Online
syllabus: http://www.cs.cornell.edu/people/sengers/Teaching/INFO4240/index.php

Instructor: Prof. Phoebe Sengers
Time: Tu, Th 1:25-2:40
Location: Thurston **203**
Office Hours:M 11:00-12:00, Room 116, 301 College Ave.

Topic

The social impact of technologies is typically thought about fairly late, if ever, in the design process. Indeed, it can be difficult at design time to predict what effects technologies will have. Nevertheless, design decisions can inadvertently "lock in" particular values early on. **In this course, we will draw on science & technology studies, technology design, and the arts to analyze the values embodied in technology design and to design technologies to promote positive social impact**. What social and cultural values do technology designs consciously or unconsciously promote? To what degree can social impact be "built into" a technology? How can we take social and cultural values into account in design?

Technical background is not needed for this course, but may be drawn on if you have it.

Course Philosophy

This course begins from the idea that technology design is intimately entangled with political, cultural, social and values issues. In the modern world, technologies are an intimate part of everyone's daily lives. **The act of designing technologies does not simply create functionality; it also offers possibilities for action, ways of looking at the world, and modes through which we can relate to one another**. Designs thus, intentionally or not, embody values—ones we as

a community of users sometimes accept, sometimes reject, sometimes build on, and sometimes alter.

This course will equip students to find their own answers to two key questions:

1. **What values do specific technology designs embody, and how and to what extent do they do so?**
   We will look at current and historical case studies of design interventions to identify ways in which technologies can, intentionally or unintentionally, promote specific values and to analyze how those values play out in practice in the complex worlds of everyday life.
2. **How and to what extent is it possible to design technologies to reflect specific values?**
   We will examine and practice a variety of design methods intended to incorporate values in design, and analyze their benefits and drawbacks.

These questions cross between two domains which are not often brought into conversation in undergraduate education: technology design and the social, cultural, and political analysis of technologies. In these course, we will develop a facility to think, speak, and act across these domains using techniques from **critically-informed technology design and analysis**. These techniques draw on and blend ideas from human-computer interaction, engineering, product design, science & technology studies, and the arts. This course is open to all students from engineering, the humanities, the social sciences, and the arts and design who are interested in reflecting on and improving the role of technology in society.

Learning objectives

Upon completion of this course, students will be able to:

- Articulate how and to what extent values are built into designed artifacts in early stages of the design process

- Identify relevant values issues that arise in a particular technology design
- Use the design workbook method to explore social implications of design and to ideate new design possibilities
- Appropriately deploy a variety of design strategies that aim to address values issues
- Weigh the possibilities and limits of different strategies for considering values in design, and identify values commitments inherent in these design strategies themselves
- Create technology designs which reflect varying value commitments in response to a design brief
- Recognize and comment on issues in values and design in everyday life
- Construct a compelling argument in writing and in design that builds on documented evidence and the arguments of others

For further information

If you have questions, please contact the instructor, Prof. Phoebe Sengers, at sengers@cs.cornell.edu.

You can download the full syllabus with all information from this website in print-friendly format.

Schedule

This class is experimental. The schedule is subject to revision as the class proceeds.

Introduction
Aug 29 - Technology, Design, and Social Impact
An introduction to the class. We'll review course mechanics, get a sense of the wide variety of approaches that have been used to design for a good social impact, and consider some of the possible social issues that come up in design.
Additional resources: Objectified. This is a lovely documentary about contemporary product design, with some

discussion of social impact. Includes an interview with noted critical designers Tony Dunne and Fiona Raby.

Values, Technology, and Design

What does it mean to build a technology that has a good impact on society? Can "values" even be built into technology? If not, does this mean designers have no responsibilty? If so, what values do technologies already have? How do they impose these values? How can we start designing with values in mind?

Sep 3 - Values in design: an introduction
Reading:
Nissenbaum: How Computer Systems Embody Values
DiSalvo: Chapter 1, Adversarial Design
Bardini, Thierry, and Horvath: The Social Construction of the Personal Computer User.
Papanek: Do-it-Yourself Murder
How have values been thought about as part of design? We'll look at key perspectives from technology design, product design, and history of computing.
Additional resources: A classic reading on how to bring values into the design process along the lines suggested by Nissenbaum: Flanagan, M., Howe, D. and Nissenbaum, H. Embodying Values in Technology. In *Information Technology and Moral Philosophy*. Jeroen van den Hoven and John Weckert (eds.) Cambridge: Cambridge University Press, 322-353.
Sep 5 - Critical design
Reading:
Dunne & Raby: Chapter 4, Design Noir
Michael: 'What are we busy doing?': Engaging the idiot (read from pp. 537 on only)
Speculative design as a strategy for reflecting on the social implications of technology and the design process itself.
Additional resources: Guest instructor Kaiton Williams's article using critical design to discuss the social impact of fitness tracking technologies: Stephen Purpura, Victoria Schwanda, Kaiton Williams, William Stubler, and Phoebe Sengers. 2011. Fit4life: the design of a persuasive technology

promoting healthy behavior and ideal weight. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11). ACM, New York, NY, USA, 423-432.

Sep 10 - Design workbooks

Reading:

Gaver: Making spaces: How design workbooks work

Gaver and Dunne: Projected realities

Aipperspach, Hooker, and Woodruff: The heterogeneous home

We'll adapt Gaver's design workbook technique as a method to explore cultural and social issues in and through the early stages of design.

Homework due: Mini-project 1: Critical design

Additional resources: More creative and thought-provoking examples of speculative design to explore social issues can be found in Bill Gaver and Heather Martin. 2000. Alternatives: exploring information appliances through conceptual design proposals. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (CHI '00). ACM, New York, NY, USA, 209-216. (Note: this is one of my favorite design papers of all time)

For more on how we can think about designs as a form of conceptual reflection, see Bill Gaver and John Bowers. 2012. Gaver and Bowers: Annotated Portfolios interactions 19, 4 (July 2012), 40-49.

Sep 12 - The 'impact' of design

Reading:

Edgerton: Significance

Edwards: From "impact" to social process

What does it mean to say that a technology design has a certain social 'impact'? How can we understand the consequences of design?

Sep 17 - Case study: High-frequency financial trading

Reading:

MacKenzie: How to make money in microseconds

What happens in the real world when you aim to make a values-driven innovation? Guest lecturer and Cornell alum Adam K. will discuss his work at a high-frequency trading firm. Adam will discuss the use of technology to increase transparency of markets and democratize participation, and

how in the financial system the regulators, marketplaces and participants each can be seen as a good (or bad) influencer for social impact.

Homework due: Design workbook check-in

Using design to persuade

One way in which we might create a positive impact is by using technology to persuade people to think or act differently, by providing new forms of information or by suggesting different ways to see what is happening around them.

Sep 19 - Persuasive computing
Reading:
Fogg, Cuellar, and Danielson:Motivating, influencing, and persuading users
Consolvo et al.: Designing for behavior change in everyday life
Froehlich et al: UbiGreen
Morozov: "Solutionism and its discontents"
Designing software and hardware to persuade people to alter their ways of thinking or their behavior, and thereby contribute to solving social problems.

Sep 24 - Review
Reviewing speculative, critical, and persuasive design and their implications

Sep 26 - Politics of artifacts
Reading:
DiSalvo: Chapter 4, Adversarial Design
Latour: "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts."
How is it that artifacts more generally 'persuade'? By what mechanisms do they encourage us to do some things and not others?

Homework due: Mini-project 2: Persuasive Computing

Oct 1 - Political information visualization
Reading:
DiSalvo: Chapter 2, Adversarial Design
How can we use information visualization to make a point?

Oct 3 - Activist Design
Reading:

Bogost: Playing Politics: Videogames for Politics, Activism, and Advocacy

Irani and Silberman: Turkopticon: interrupting worker invisibility in amazon mechanical turk

Designing technologies to fulfill activist agendas.

Homework due: Design workbook check-in For this check-in, you may select two pages from your workbook you would like to have feedback on. If you are working in a physical notebook, **please bring a xerox copy** to hand in.

Re-engineering engineering

So far we've considered social issues mostly at the level of the interface and application, but sometimes social issues arise in the details of the code. Programmers may have difficulty knowing or addressing those issues, since they aren't generally trained in values. How could/should engineering practices be altered in order to embody different values?

Oct 8 - Open source
Reading:
Benkler and Nissenbaum:"Commons-based Peer Production and Virtue."

Goldman and Gabriel: Chapter 6, How to Do Open-Source Development (follow the links at the bottom of the page for the subsections of this chapter)

Using open-source methods to expand the range of values embodied in contemporary engineering practice: why and how to.

Additional resources: Dykstra-Erickson and Cheri: "An Open Source Primer." ; Schlesinger: "Working with Open Source: a Practical Guide," ; Bach and Twidale: "Social Participation in Open Source: What It Means for Designers,"

Oct 10 - Take-home prelim
The take-home prelim will be handed out electronically on Oct 8 at 2:40pm. It will be due electronically at 2:40 pm on Oct 10. Before spring break is a busy time for many students. To provide flexibility to your schedule, an alternative take-home prelim will be available for students to take, delivered Oct 4 at 2:40pm and due Oct 6 at 2:40pm. If you wish to take

advantage of the alternative prelim, please contact the professor via e-mail by Sept. 30.

Homework due: Prelim

Oct 15

Fall Break

Oct 17 - Politics of algorithms

Reading:

Introna and Nissenbaum:"Shaping the Web: Why the Politics of Search Engines Matter."

Gillespie: Politics of platforms

How do political issues become embodied in the details of how computer programs work?

Oct 22 - Critical technical practice

Reading:

Agre: Toward a critical technical practice

How technical discourses shape what is possible to do with computing, why they resist alteratin, and how they might be shaped differently.

Homework due: Mini-project 3: Peer production

Oct 24 - Freedom and computing reconsidered

Reading:

Pfaffenberger: "Why the Personal Computer Revolution Was No Revolution"

How 'free' do computers make us? How can we weigh the dreams and hopes of freedom we associate with technology?

Homework due: Design workbook check-in

Additional resources: Turner: "Burning Man at Google"

Expanding participation in design

Until now, engineers and designers have mostly been in the driver's seat. Here we expand beyond experts in technology - how can individuals and communities be involved in design decisions that affect them? Can we use this to improve the design of technology and its impact?

Oct 29 - Participatory design

Reading:

Namioka and Rao: Intro to participatory design

Developing methods and philosophies for designing technology directly with non-technically-trained participants.

Additional resources: Brandt: Designing exploratory design games; Kyng: Designing for cooperation: cooperating in design; Foverskov and Binder: Super Dots

Oct 31 - Critical making

Reading:

Ratto: Critical making

DiSalvo et al.: Neighborhood Networks

Making objects with non-technically-trained participants to expand the audience able to critically comment on technology

Homework due: Mini-project 4: Participatory design

Nov 5 - Challenges in participatory design

Reading:

Asaro: Transforming society by transforming technology

What happens to participatory design when it is deployed in complex social worlds that sometimes resist its central message.

Homework due: Design workbook check-in

Additional resources: Dunbar-Hester: "Beyond 'Dudecore'? Challenging Gendered and 'Raced' Technologies Through Media Activism\

What you care about

In this part of the course, students will select two issues to focus on as a case studies for applying design methods and thinking through issues related to them. For example, possible issues include surveillance, development, health, or sustainability. The issues will be selected by the class early in the semester and the syllabus developed to match.

Nov 7 - Final project workshop

Homework due: Final project proposal

Nov 12 - Your choice: Materiality and infrastructure

Reading:

Dourish, P. & Mazmanian, M., (2012). "Media as material: Information Representations as Material Foundations for Organizational Practice ."Perspectives on Process Organization Studies: How Matter Matters: Objects, Artifacts and Materiality in Organization Studies. Volume 3. Eds. Paul Carlile, Davide

Nicolini, Ann Langley and Haridimos Tsoukas. Oxford University Press.

Chalmers, Matthew, and Ian MacColl. "Seamful and seamless design in ubiquitous computing."Workshop At the Crossroads: The Interaction of HCI and Systems Issues in UbiComp. 2003

Nov 14 - Materiality and infrastructure design workshop

Homework due: We will develop design workbook pages in class

Nov 19 - Your choice: Loss of traditional knowledges

Reading:

Verran, Helen, and Michael Christie. "Using/designing digital technologies of representation in aboriginal Australian knowledge practices." Human Technology: An Interdisciplinary Journal on Humans in ICT Environments 3.2 (2007): 214-227.

Nicola J. Bidwell and Heike Winschiers-Theophilus. 2012.Audio pacemaker: walking, talking indigenous knowledge. In Proceedings of the South African Institute for Computer Scientists and Information Technologists Conference (SAICSIT '12). ACM, New York, NY, USA, 149-158. DOI=10.1145/2389836.2389855

Additional resources:

- C. A. Bowers, Miguel Vasquez and Mary Roaf. Native People and the Challenge of Computers: Reservation Schools, Individualism, and Consumerism. American Indian Quarterly , Vol. 24, No. 2 (Spring, 2000), pp. 182-199.
- Elizabeth Goodman and Daniela Rosner. 2011. From garments to gardens: negotiating material relationships online and 'by hand'. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11). ACM, New York, NY, USA, 2257-2266.
- Phoebe Sengers. 2011. What I learned on Change Islands: reflections on IT and pace of life. interactions 18, 2 (March 2011), 40-48.

Nov 21 - Loss of traditional knowledges design workshop

Homework due: We will develop design workbook pages in class
Wrapping up: Final Projects
Nov 26 - Project workshop
Homework due: Submit complete design workbook
Nov 28
Thanksgiving Break
Dec 3 - Project critiques
Homework due: Oral presentation of project
Dec 5 - Project critiques
Dec 18: Final project due

Assignments

Reading

The foundation for your work in this class are the **course readings**, which contain the core course content. You are expected to have thoughtfully read the day's reading prior to coming to class. **I strongly encourage you for your own benefit to keep written notes of your reading annotated with page number**; such notes will be invaluable to you in your written work for the course. Course reading varies considerably in discipline and difficulty; be aware that reading length does not greatly correlate to expected reading time. You should bring the readings and your notes to class to ground our discussions.

Design workbook

Over the course of the semester, you will document your thoughts and ideas in response to the readings in the form of a **design workbook**. A design workbook is a method for tracking and communicating early design ideas which freely combines concepts to inspire design with rough sketches of design concepts and annotations exploring their implications. For each unit in the course, you will add pages to your design workbook in response to a specific question. On the day the question is due, you will bring your design workbook to class in order to share your ideas with your classmates; you will revise

and improve your ideas based on their response. Your design workbook will be due as an annotated portfolio at the end of the semester.

Class participation

Your **participation in class** is expected and essential to your success in the course. This is not a lecture course; the class format is interactive and activities-based. In class we will analyze, build on, and debate about the course readings; practice design skills; do preparatory work for homeworks and the final project; and engage in other activities to aid your facility in the course material. Credit for class participation in your grade is given for a combination of regular attendance and any form of evidence of engagement with the course, whether in-class or on-line.

Design mini-projects

Over the course of the semester, you will have 4 **group design mini-projects** which will help you develop facility in the design methods we are learning about in the course. For example, you may design a design activity, try it out in class on your classmates, and then document the results.

Value case studies

Twice during the course of the semester, you will post a 500-word **value case study** to our course site on piazza. Your value case study will be based on a recent newspaper or magazine article about the technology of your choice. Your write-up will analyze one or more values you believe the technology to embody—or to unintentionally fail to embody. Your write-up will be in the style of an editorial with a strong point of view and a compelling argument.

At least twice a semester, you will post at least one **comment** on another student's value case study, within 5 days of the original posting. Comments may be brief (3-5 sentences). Of course, if the spirit moves you at any time you

may make longer or more comments. Comments are graded on a pass/fail basis; you will get full credit for any comment that shows engagement with another student's thoughts.

Prelim

There will be a take-home prelim for the course. You will have 24 hours to write a 5-page essay in response to a set question. Your essay will be well-grounded in the readings for the course. The careful notes you took on the reading will pay off here.

Final project

The final project will be a critical design exploration of any topic or issue of interest to you. It will consist of at least two of the following three components:

1. An essay exploring the background of the issue, based on evidence and ideas from independent library research.
2. A design workbook which springboards from this essay to explore possible design approaches to the issue. This workbook will be a more in-depth exploration than is possible in the shorter responses to the readings over the course of the semester.
3. One or more prototypes of a design from your workbook. This may be a "paper prototype" that serves to illustrate the design details in more depth, or a functional prototype (e.g., in software) in which the design can be tried out.

You will select the relative weight of each of these elements for your projects, allowing you to concentrate on the parts that best reflect your skills and interests. The final project may be executed individually or in groups of 2-3.

Grade breakdown

- 5% Class participation
- 20%: Design workbook
- 10%: Value case studies and comments

- 20%: Design mini-projects
- 15%: Prelim
- 30%: Final project

Grading is not just a matter of numbers, but also of judgment. The instructor reserves the right to adjust grades by up to half a letter grade based on knowledge of your performance not summed up in this tidy formula.

Academic Integrity

My expectation is that you are generally aware of the need for academic integrity and self-motivated to achieve it. Issues with academic integrity that have come up in my courses in the past have been almost exclusively due to students being unaware of the specific requirements of academic integrity at Cornell, rather than students trying to "game the system" for their own advantage. Some examples of situations I have encountered include:

- Not knowing how to properly cite or use non-academic on-line sources, informal sources such as another student's comments in class, or another person's ideas (as opposed to their words)
- Not being aware when doing literature reviews that close paraphrasing of someone else's text is considered a form of plagiarism
- Coming from cultural or disciplinary contexts where it is considered more appropriate to use an expert's words to express an idea rather than one's own

I am required by the university to prosecute for such violations; doing so is particularly sad because they could have been avoided with a bit of pro-active education. I would therefore strongly encourage you to take Cornell's (brief) on-line tutorial on how to avoid unintentional plagiarism if you have not done so already. I particularly encourage this for students whose prior primary education was at a non-US institution as well as students who come from a substantially different disciplinary orientation than the sciences, social

sciences, and humanities (e.g. art, journalism, law). You are responsible for understanding what constitutes academic integrity violations in Arts and Sciences at Cornell. Please contact me if you have any questions about how to achieve academic integrity in the context of this class (e.g., proper use of citations).

Textbook

The course uses the following book, which you will need to purchase:

DiSalvo, Carl. *Adversarial Design*. Cambridge, MA: MIT Press, 2012.

I encourage you to order it on-line if it is not available at the book store.

The rest of the course readings are available on-line or will be handed out in class. **To access many of these readings through the links, you will need to be on the Cornell network, or logged in to the Cornell library through a proxy using your NetID**. If you have trouble with the links, look up the eJournal through the Cornell library site and search for the specific issue.

Bibliography of course readings

Agre, Philip E. "Toward a Critical Technical Practice: Lessons Learned in Trying to Reform Ai." In *Social Science, Technical Systems, and Cooperative Work: Beyond the Great Divide*, edited by Geoffrey Bowker, Susan Leigh Star, William Turner and Les Gasser, 131-57. Mahwah N.J.: Lawrence Erlbaum Associates, 1997.

Aipperspach, Ryan, Ben Hooker, and Allison Woodruff. "The Heterogeneous Home." 2007.

Asaro, Peter M. "Transforming Society by Transforming Technology: The Science and Politics of Participatory

Design."*Accounting, Management and Information Technologies* 10, no. 4 (2000): 257-90.

Bach, Paula M., and Michael Twidale. "Social Participation in Open Source: What It Means for Designers." *interactions* 17, no. 3 (2010): 70-74.

Bardini, Thierry, and August T. Horvath. "The Social Construction of the Personal Computer User." *Journal of Communication* 45, no. 3 (1995): 40-66.

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Bogost, Ian. "Playing Politics: Videogames for Politics, Activism, and Advocacy." *First Monday* Special Issue, no. 7 (2006).

Brandt, Eva. "Designing Exploratory Design Games: A Framework for Participation in Participatory Design?" Proceedings of the Ninth Conference on Participatory Design: Expanding Boundaries in Design - Volume 1, 2006.

Çetin, Görkem, and Mehmet Göktürk. "Usability in Open Source: Community." *interactions* 14, no. 6 (2007): 38-40.

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DiSalvo, Carl, Illah Nourbakhsh, David Holstius, Ayça Akin, and Marti Louw. "The Neighborhood Networks Project: A Case Study of Critical Engagement and Creative Expression through Participatory Design." Proceedings of the Tenth Anniversary Conference on Participatory Design, 2008.

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Dykstra-Erickson, Elizabeth, and Yann Cheri. "An Open Source Primer." *interactions* 14, no. 6 (2007): 30-32.

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Fogg, B. J., Gregory Cuellar, and David Danielson. "Motivating, Influencing, and Persuading Users." In *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications*, edited by Julie A. Jacko and Andrew Sears, 133-47. Mahwah, N.J.: Lawrence Erlbaum Associates, 2003.

Foverskov, Maria, and Thomas Binder. "Super Dots: Making Social Media Tangible for Senior Citizens." Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces, 2011.

Froehlich, Jon, Tawanna Dillahunt, Predrag Klasnja, Jennifer Mankoff, Sunny Consolvo, Beverly Harrison, and James A. Landay. "Ubigreen: Investigating a Mobile Tool for Tracking and Supporting Green Transportation Habits." Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2009.

Gaver, Bill, and John Bowers. "Annotated Portfolios." interactions 19, no. 4 (2012): 40-49.

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Hustwit, Gary. "Objectified." 2009.

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Morozov, Evgeny. "Solutionism and Its Discontents." In *To Save Everything, Click Here: The Folly of Technological Solutionism*, 1-16. New York: PublicAffairs, 2013.

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Sampson, Fred. "Who Said "Usability Is Free"?" *interactions* 14, no. 4 (2007): 10-1.

Schlesinger, David. "Working with Open Source: A Practical Guide." *interactions* 14, no. 6 (2007): 35-37.

Turner, Fred. "Burning Man at Google: A Cultural Infrastructure for New Media Production." *New Media & Society* 11, no. 1-2 (2009): 73-94.