

HST 120A  
Introduction to Science and Technology Studies

AKA

# **Peoples and Things: An Introduction to Technology Studies**

College of Arts and Letters  
Stevens Institute of Technology  
Fall 2016

**Lee Vinsel**

Class:

Section A: 9-9:50 Wed, Thurs, Fri

Section B: 10-10:50 Wed, Thurs, Fri

Office hours: Morton 329, Tuesdays 9-12, or by appointment

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## Course Description:

There is good news and there is bad news about what we will call “Technology Studies.” The good news is that several academic disciplines, including anthropology, economics, history, psychology, and sociology, have made great strides around the topic over the last fifty years. The bad news is that they hardly ever talk to each other. This course presents a synthetic, interdisciplinary picture of human life with technology. It pays special attention to the kinds of empirical work researchers do to substantiate their claims about technology.

### CAL Objectives:

1. Students will demonstrate an awareness of ethical responsibility and the societal impact of their future profession.
2. Students will demonstrate a fuller understanding of the traditional humanities and social sciences through an understanding of their relation to the study of sciences and technology.
3. Students will demonstrate an awareness of cultures and societies other than their own.
4. Students will demonstrate writing and public speaking skills.
5. Students will demonstrate a love of learning in the liberal arts for its own sake.
6. Students will demonstrate leadership and team skills.

### STS Program Outcomes:

1. *Philosophical foundation.* The student will understand the underlying theories and methods used in Science and Technology Studies and be able to apply them in individual and team research.
2. *Historical foundation.* The student will understand the evolution of the Science and Technology Studies as an academic field, and be able to discern different schools of interpretation within STS.
3. *Research.* The student will be able to design and conduct research and to ask and answer appropriate and original research questions.
4. *Tools.* The student will be proficient in the application of STS tools, methods, and concepts toward the resolution of practical problems.
5. *Professionalism.* The student will achieve a high degree of knowledge, accountability, and ability to transfer classroom experiences to professional practice.
6. *Leadership.* The student will be able to develop plans for research projects and policy actions on a professional level.
7. *Teamwork.* The student will be able to contribute to research activity as part of working team member, and facilitate cooperation among the members of the team resulting in a successful project.
8. *Communication.* The student will enhance written and oral presentation skills using a variety of mean to convey significant ideas and proposals.
9. *Ethics.* The student will understand and abide by professional standards of ethics appropriate for STS research.
10. *Social Issues.* The student will place into modern social context information derived from research such that the relationship between theory and practice are manifest.
11. *Lifetime learning.* The student will be treated as a professional with a lifelong investment in one's field of study, and a professional goal of continuing self-assessment and self-improvement.

### HST 120A Course Outcomes:

1. Students will be able to define and use key concepts from the field of Technology Studies. (1)
2. Students will be able to discuss the historical development of several key ideas in the field Technology studies. (2)
3. Students will engage in written and oral presentations that will summarize complex material, articulate a definite point of view, and demonstrate empathy and understanding of diverse positions. (8)
4. Students will apply nuanced analysis to difficult social problems associated with the development and use of technology in the present world. (10)

### Honor Board Policies:

You should by now be familiar with [The Honor System at the Stevens Institute of Technology](#). It is your responsibility to uphold the ideals set forth in the Honor System Constitution. Specific student responsibilities include:

- Maintaining honesty and fair play in all aspects of academic life at Stevens;
- Writing and signing the pledge, in full, on all submitted academic work;
- Reporting any suspected violations to an Honor Board member or to the Dean of Student Development;
- Cooperating with the Honor Board during investigations and hearings.

If you ever have questions about how to interpret the Honor System in relation to your work in this class, please get in touch with me.

### Students with Disabilities:

If you require special accommodations due to a disability, or if you need individual arrangements should the building be evacuated, you must inform the office of [Student Counseling and Psychological Services](#), Dr. Jodi Streich, Director, in the Howe Center, 7th floor (x5177), and complete the Faculty Contact Form. Once you have done so, you should ask to meet with me so that we can work out any special arrangements that may be necessary.

## Required Books:

There are no required books; all readings will be made available on Canvas

**NOTE:** Whenever we are talking about a reading in class, you must bring in your copy of the reading. For readings available online, this means a paper copy — no laptops, tablets, or smart phones will be allowed for use in class, and you must have a paper copy of the readings. When possible, printouts will be available for you in class the week before.

## How to Read:

Obviously, you know how to read (if you didn't, this would not be a very useful document, would it?). In this course we are mostly going to be talking about ideas. This means that you should be reading the texts assigned for their arguments. Ask yourself the following questions as you read:

- What is the author's big argument?
- What is his or her evidence offered for it?
- What motivates the author, implicitly or explicitly?
- What does the author see as the consequences of their argument and research? (What are the stakes?)

Pay close attention to the beginnings and ends of chapters or articles, where conclusions and big points usually hide. (Pro-tip: these approaches give good results for *all* non-fiction reading, but especially for this class.)

## Grading and Course Policies:

Attendance is mandatory. Any absences must be accounted for by notifying me before the start of class; otherwise I will need verification from an outside authority (i.e., doctor, coach, another professor) explaining why it was necessary for you to miss class.

Cell phones must be turned off or silenced and put away. Students may not use laptops or other computers (tablets, etc.) in class. They are distractions for everyone. I can tell when you are looking at your phone. Even if I don't say anything about it, I see it, and it hurts your participation grade.

You should stay awake at all times during class. *Any students in violation of these simple rules will be marked as absent for that particular class.*

Grades will be based on the following criteria:

- Class participation (including attendance, discussion): 20%
- Short essay 3-Pages on the topic "What is Technology?": 10%
- Midterm and Final: 20% Each
- Final essay: 30%

## The Zombie Scale of Classroom Participation

- 4 points = Congratulations! You are a healthy adult human being! And as a responsible adult, you have prepared and are now making quality in-class contributions.
- 3 points = Hmm. You may have prepared, but your contributions are just OK and don't demonstrate any deep understanding of the material. Perhaps you are just having an off day, OR (!) perhaps you have been bitten and now have the zombie plague! It's hard to say . . .
- 2 points = It's fairly clear you've been bitten now. You have the creeping zombie crud. Most times, you sit silently, becoming gray and developing the zombie shake. Sometimes you may talk in class, but what you say is off topic, displays no sense that you read the material, or is pure bullshit. Every now and then you emit strange, small sounds, somewhere between a wheeze and a snore.
- 1 points = No signs of human life remain. Your body may be here, but your mind isn't. If any thought is present, it is for checking your cell phone.
- 0 points = Unexcused Absence. You have become so zombified you are not even here. In all likelihood, you are feasting on someone's liver in Pierce Dining Hall.

## Writing & Communications Center:

The College of Arts & Letters maintains the [Writing & Communications Center at Stevens](#) in Morton 210. Their office hours are Monday-Friday, 11 am - 5 pm. You can stop in or make an appointment to get help with your papers, presentations, and all other work you do at Stevens. Writing and presenting are *skills* and like all skills they can *always* be *improved*.

## Class-time Policies:

You cannot get a good grade in the class unless you do the reading and participate in class discussions. If you don't get all of the reading done each week, that isn't terrible, as long as you can contribute to the discussion; but don't show up without having given it a shot. People who show up and sit in the back, saying nothing, looking sleepy, will *not* get good participation grades. If you are worried about your participation grade, please let me know, but do not expect me to warn you if you are not participating.

Electronic devices (laptops, tablets, smart phones) are not allowed in class; they are too distracting, for you and for me. Please don't make me ask you to put them away.

## Course schedule

*Subject to some adjustment depending on how things are going.*

*Reading listed for each week is what you need to have read by the date of class.*

**Week 1—Technology: What’s to Explain? Why Explain It?:** Technology is important, right? Well, maybe. Yet, the word “technology” was not widely used until the 1930s, and the study of technology is relatively young. In this first week, we will explore definitions of technology and the history of technology studies, with special focus on what we hope to explain about technology in the first place. In the first lecture, I will lay out what this course is and how it will work. In the second lecture, I will outline how individual academic disciplines started thinking about technology. Thinkers covered will include the proto-archaeologist Christian Jurgensen Thomsen, the anthropologist Lewis Henry Morgan, the economists Karl Marx and Joseph Schumpeter, the psychologist Hugo Munsterberg, the sociologist William Ogburn, and the historians Lewis Mumford and Siegfried Giedion.

Eric Schatzberg. "Technik comes to America: Changing meanings of technology before 1930." *Technology and Culture* 47, no. 3 (2006): 486–512.

Nightingale, Paul, What is Technology? Six Definitions and Two Pathologies (October 10, 2014). SWPS 2014–19. Available at SSRN: <http://ssrn.com/abstract=2743113> or <http://dx.doi.org/10.2139/ssrn.2743113>

**Week 2—Affordances and Social Networks:** In this course, I will argue that we can get a lot of mileage out of focusing on just two basic ideas, affordances and social networks. In the first lecture, I will outline the psychologist James J. Gibson’s notion of “affordances,” which are possible courses of action that creatures perceive in their ecological environments. Among other things, the beauty of the affordance idea is that it will allow us to dodge the problem of defining technology that we encountered in the first week. The notion also opens up a slew empirical approaches, from asking people questions to observing their behavior. In the second lecture, I will connect this idea to the world of social networks. I will argue that people’s relationships to affordances are highly dependent on which social networks they belong to. To explore this idea, we will examine research on how animals learn to use tools, including how Israeli roof rats learn how to open pinecones and how chimpanzees take up “termite fishing.”

William W. Gaver "Technology affordances." In *Proceedings of the SIGCHI conference on Human factors in computing systems*, pp. 79–84. ACM, 1991.

William H. Warren "Perceiving affordances: visual guidance of stair climbing." *Journal of experimental psychology: Human perception and performance* 10, no. 5 (1984): 683–703

Bennet G. Galef, Jr., “Social Learning by Rodents” in *Rodent Societies: An Ecological & Evolutionary Perspective*, eds. Paul W. Sherman and Jerry Wolff, 207–215.

Charles Kadushin, *Understanding Social Networks: Theories, Concepts, Findings*, pg.'s 3-26.

**Week 3—Hierarchy and Segregation:** Technologies and other material realities are tightly inter-coupled with all kinds of social inequalities. In lecture 1, I will examine an argument that goes back to Jean-Jacques Rousseau, Lewis Henry Morgan, and Friedrich Engels, which holds that social inequality arose from one of the most important technological “revolutions” in human history, namely the birth of agriculture. We will learn that—no surprises—contemporary thinkers say, “Hey, it’s more complicated than that.” But they also still believe that inequalities and social hierarchies have a lot to do with how wealth and power are distributed. We will trace this history forward to contemporary anxieties about economic inequality. Inequality is often expressed through segregation, and Lecture 2 will examine segregation both in what kind of work we do and where we live. The habits, skills, and relationships to affordances that end up in our bodies and minds depend in large part on who we are and where our networks fall in social hierarchies. Topics will include the “gender division of labor,” the history of racialized work extending back to slavery, and the long, long, long history of segregated housing.

Friedrich Engels, *The Origin of the Family, Private Property, and the State*, excerpts

Yu Tao and Sandra L. Hanson, “Engineering the Future: African Americans in Doctoral Engineering Programs”

Ruth Cowan, *More Work for Mother*, Introduction

Carl H. Nightingale, *Segregation: A Global History of Divided Cities*, Chapter 1, “Seventy Centuries of City-Splitting”

**Week 4—Diffusion, Adoption, Consumption, Use:** Authors of books on technology often begin with the topic of invention because, they reason, invention marks the beginning of technologies. But that approach is kind of crazy because, in fact, all of our lives begin *in media res*, or in the middle of things. We are born into a world full of objects that we then learn to use. This week will build on the thoughts from Weeks 2 & 3 to explore, in lecture 1, the study of use and, in lecture 2, the diffusion and adoption of things, which at both the organizational and individual levels has loads and loads to do with social networks.

Edgerton, David. "From innovation to use: Ten Eclectic Theses on the Historiography of Technology." *History and Technology, an International Journal* 16, no. 2 (1999): 111-136.

Charles Kadushin, *Understanding Social Networks: Theories, Concepts, Findings*, pg.'s 135-139.

Thorstein Veblen, *The Theory of the Leisure Class*, a two-page excerpt.

Mark Thomas Kennedy and Peer Christian Fiss. "Institutionalization, framing, and diffusion: The logic of TQM adoption and implementation decisions among US hospitals." *Academy of Management Journal* 52, no. 5 (2009): 897-918.

**Week 5—Invention:** Depending on how we define the term “invention,” it is either quite common or quite rare. In this class, we will think of invention as the introduction of new affordances. Lecture 1 will consider the biological and psychological underpinnings of problem-solving and creativity. We will begin by considering how ethologists have studied animal behavior around problem-solving and will spend a lot of time talking about crows, octopi, and non-human primates before turning to human primates and their penchant for self-aggrandizement. Lecture 2 will examine how institutions and other social factors have given rise to a culture and cult of invention since, say, 1700.

Carlson, W. Bernard, and Michael E. Gorman. "A cognitive framework to understand technological creativity: Bell, Edison, and the telephone." *Inventive minds: Creativity in technology* (1992): 48-79.

Joel Mokyr, *The Enlightened Economy: An Economic History of Britain, 1700-1850* (2009), Ch. 5, “Enlightenment and the Industrial Revolution.”

**Week 6—Organizations:** Modern technologies go hand-in-hand with bureaucratic organizations, which both produce technologies and use them. Lecture 1 explores a theory first put forward by the business historian Alfred Chandler, who argued that the modern, M-form corporation arose around certain large and capital-intensive technologies. This thesis has not fared well with subsequent thinkers, who have asserted, for instance, that corporations had just as much to do with extending social control or, alternately, that the M-form was just an intellectual fad that had little to do with economic or technological reality. At the same time, Chandler’s explanation works pretty well in some cases, which have to do with stable demand structures. Lecture 2 offers brief exegeses on two topics: first, I’ll look at the role that communications and organizational technologies play in bureaucracies, including a history that takes us from the filing cabinet to the kinds of complex logistics systems used at Wal-Mart and Amazon. Second, I will hammer home the point that technologies play a role in all “organizations,” including social movements, and not just big ones, like companies. This includes the use of communications technologies in social uprisings, such as the use of printing presses in the American Revolution and social media in the so-called Twitter Revolutions. I will describe how activists used mimeograph machines, personal automobiles, and buildings called “churches” to undertake the Montgomery bus boycott.

Alfred Chandler, *The Visible Hand*, Introduction



Stalk, George, Philip Evans, and Lawrence E. Shulman. "Competing on capabilities: the new rules of corporate strategy." *Harvard business review* 70, no. 2 (1991): 57-69.

### Week 7—Midterm Week

**Week 8—Systems, Infrastructure, Maintenance:** A lot of early thinking focused on individual instances of technology, or what are sometimes called “artifacts.” Later theorists argued that this approach isn’t helpful for thinking about all of the interconnected technologies around us, or what we call “systems.” In the first lecture, I will outline theories about systems and infrastructure, and I will look examples, like electrical power systems and the complex networks of satellites and computers that we use to study global climate change. The second lecture will focus on recent work on maintenance and repair.

Hughes, Thomas P. "The evolution of large technological systems." *The social construction of technological systems: New directions in the sociology and history of technology* (1987): 51-82.

Lara Houston, “Unsettled Repair Tools: The ‘Death’ of the J.A.F. Box”

Russell and Vinsel, “Hail the Maintainers”

**Week 9—Industries, Professions, Standards:** The fates and life-cycles of technologies are deeply interwoven with the rise and fall of social structures that we call *industries*. In the first lecture, I will trace developments in various strands of thought, including economic history and Neo-Schumpeterian economics. These thinkers argue that industries usually go through certain dependable life-cycles, the shape of which we will explore. Lecture 2 will examine professional groups, especially engineering societies, and standardization organizations. We will use the historian Ann Johnson’s notion of “knowledge communities” to think through how engineering knowledge grows (and doesn’t grow) and how these groups manage to standardize nearly every conceivable thing around us, except for what they can’t.

Steven Klepper, *Experimental Capitalism: The Nanoeconomics of American High-Tech Industries* (2016), Ch. 2, “Once Upon a Time”

Robert Gordon, *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War* (2016), Preface and Introduction, “The Ascent and Descent of Growth.”

**Week 10—Politics, Policy, Regulation:** Many contemporary academics will tell you, “Hey, man, everything is political!” and they will argue that “everything” includes everything we have covered in this class so far. Such potential quibbling

is, of course, simply a matter of definition. In this week, we will cover capital-P, or formal, politics, including things like voting, political parties, and the workings of the various branches and levels of government. Government, it turns out, has *always* had an enormous influence on the development and use of technologies (libertarians be damned).

David M. Hart, *Forged Consensus: Science, Technology, and Economic Policy in the United States, 1921–1953*, Ch. 1, “The Malleability of American Liberalism and the Making of Public Policy”

Vinsel, Lee Jared. "Designing to the test: performance standards and technological change in the US automobile after 1966." *Technology and culture* 56, no. 4 (2015): 868-894 . . . . or alternately, Vinsel, “Focus: A Theory of Regulation and Technological Change,” if I have gotten around to it yet.

**Week 11—Accidents, Disasters, and Terrorism, Oh My:** Accidents, large-scale technological (and “natural”) disasters, and terrorism seem to be part and parcel of living in modern societies with enormous, interconnected, interdependent systems. A literature, which goes back at least to the 1980s, argues that such events show us a great about technology and human life with it. Yet, at least one of our authors will argue that, if disasters have anything to “teach,” we do not “learn.” Lecture 1 will focus on disasters and accidents, with special attention paid to so-called “natural disasters” and car crashes. Lecture 2 will examine terrorism, including a brief history of the car bomb. (Self-driving cars will make great bomb delivery devices, won’t they?)

Knowles, Scott Gabriel. "Learning from Disaster?: The History of Technology and the Future of Disaster Research." *Technology and Culture* 55, no. 4 (2014): 773-784.

Fortun, Kim. "Ethnography in late industrialism." *Cultural Anthropology* 27, no. 3 (2012): 446-464.

Skim: Richard Little, “Managing the Risk of Cascading Failure in Complex Urban Infrastructures”

Skim: Moghadam, Assaf. "How al Qaeda innovates." *Security studies* 22, no. 3 (2013): 466-497.

**Week 12—Culture:** Culture is a famously complex concept, which includes social phenomena like beliefs, rituals, ideas, practices, and ways or forms of life. Just like the academics who will remind us “Everything is political!” any self-respecting student culture is going crash our party to inform us—quite condescendingly no doubt—that we have been talking about nothing-but-culture all semester long. True, true. But this week will focus on the so-called “cultural history of technology,” which has been one of the fastest growing and most intellectually exciting areas of technology history over the past two decades. In

practice, cultural history has focused on examining *how people think about technology*, rather than on how technology changes or is used. In Lecture 1, I will outline the theoretical perspectives undergirding cultural history, and I will give examples of the many fascinating things people have been exploring using this family of approaches. I will also argue that cultural history has real limits, that we are already bumping into them, and that we need to place the tools of cultural history in the context of older methods—like building economic statistics and counting dead people—which scholars have found very, very, very boring for decades now. Lecture 2 will present a cultural historical case study of how policy-makers in the USA have thought about technology in the Post-WWII period, ranging from the “linear model” to the current scene of “innovation,” “STEM Education,” and whatnot.

Voskuhl, Adelheid. "Motions and Passions: Music-Playing Women Automata and the Culture of Affect in Late Eighteenth-Century Germany." (2007).

Patrick McCray, “California Dreamin’: Visioneering the Technological Future”

**Week 13—Senses, Space, Time; Thinking, Things, and Thinking Things:** In this week, we will consider how technologies connect with thinking and sensing, including our perceptions of space and time. In the first lecture, we will begin with Ernst Kapp’s arguments from the 19<sup>th</sup> century that technologies are “organ projections,” or extensions of the human body, especially of the body’s senses. We will furnish lots of examples, like microscopes and telescopes and what have you. We will learn that our ideas of time are deeply intertwined with technologies of time-keeping. Finally, we will examine long-standing arguments that technologies erase space and compress time. It turns out that such arguments are hard to substantiate and separate from an enemy of thought known as “nostalgia.” We will look at scholars who have attempted to study the issue empirically. In the second lecture, we will look at how tools interconnect with and aid human thinking, including ideas that our tools are part of an “extended mind.” This will lead us into a consideration of tools, like jeton coins and abacuses, which eventually feeds into the entire history of computing.

Frumer, Yulia. "Translating Time: Habits of Western-Style Timekeeping in Late Edo Japan." *Technology and Culture* 55, no. 4 (2014): 785-820.

Wajcman, Judy. "Life in the fast lane? Towards a sociology of technology and time." *The British journal of sociology* 59, no. 1 (2008): 59-77.

**Week 14—Media:** Why has the study of media traditionally been the scene of terribly weak thinking? That question is hard to answer, but the observation remains true nonetheless. In the first lecture, I will beat up on two German guys named Theodor Adorno and Max Horkheimer. I will argue that most of their confusions stem from having no understanding of how media industries actually operate (as well as no defensible psychological theory of how humans work). We

will then discover that, hey, we are in luck because other thinkers have been doing wonderful research on media industries for decades. I will focus especially on the writings of Joseph Turow, who has given us great studies of the rise of target marketing and how target marketing eventually morphed into the online micro-targeting of today. In the second lecture, we will take aim at Marshall McLuhan's motto, "The Medium is the Message." First, we will ask, "WTH?" We will find that McLuhan was always wrong. We will explore the history of people doing actual empirical research on media use, and we will discover that human beings nearly always choose media that reinforces their pre-existing worldviews.

Paul Felix Lazarsfeld, Reading TBD with the help of Eric Hounshell.

Explore the homepage of Eszter Hargittai's Web Use Project and read one article posted there: <http://webuse.org/>

Charles Kadushin, *Understanding Social Networks: Theories, Concepts, Findings*, pg.'s 139-148