manager on behalf of the Academy. The Committee met several times in Washington, DC, in the course of a 2-year period. Well-known 'technology and society' author Robert Poole was assigned to write the text of the Committee's report. In the Committee a variety of fields was represented: among others, philosophy of technology, curriculum development, test development, educational theory, and science museum expertise. This made the meetings a rich experience in which ideas coming from quite different points of view were exchanged. The result was *Tech Tally*, a 360-page book that describes the Committee's considerations, conclusions and recommendations.

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Tech Tally in a way is a successor to NAE's previously published document *Technically Speaking*. This document was produced in a similar way as *Tech Tally*, and some of the members of the Committee that had produced *Technically Speaking* were also involved in *Tech Tally*'s Committee. In *Technically Speaking* the contents of the concept of technological literacy were outlined. Of course, that conceptualization was an important input for the *Tech Tally* considerations. The complexity of this concept was reflected in the fact that even though *Technically Speaking* was on the *Tech Tally* Committee's table, still the Committee felt the need to discuss about this concept, and in some respects the considerations in *Technically Speaking* were extended with some additional insights. These were presented in the second chapter of *Tech Tally*, as well as a summary of what *Technically Speaking* had already clarified. This conceptual chapter is preceded by an introductory chapter that—again, as *Technically Speaking* had also done—stressed the importance of stimulating technological literacy. For the *Tech Tally* Committee the charge was to find ways of assessing technological literacy. It is evident that if one considers technological literacy crucial for living in today's society, a proper assessment of the extent to which citizens are technologically literate is equally important.

Efforts to assess technological literacy, of course, have been made and still are made in the context of education, and in particular in technology education, but not only there. Governments have induced surveys among the population to find out what people know of and think about technology. The Eurobarometer is a well-known example of that in Europe. But also in science museums more and more the need is recognized to investigate what people know and want to know about technology. This information both helps to set up those exhibitions that appeal to people's interests, but also fills in gaps in the knowledge they should have as a 21st century citizen. As a result, there are numerous instruments scattered around in various fields that aim at assessing (elements of) technological literacy. One of the first tasks the Committee set for itself was to investigate this variety of instruments. It is a logical early step in a design process to seek information about what one is designing and also to see how earlier designs have tried to solve the design problem at stake or a similar design problem. This was what the Committee realized when it formulated its mission as a design problem and studied what literature would bring forward as important if coming up with proper approaches for assessing technological literacy was seen as a design problem. Chapter 3 in *Tech Tally* informs the reader about those considerations. Chapter 5 contains the results of the survey of existing instruments. In between in Chap. 4, in which basic concepts and principles of assessing in general are presented. The combination of general ideas and the specific examples of existing instruments resulted in some overall guidelines for how proper technological Literacy assessment would look like. To make clear what these meant, the Committee made the decision to present those in the form of five cases of assessment, in which these guidelines were transformed into specific directions for how to assess in each of those five cases. In Chap. 7 one particular issue was separated out, namely the options for using computers in assessing technological literacy. Information Technology has provided some new options for this, such as the use of simulations, games, and electronic portfolios. As those were not yet discussed very much in previous publications on assessing technological literacy, the Committee thought it would be good to devote a separate chapter to this issue. Finally, there is Chap. 8, in which all recommendations are summarized and structured according to, e.g., age level, type of setting, and assessing actor.

Almost half of the book is filled with five Appendices. These contain, among other information, extensive information on all of the examined existing instruments. It makes a rich practical resource for everyone who works on the construction of instrument and is

looking for inspiration. The set contains examples of varying quality, which is revealed in the short reviews by Committee members that are added to the instrument description. The whole set gives a pretty good impression of where we are in terms of existing instruments and it makes clear that numerous interesting ideas have been tried, and as well it shows that there is still a lot of work to be done.

Tech Tally is not the first NAE involvement in technology education. This prestigious organization also served as an important reviewer of the draft version of the Standards for Technological Literacy. The fact that NAE is quite aware of the importance of education for ensuring the next generation's technological profession was illustrated by the presence of NAE's president, William B. Wulfe, at the opening of the Committee's first meeting. NAE is to be complimented for this commitment. *Tech Tally* is a document that is valuable for all those involved in the assessment of technology education outcomes.

Peter-Paul Verbeek and Adriaan Slob (eds): User Behavior and Technology Development. Shaping Sustainable Relations Between Consumers and Technologies. Springer, Dordrecht, 2006, 409 pp, ISBN-13 978-1-4020-4433-5

This is not a book about technology education, but it is useful as background reading for technology educators. It is volume 20 in a series "Eco-Efficiency in Industry and Science". The book is the outcome of cooperation between experts in a variety of disciplines: cognitive psychology, industrial design, public administration, marketing, sociology, ergonomics, STS (science, technology and society) studies, and philosophy of technology. Together they seek to build a conceptual basis for the way people interact with products and systems. Furthermore, there is a focus on the way this interaction stimulates or hampers sustainable developments in technology. In the book we find no less than 36 short chapters, divided over four parts. Together, these chapters offer a rich orientation on the topic of the book, which, I am sure, contains lots of material that technology educators can use as a source of inspiration for classroom activities, but perhaps above all as a source of reflection on the nature of what they teach.

The title of Part 1 is: Conceptual Frameworks for Analyzing Technology and Behavior. In the first chapter of this part, the editors, Peter-Paul Verbeek and Adriaan Slob, introduce the nature of the book as a multidisciplinary collection of contributions. This multidisciplinarity already features in the two editors: Verbeek is known for his philosophical writings, particularly on the American philosopher of technology Don Ihde, and Slob is a policy researcher. In the next chapters of this Part a variety of frameworks from different disciplines is introduced: action theory from cognitive psychology in Chap. 2 (there is also an action theory in philosophy, but this is not discussed here), safety concepts in Chap. 3, consumer-technology interaction models from sociology of technology, philosophical concepts in Chap. 6 (written by Verbeek, and consequently focused on phenomenology), some theories from the field of STS in Chap. 7, the concepts of affordances and constraints from psychology, and the conceptual mapping technique, also from (cognitive) psychology. All together this part offers a rich survey of quite different approaches to the topic of user behavior and technological developments.

Part 2 consists of a number of empirical case studies on this topic. Here, too, we find a rich variety. Chapter 10 is on passengers and transport, Chap. 11 deals with examples of sustainability in everyday (consumer) life, Chap. 12 is on housing, Chaps. 13, 14, 15 and 18 on energy (production and consumption), Chap. 16 on marketing of technological (consumer) products, Chap. 17 on diffusion of new technologies, and Chap. 19 on

consumer attitudes toward sustainable energy. In this part we find many of the concepts that had been introduced in Part 1, now in action.

Part 3 is on Designing technology-behavior interactions. This part is opened by a philosophical account of the use of artifacts. Houkes and Vermaas introduce the concept of use plans and claim that a designer always delivers both an artifact and a use plan for it. This concept was developed in the context of the Dual Nature of Technical Artifacts research program at the Delft University of Technology (I have described this program in Teaching About Technology). The next two chapters also draw from philosophy primarily: Van Lente writes about anticipation of use and Jelsma writes about the idea of artifacts containing scripts that suggest certain ways of using. The next two chapters deal with the scenario method for gaining insight into future use of artifacts. Chapter 25 is on the use of ICT-applications. Chapter 26 deals with product–service systems (the combination of product and service reminds of the combination of artifact and use plan that was described in Chapter 20). The last two chapters of this part discuss cultural sustainability and the (industrial) design of technology-behavior interactions.

Part 4, finally, draws consequences for policy. The eight chapters that make up this part are again written from quite different perspectives. Here, too, we find a philosophical chapter, by Strijbos, who writes from the perspective of reformational philosophy (the same as I take in part of my own work) combined with a systems theory approach, also to be found in Chap. 29 by Van Vliet. Ethics and normativity feature in this part, both in Strijbos' chapter and in a chapter by philosopher Brey from Twente. Transport and mobility, already present in Part 2, come back here as important policy domains (in Chaps. 30 and 31).

Although all authors are Dutch, and the book was the outcome of a publicly funded research project in the Netherlands, the book does not have a local character. The authors all draw from international literature and theories and it is only the examples and case studies that remind the reader of the specific context in which it was written. I warmly recommend this book to technology educators as a useful background reference. Design activities in classrooms ought to have an element of user-orientation in them, and this book offers a good insight into what issues are involved in that.