Teaching Materials: A Journey through STS and Innovation Studies

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Abstract
A series of teaching materials to accompany the Engagement “A Journey through STS and Innovation Studies” published as part of the STS and Innovation thematic collection.

Keywords
innovation studies; UK universities; STS method; Schumpeterian economics, radical science movement

Teaching Innovation Studies at the University of East London in the 1990s
What follows is a small selection of teaching materials I used when teaching innovation studies and STS to first year students at the University of East London (UEL). The course was called “Innovation, Technology & Culture”. It was compulsory for all of the students following the “New Technology” degrees. Included on the following pages are the aims and objectives, lecture and seminar schedules, examples of seminars, lectures and assessment. Along the way, I point to some of the material features of teaching pre-Internet. More context for this material can be found in my article “A Journey through STS and Innovation Studies”.


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Course Handbook Covers

Figure 1. These are the covers for the same course, one from 1992/93 and the other from 1999/2000. By the turn of the millennium we had coloured paper and binding. But we didn’t have a logo on the course material. Perpetual branding of university materials really took off in the 21st century. The course was called “Innovation, Technology & Culture”, and was compulsory for all first year students.
Aims and Object[ive]s

Figure 2a and 2b. Interesting typo on the first line of this overhead sheet. In the 1990s, pre-PowerPoint, we used these sheets. Being able to print them was already a major innovation. In the early '90s, I was still writing them by hand, as illustrated by this sheet from a lecture about labour process theory.
Lecture and Seminar Schedules

**Figure 3a and 3b.** Those were the days – a course that lasted for 24 weeks, with time to develop arguments and make connections. Students had two one-hour lectures every week, one more theoretical and one about a case study relevant for the theories we were exploring that week. For example, when introducing students to the concept of ‘techno-economic paradigm’, we also spent time on the history of the railway (see next page). Seminars, in smaller groups, lasted for one and a half hours, and addressed both theoretical and empirical themes.
What we Did in Week 9: Schumpeter

In retrospect, I find it quite ambitious that we expected students to read major texts from the field in week 9 of their first year. Often, first-year students only encounter highly processed material, in the form of textbooks. Looking at the paragraph about ‘Preparation’, it was clear that we paid attention to developing the skills of close reading, and that works best with primary sources.

Figure 4a and 4b. In retrospect, I find it quite ambitious that we expected students to read major texts from the field in week 9 of their first year. Often, first-year students only encounter highly processed material, in the form of textbooks. Looking at the paragraph about ‘Preparation’, it was clear that we paid attention to developing the skills of close reading, and that works best with primary sources.

Figure 4c. Untitled.
Lecture Notes from Week 16: The Role of Government

Figure 5. These lecture notes were prepared on a home computer, probably WordPerfect, the dominant word processing software from the mid-1980s until the late 1990s (and still used today by the legal profession). If you look closely, you can see it was printed using a dot matrix printer (still in use for high-volume printing needs in some sectors).

I love my clarification of the difference between ‘a Marxist view of the role of the state in a capitalist country’ and ‘a Marxist state’. The former emphasises the role of the state as an agent to support the interests of
capital (as described by Karl Marx and Friedrich Engels in *The Communist Manifesto, 1848*), whereas the latter is a system of government based on Marxist principles.

**Assessment**

**Figure 6.** This is one of the assignments related to the theoretical part of the course. Students are referred to the reading list, of which the first page is reproduced here. The numbers after some of the references refer to the library (MH – Maryland House where we were based, or BK another part of the campus). The reading list was four pages long.
Assessment

Figure 7. These two assignments relate to the case studies. Again, I’m struck by our ambition in asking students to read Eric Hobsbawm and/or David Landes. I also like how we expected them to incorporate non-academic sources in the second assignment. We wanted to sensitise students to the idea that science, technology and their representations could be found everywhere, including popular and high culture.
Assessment

Figure 8. This is an example, given to students in advance, to help them prepare for the final exam. The exam was done in closed conditions, and the students wrote by hand, with a separate book for each of their three answers. Carrying these to and from the exam location, and to and from home in order to grade them was heavy work.
What students should know about innovation theory by their third and final year

WHAT A THIRD YEAR STUDENT ON THE NEW TECHNOLOGY DEGREE NEEDS TO KNOW ABOUT INNOVATION THEORY

Objectives
* to learn about innovation theory concepts
* to develop analytic skills
* to develop oral and written communication skills
* to know how to develop further all of the above

Topics
1. What is innovation?
   - product/process
     - hierarchy of innovations - incremental...revolutionary
     - technological trajectories
     - product cycle
     - changes in the locus of innovation
     - technology push vs. demand led innovation

2. Innovation and the firm
   - success and failure
   - organising for innovation
   - project selection and evaluation
   - appropriation

3. Sector studies

4. Public policies for innovation
   - technological change and economic growth
   - comparative analysis of national systems of innovation
   - forecasting, including measurement of innovative activity
   - standards

5. Non-governmental influences on innovation
   - public participation
   - trade unions
   - pressure groups
   - experts

Projects
* Identify a consumer product that has recently become available in the shops. Outline how it has come to be there. Do you think it will become a commercial success? Provide reasons.

* Identify a technology that is widely used. Trace back its development. Were there competitors at an early stage, or earlier attempts to introduce this or a similar product? Why did this one succeed where others failed?

* Analyse competing alternatives for delivering a similar service, for example terrestrial versus satellite broadcasting? What are the advantages and disadvantages of both? Include technical and social factors.
The Materiality of Teaching
In some of the previous pages, we’ve seen examples of dot matrix printing, overhead sheets, out-of-academic-use software, how to bind paper. Here are a few more examples – 3.5 inch disks, tape recording, slides (of paintings by John Constable and William Turner, a sort-of before and after of industrialisation). There was also chalk, and chalk dust. Outdated fashion tip: never wear black when lecturing with chalk.

Figure 10. 3.5” disks.
Readable Version of Lecture Notes

THE ROLE OF GOVERNMENT – THEORIES OF THE STATE Set 1A

Aims – this week
1. explore how governments can affect innovation and technical development
2. many ways open to them, including tax relief on R&D [research and development], funding education and training, health and safety at work, environmental legislation, procurement
3. governments choose different mix depending on view of own role
4. possible roles for government will be related to the available measures

- will be done on fairly abstract level – next week we shall look at the actual experience of four different countries, and their different approaches in order to see how significant the state's involvement is in the overall direction of S&T [science and technology] development, and on what criteria the state chooses to support one area and not another – resources are limited – why support cancer research and not sickle cell anaemia, nuclear physics and not coal gasification

Outline of today's lecture

0. introduction
1. definitions – of state
2. three main views – liberal, interventionist, Marxist
3. mechanisms open to state – sponsorship, regulation
4. relationship between 2. and 3.

Introduction (don't need to write this down)
- there are many ways of talking and thinking about the state, and many ways of dividing it up, depending on what one’s interest is – as we have only two lectures on this topic, I have to narrow down our focus – what I shall be talking about is the role of the state in industrialised, democratic countries – large parts of Europe, North America, Japan, Australia – in other words OECD [Organisation of Economic Cooperation and Development] countries – role of the state in dictatorships is very different, problems of industrialising countries, even where democratic are also quite different – even within OECD, systems of government are very different – whether or not it is a federal system, how representatives are elected, but they do have things in common, and the differences are not so important for understanding role of state in innovation and technology policy – more than enough to cover by just focusing on industrialised, democratic countries and different views of the role of the state in such countries

- couple of things which are quite tricky, which I want you to be aware of – first is that there is a difference between a Marxist view of the role of the state in a capitalist country and a Marxist state
– which will hopefully become clear – second, gets messy because the categories I shall use are not only to be found in the academic literature, but also in the statements of [continued on next page, not reproduced here]

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Author Biography
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