Reframing ‘science’ as an object of inquiry

- standard images of science (from Bijker)
  - Clear distinction between the social and the scientific domain
  - Scientific knowledge is discovered by asking methodologically sound questions, which are answered unambiguously by nature.

- Constructivist images of science
  - Society and science are intertwined
  - The stabilization of scientific knowledge is a social process

-Implications: what does STS study?
  - The development of scientific knowledge is a social process and thus is open to inquiries which focus on its social aspects.
  - Students of STS thus familiarize themselves with the cultures of scientific knowledge creation...
    (just as an anthropologist might familiarize herself with the cultures of primitive tribes)...
Reframing ‘science’ as an object of inquiry

- IMPACT TALK: SCIENCE<>SOCIETY DISTINCTION
- ‘CRITIQUE’ == ‘normative critique’: is the impact, thus the S or T, good/bad, pos/negative?
- ‘CRITIQUE’ == ‘descriptive critique’: what kind of sense-making is going on here? Whose interests are taken into account through this process?
- Implications: what does STS study? What kind of “critique” does STS engage?
  - The development of scientific knowledge is a social process and thus is open to inquiries which focus on its social aspects.
  - Students of STS thus familiarize themselves with the cultures of scientific knowledge creation...
    (just as an anthropologist might familiarize herself with the cultures of primitive tribes)...
STS in the Classroom

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- scientific knowledge production as a social process
  - The social process is fragile...
    - (involves work that is held together by often weak ties, which can be mapped)

- The social process is contingent ...
  - (it could have been otherwise)

-2 contingent processes:
  - Problematization: The manner in which the issue, as well as the various interested actors' roles and identities, are defined.
  - Interest formation: Aligning the players who are involved or have an interest in the solving of the issue.
STS in the Classroom

Reframing ‘science’ as an object of inquiry

-Links to the LO’s:

LO 2: Students will acquire a better understanding of the methods and process of scientific inquiry and how science and technology advance through such processes.

Definition: Expresses the need for students to acquire a greater capacity for understanding how scientific inquiry and/or technology actually progress. Students will develop and employ critical and independent thinking skills in the analysis of the social impact of science and technology, and how science and technology are themselves impacted by the needs and demands of society.

LO3: Students will develop and employ critical and independent thinking skills in the analysis of the social impact of science and technology, and how science and technology are themselves impacted by the needs and demands of society.

Definition: This objective concerns a range of cognitive habits and abilities that foster the ability to move beyond the confines of current conventional thinking and/or one’s own background assumptions and prejudices, and to move in directions that are fruitful because they further illuminate the world and/or suggest constructive avenues of response to challenges.
STS Curriculum Development Workshop
June 16-17, 2009

STS in the Classroom

Research/learning activities - questions

- How to engage this kind of critique with undergraduates???

-Mapping the landscape of the problem:
  - What is the issue?
  - What do we need scientific knowledge about?
  - What happens if we do not understand this properly?
  - If we know this, what problems are solved?

-Mapping the interested players:
  - Whom does such knowledge serve?
  - What will happen to them if we understand this? Or not?
  - Who is required to create this knowledge?
  - What do these required people need to know how to do?
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STS in the Classroom

Research/learning activities – empirical resources useful for introductory undergrads

  - Program calls
  - Award abstracts → awarded research websites
- NSF related Program Agenda Workshop & Advisory Panel Reports
- Various scientific initiative/consortia websites
  - [http://www.nano.gov/](http://www.nano.gov/) (national nanotechnology initiative)
- Leading journals of various scientific fields/disciplines
Critical Thinking Games

- Re-cap of yesterday’s STS in the classroom - Reframing ‘science’ as an object of inquiry
- Links to the LO’s:

  **LO 2:** Expresses the need for students to acquire *a greater capacity for understanding how scientific inquiry and/or technology actually progress.* Students will develop and employ critical and independent thinking skills in the analysis of the social impact of science and technology, and how science and technology are themselves impacted by the needs and demands of society.

  **LO 3:** This objective concerns a range of cognitive habits and abilities that foster the ability to move beyond the confines of current conventional thinking and/or one’s own background assumptions and prejudices, and to move in directions that are fruitful because they further illuminate the world and/or suggest constructive avenues of response to challenges.
Critical Thinking Games

- IMPACT TALK: SCIENCE<>SOCIETY DISTINCTION
  - ‘CRITIQUE’ == ‘normative critique’: is the impact, thus the S or T, good/bad, positive/negative?
  - ‘CRITIQUE’ == ‘descriptive critique’: what kind of sense-making is going on here? Whose interests are taken into account through this process?

- The purpose of the critical thinking games is to provide an occasion for students to:
  - Sit with the sociality of scientific practice
  - Sit with the craft and the strangeness of scientific agendas
  - Sit with the building blocks of scientific value and legitimacy
Critical Thinking Games

-Simultaneously to *demystify* and *enchant*

-What does it mean for scientific practice to be *in itself* ‘social’ ??

-??
-??
-??
-??
Critical Thinking Games

- ‘CRITIQUE’ == ‘normative critique’: is the impact, thus the S or T, good/bad, positive/negative?
LO 3: “Analyze and evaluate the social impact of science and/or technology and how science and/or technology are themselves impacted by the needs and demands of society.

-‘CRITIQUE’ == ‘descriptive critique’: what kind of practice is happening here? What kind of sense-making is going on here? In whose interest does this practice occur?

-What does it mean for scientific practice to be in itself ‘social’? ??
-What can we do to create collective reflection on this ‘social’?

-??
-??
-??
Critical Thinking Games

An instance of sociality: collective sense-making
social cohesion
difference

-The keywords game:
- Students work in groups of 2-3;
- Each student codes a key text in such a way as to identify the salient terms:
  - That are used with high frequency
  - That seem to be used in multiple ways strategic ambiguity)
  - That seem to be holding the problem space together
- Students present, compare, and discuss their findings
Critical Thinking Games

An instance of sociality: collective value/norm construction

- The mock NSF program committee courtroom game:
  - Student teams deliberate the worthiness of an NSF program call (RFP, and whether it should be funded):
    - One side argues for the value of a program, the other against it;
    - An independent team deliberates the winner.