School of Communication
Simon Fraser University

CMNS 895-B Comprehensive Examination

CONTEMPORARY APPROACHES TO TECHNOLOGY ASSESSMENT

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Approved Area of Examination Under the Supervision of

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Contemporary Approaches to Technology Assessment

Course Overview

This course will examine a selected range of contemporary approaches to technology assessment. The concept of 'technology assessment' in this context refers in a general sense to any 'systematic attempt to forsee the consequences of introducing a particular technology in all spheres it is likely to interact with' (Braun 1998, p. 28). Technology assessment is, therefore, a future-oriented method for investigating and reporting on the potential impact of a technology within a specific setting. Because technology assessment is a *systematic* approach, it is generally established around a methodological and a theoretical framework. As such, a central objective of this course is to identify and critically examine the various frameworks inherent in different approaches to technology assessment. Another objective of this course is to establish a clear understanding of the similarities and differences between technology assessment in the private firm (i.e., management of technology) versus technology assessment in the public sphere (i.e., public policy formation).

Students should expect the following outcomes from this course: an introduction to the contemporary field of technology assessment and its various approaches; a practical understanding of the theoretical perspectives and methodologies associated with specific technology assessment approaches covered in the course.

Course Texts:

Braun, Ernest (1998). *Technology in Context: Technology Assessment for Managers.* London: Routledge.

Grin, J. and A. Grunwald (2000). *Vision Assessment: Shaping Technology in 21st Century Society: Towards a Repetoire for Technology Assessment.* New York: Springer Verlag

Rip, A., T. Misa, and J. Schot (Eds) (1995). *Managing Technology in Society: The Approach of Constructive Technology Assessment.* New York: St. Martin's Press

Selected readings on reserve.

Course Requirements:

Weekly reviews of readings (500 words max.)	50%
Take Home Exam (2500 words)	35%
Participation and Presentation	15%

Students are expected to complete a set of 10 weekly reviews (not to exceed 500 words

each!). Each review will explore or critique an issue or idea from the corresponding week's selection of readings. The first review is due at the beginning of class in week two.

PROPOSED QUESTIONS FOR EXAMINATION:

Why does technology assessment belong in communication studies?

Explain the innovative contribution that Constructive Technology Assessment introduced for technology policy? What unique methodological problems does CTA introduce into the process of assessing technology? How have these problems been addressed? How would the concept of CTA change if it was operationalized in a commercial setting?

Describe the value of/need for technology assessment in your particular field of research. Characterize each of the technology forecasting approaches covered in your set of readings, evaluate them for their applicability in a public policy setting, and speculate on how they might be operationalized (and the challenges therein) in the context of your research.

Reading Schedule

Week 1

'Technology Assessment in Theory and Practice' (Mohr, 1999)
'Principles of Technology Assessment' in Braun (1998)
'Technology Assessment: Product or Process?' (van Eijndhoven, 1997)

Week 2

'Lessons in Technology Assessment: Methodology and Management at OTA' (Wood, 1997)
'Congressional Office of Technology Assessment: A Retrospective and Prospects for the Post-OTA World' (Hill, 1997)
'New Opportunities for Technology Assessment in the Post-OTA World' (La Porte, 1997)

Week 3

'The Past and Future of Constructive Technology Assessment' (Schot & Rip, 1996)
'Constructive Technology Assessment: A New Paradigm for Managing Technology in Society' (Rip, Misa, & Schot, 1995)
'Science & Technology Studies and Constructive Technology Assessment' (Rip, 1994)
'Technology Assessment as Learning' (Grin & Graaf, 1996)

Week 4

'Contemporary Problems of Technology Assessment' in (Braun, 1998)
'Some Applications of Technology Assessment' in (Braun, 1998)
'Wireless Technologies and the NII' (Executive Summary and Introduction) (Office of Technology Assessment, 1995)
'Integration of Technology Assessment in R&D Management Practices' (Berloznik & van Langenhove, 1998)

Week 5

'Town Meetings on Technology' (Sclove, 1996)
'Public Participation Methods: A Framework for Evaluation' (Rowe & Frewer, 2000)
'Reflections of a Participant-Observer: The Technocratic/Democratic Contradiction in the Practice of Technology Assessment' (Bereano, 1997)

Week 6

'Strategic Management of Technology' in (Braun, 1998) [31pp]
'Technology Threat and Opportunity Assessment' (du Preez & Pistorius, 1999) [19pp]

Week 7

'Lead User Analyses for the Development of New Industrial Products' (Urban & von Hippel, 1988)
'Predicting the Source of Innovation: Lead Users' (von Hippel, 1988)

'A Method for Projects Seeking to Merge Technical Advancements with Potential Markets' (Bailetti & Guild, 1991b)
'Designers' Impressions of Direct Contact Between Product Designers and Champions of Innovation' (Bailetti & Guild, 1991a)

Week 8

'Vision Assessment to Support Shaping 21st Century Society? Technology Assessment as a Tool for Political Judgement' in (Grin & Grunwald, 2000)
'Technology Assessment as Metaphor Assessment: Visions Guiding the Development of Information and Communications' in (Grin & Grunwald, 2000)
'Technology Policy between Long-Term Planning Requirements and Short-Ranged Acceptance Problems: New Challenges for Technology Assessment' in (Grin & Grunwald, 2000)

Week 9

The Art of the Long View (Schwartz, 1991)
'Using Scenarios to Develop Strategies' (Leemhuis, 1985)
'Scenario Development: An Approach to Develop Future Potentials' (Gausemeier, Fink, & Schlake, 1998)

Week 10

'Traditional and Modern Technology Assessment: Toward a Toolkit' (van den Ende, Mulder, Knot, Moors, & Vergragt, 1998)
'First Lessons we Learned: First Outline of Strategy and a Methodological Repetoire for Vision Assessment' in (Grin & Grunwald, 2000)
'Methodology fo constructive assessment of IT-based systems in an organizational context' (Brender, no date)
'Steering Technology Development Through Computer-Aided Design' (Downey, 1995)

Week 11 Review

Week 12 Examination

Week 1: The Principles of Technology Assessment

Readings

'Technology Assessment in Theory and Practice' (Mohr, 1999)
'Principles of Technology Assessment' in Braun (1998)
'Technology Assessment: Product or Process?' (van Eijndhoven, 1997)

Lecture

This week provides a general introduction to technology assessment, with a specific emphasis on parliamentary TA. We will examine its historical roots in the US Congressional Office of Technology Assessment and its European counterparts. In addition, we will map out the various approaches to parliamentary technology assessment, making a distinction between analytic and process-oriented forms of involvement. Finally, we will touch upon the important role that communication plays in various TA activities.

Discussion Questions

Do you agree with Mohr's two theses (i.e., technological innovation is indispensible; our current economic strategy for development is unsustainable) Is it possible to return to a less technological age? Is such a thing desirable? What would be the benefits/drawbacks?

Can a better understanding of technology lead to a strategy that is sustainable in the long term? What does 'sustainable' mean, anyway?

Week 2: The Post-OTA World of Technology Assessment

Readings

'Lessons in Technology Assessment: Methodology and Management at OTA' (Wood, 1997)
'Congressional Office of Technology Assessment: A Retrospective and Prospects for the Post-OTA World' (Hill, 1997)
'New Opportunities for Technology Assessment in the Post-OTA World' (La Porte, 1997)

Lecture

This week we will review the process of technology assessment as it was conceived and carried out by the US Office of Technology Assessment. Because the OTA provided an important model for other parliamentary TA organizations and practices around the world, it is helpful to understand how the concept of TA was realized in early studies. We will also look at the unique position that a parliamentary TA organization has in a democratic society, and some of the inherent difficulties in carrying out public policy-

oriented TA in non-government sectors.

Discussion Questions

Is it possible to forecast the development of technology, and to provide a reasonable 'early warning' function to policy makers? Is it possible to have an objective assessment of technology? Why or Why not?

Does Canada have a parliamentary TA organization? Do we even carry out formal TA as part of public policy development in Canada? If so, who does it? If not, speculate on why not?

Week 3: Constructive Technology Assessment

Readings

'The Past and Future of Constructive Technology Assessment' (Schot & Rip, 1996)
'Constructive Technology Assessment: A New Paradigm for Managing Technology in Society' (Rip et al., 1995)
'Science & Technology Studies and Constructive Technology Assessment' (Rip, 1994)
'Technology Assessment as Learning' (Grin & Graaf, 1996)

Lecture

Having established the foundations for parliamentary TA in the United States, we will begin to look at the European approach to parliamentary TA. This week we will look at Constructive Technology Assessment, an important approach developed in The Netherlands and Denmark in the 1980s. CTA seeks to move the process of assessment far ahead into the development phase of new technology so as to be able to influence their development at conception. CTA is also a democratic and participation-oriented approach to TA that seeks to expand social dialogue and positive societal change in the process of shaping technology development. Various issues and problems related to the unique approach of CTA will be discussed.

Discussion Questions

Rip, Schot, and Misa (p. 2) claim that the "two track approach [of social responses to technology] has lost its earlier effectiveness." What does this mean and how does it relate to the CTA philosophy? Describe the three generic strategies and compare/contrast with the so-called two track approach.

Schot and Rip claim that CTA "can be seen as a new design practice" (p. 255). Explain what this means and what it might suggest for methodological concerns, particularly with respect to the "Collingridge Dilemma" (Rip, Schot, Misa. p. 7)

What is the implicit theory of technology dynamics that underlies CTA? How does CTA leverage this theory for political effect? Is this theory of technology dynamics a reasonable assumption? What are the problems with it?

Week 4: Applications of Technology Assessment

Readings

'Contemporary Problems of Technology Assessment' in (Braun, 1998)
'Some Applications of Technology Assessment' in (Braun, 1998)
'Wireless Technologies and the NII' (Executive Summary and Introduction) (Office of Technology Assessment, 1995)
'Integration of Technology Assessment in R&D Management Practices' (Berloznik & van Langenhove, 1998)

Lecture

This week we look at applications of technology assessment. Our focus will be on describing the different settings in which TA is undertaken, as well as the wide variety of subject matter that TA needs to address. Motivation for initiating TA will be addressed. Excerpts from actual TA will be covered, specifically those dealing with communication technologies. We will also touch upon the important relationship between TA and research & development activities.

Discussion Questions

Berloznik offers a framework for integrating TA into the R&D process, which he distinguishes from CTA. What is the key difference between Berloznik's ITA and CTA? Describe the hierarchy of constraints that ITA faces.

What makes TA different from environmental impact or risk assessments?

Week 5: TA for Public Policy

Readings

'Town Meetings on Technology' (Sclove, 1996)
'Public Participation Methods: A Framework for Evaluation' (Rowe & Frewer, 2000)
'Reflections of a Participant-Observer: The Technocratic/Democratic Contradiction in the Practice of Technology Assessment' (Bereano, 1997)

Lecture

While most of the course has in fact focussed on TA for public policy, this week we will examine the role of public participation in more detail. In particular we will look at Richard Sclove's ideas about the Consensus Conference approach to TA, including his rationale and his vision. We will also look at an analytic framework for categorizing and evaluating public participation methods.

Discussion Questions

Comment on the following statement. Do you agree or disagree with it. Provide a clear rationale for your position and support it or refute it with reference to Sclove's claims about the Consensus Conference method of TA.

There's no point in getting the public involved in a debate about science and technology. For the most part, they are neither interested in it nor capable of providing worthy input. It's better to assign experts to the task and let them represent the interests of the public.

Week 6 (June 12): TA for Commercial Firms

Readings

'Strategic Management of Technology' in (Braun, 1998) [31pp]
'Technology Threat and Opportunity Assessment' (du Preez & Pistorius, 1999) [19pp]
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Lecture

The role of technology assessment varies according to the setting in which it occurs. This week explores some of the key similarities and differences between TA for public policy research and MOT in commercial firms.
TA for public policy can be directed toward a wide range of societal objectives, including economic development. This week we will focus on TA as it applies to commercial firms and its strategic role in economic and competitive activities. Our primary concern in making this important distinction is to draw attention to differences in stakeholders, objectives, and approaches when the motivation for TA is largely commercial in nature.

Discussion Questions

Describe what duPreez and Pistorius describe as technological threats and opportunities. Can these notions be applied equally to TA in the public policy sphere?

TA for commercial firms can be seen to encompass internal or external motivational factors (such as corporate strategic planning versus sectoral economic development by a government). Given the highly competitive nature and rapid pace of technology development in the commercial sector, under what conditions, or in what circumstances, is it appropriate to open up commercial technology development to wider public debate? Realistically speaking, how/where could the wider public enter into commercial TA activities?

Week 7 (June 19): Technology Forecasting—Lead-Users

Readings

'Lead User Analyses for the Development of New Industrial Products' (Urban & von Hippel, 1988)
'Predicting the Source of Innovation: Lead Users' (von Hippel, 1988)
'A Method for Projects Seeking to Merge Technical Advancements with Potential Markets' (Bailetti & Guild, 1991b)

'Designers' Impressions of Direct Contact Between Product Designers and Champions of Innovation' (Bailetti & Guild, 1991a)

Lecture

One important aspect of all forms of TA is the anticipation of future impacts of, or developments in technology. As a result, each approach to TA offers its own method for developing visions of the future. The next few weeks will explore these methods and their accompanying theories.

This week we will explore the lead-user approach developed by von Hippel and further operationalized by Bailetti and Guild as the 'Champions of Innovation' method. This distinctive approach to TA seeks out uniquely innovative individuals, the so-called lead user hypothesis, as a means of tapping into visions of the future and providing important insights into new product development.

Discussion Questions

Urban and von Hippel posit what we could term an *imagination block* with typical users and with standard market research strategies. How does the rationale for this position feed into the lead user hypothesis?

An important, if not crucial, step in the lead user/Champions of Innovation methodology is the creation of new product ideas through creative group sessions. How have each of the authors described and treated this step? Is there adequate information for the reader to operationalize it? What kinds of problems or challenges could you anticipate during this step?

Week 8 (June 26): Technology Forecasting—Vision Assessment

Readings

'Vision Assessment to Support Shaping 21st Century Society? Technology Assessment as a Tool for Political Judgement' in (Grin & Grunwald, 2000)
'Technology Assessment as Metaphor Assessment: Visions Guiding the Development of Information and Communications' in (Grin & Grunwald, 2000)
'Technology Policy between Long-Term Planning Requirements and Short-Ranged Acceptance Problems: New Challenges for Technology Assessment' in (Grin & Grunwald, 2000)

Lecture

Returning to our parliamentary TA roots, this week we will explore the vision assessment approach that has emerged from the European Academy for the Study of Consequences of Scientific and Technological Advance (*European Academy Bad Neuenahr-Arweiler GmbH*). This approach is built on the assumption that it may be possible to shape technological development by exploring, articulating, and influencing the visions, or *Leitbild*, held by key stakeholders. A specific case study that looks at the role of

metaphor in shaping visions will be explored. The tension between long term planning and short-range acceptance is also at issue in this approach. Armin Grunwald's concept "pragmatic rationality" will be explored as a means of addressing this problem for future-oriented technology policy.

Discussion Questions

Compare the vision assessment approach to the lead user approach. Are they competing approaches, or can they work together? Explain.

Describe the key assumption behind Mambrey's and Tepper's metaphor assessment. How does metaphor relate to Grin's discussion of the *Leitbild* concept?

What is 'pragmatic rationality' and how does Grunwald propose that it reconciles long-term planning with short term acceptance? Do you see any flaws with his argument? Provide an example of how this might (or might not) work with a regulated communications field, such as telecommunications standards or spectrum management.

Week 9 (July 3): Technology Forecasting—Scenario Planning

Readings

The Art of the Long View (Schwartz, 1991)
'Using Scenarios to Develop Strategies' (Leemhuis, 1985)
'Scenario Development: An Approach to Develop Future Potentials' (Gausemeier et al., 1998)

Lecture

Turning back toward the commercial motivation for TA, this week we will explore the scenario planning approach popularized by Peter Schwartz's book *The Art of the Long View*. This approach outlines a method for constructing stories about the future to provide input to strategic planning.

Discussion Questions

Compare the steps taken in scenario planning with those taken in the other approaches. What are the major similarities and differences? Are they competing or compatible approaches?

Describe the output of a scenario planning exercise and how it contributes to policy making process? Could scenario planning be used in a wide public forum? If yes, explain how it might be organized. If no, explain why it wouldn't work.

Week 10 (July 10): Getting Down to Business

Readings

'Traditional and Modern Technology Assessment: Toward a Toolkit' (van den Ende et al., 1998)
'First Lessons we Learned: First Outline of Strategy and a Methodological Repetoire for Vision Assessment' in (Grin & Grunwald, 2000)
'Methodology for constructive assessment of IT-based systems in an organizational context' (Brender, no date)
'Steering Technology Development Through Computer-Aided Design' (Downey, 1995)

Lecture

This week we will look at some specific methodological issues and concerns related to a number of TA approaches. Our concern is with the specific challenges and issues faced when operationalizing a TA project.

Discussion Questions

Describe the data collection methods mentioned in this week's literature. Do you see any relationships between methodological considerations and the theoretical perspectives developed in the various TA approaches?

What do you consider to be the major methodological hurdles in operationalizing a TA project?

Week 11 (July 17): Review

Week 12 (July 24): Examination

Take Home Exam (48 hours)

Comprehensive Examination
Questions to be issued: July 27
Responses to be returned: July 28

Course Bibliography

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