

The Wharton School, University of Pennsylvania
Department of Management
Office Hours: Tues, Thurs 3:30-4:30pm
or by appointment

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MANAGEMENT 743
Work and Technology: Choices and Outcomes
Fall 2022 Syllabus
Q2: Tuesday, October 25 – Thursday, December 8 - 12:00-1:30pm
(version 1.0 – August 26, 2022)

Purpose and Course Description

That technology affects work is a commonplace - but we accept technology's impact too readily as inevitable and unchangeable. This 0.5 CU course challenges the mindset of technological determinism and explores what choice points are available to managers implementing new technologies as well as the engineers who design them.

- Module 1: “Technology and Its Impact on Jobs and Skills” considers which technologies deserve the characterization of “revolutionary” due to their capacity to change entire organizations – and even societies — vs. those that only substitute narrowly for past technologies. We’ll examine past anxieties related to automation and evaluate the extent to which the “worst-case” scenarios about employment loss have or have not come to pass – and evaluate claims of “this time it’s different”.
- Module 2: “Intelligent Technologies: How Will They Affect Work and Organizations?” explores how Artificial Intelligence (AI) is changing core “managing people” activities (e.g., hiring and performance appraisal) – plus shifting the locus of management away from human bosses and into algorithms. We’ll examine controversies around “gig work”, i.e., the positives of worker schedule flexibility vs. the negatives of algorithmic control. We’ll also consider the metaverse and its potential for unleashing human creativity and fostering richer and more nuanced virtual communication - as well as providing organizations with new ways to monitor and control.
- Module 3: “Technology and Policy” examines three policy issues. First, how can we inject more ethical criteria into the development of artificial intelligence and algorithms affecting work? Second, what are the pros and cons of “universal basic income”, whose premise is that technological change will soon lead to an unprecedented amount of job elimination? Third, how does “technology make us dumber”? How can we avoid the obsolescence of critical human skills?

Take this course to be ready to manage the strategic and analytic issues involving the design and implementation of technology at work - and for a preview of your own future work life. Requirements include: class participation; in-class quizzes; interviewing someone you know to ask how technology has affected their work life; and the “In Hindsight” group assignment looking back on past scares about a particular technology’s impact on work - and what actually happened.

The topics of this course are highly complementary to topics in Wharton electives in OIDD, Management, and Legal Studies. I hope to attract both students interested in organizational/HR topics who want to know more about technology and operations strategies as well as those primarily studying technology and operations who want to understand more about work and employment practices, and the impact on economic and social outcomes for individuals, firms, and societies.

Prerequisites: For Wharton students, it is advantageous but not required to have taken the core MGMT 611 or 612 class, which will be helpful in understanding how organizations function in their environment and the context within which firms make strategic decisions. **The course is open to non-Wharton students.** Please email me at macduffie@wharton.upenn.edu to let me know why you are interested in taking the course.

Course Requirements

Students will be evaluated on class participation (30%), a group assignment (20%), an individual paper (30%) and in-class quizzes (20%)

- **The group assignment is due, on Canvas, at 11:59pm on Sunday November 13th.**
- **The individual paper is due, on Canvas, at 11:59pm on Wednesday November 30th.**
- **Quizzes (5) are distributed across the course (dates below).**

Class Participation (30% of your grade)

This course requires a great deal of student involvement. Regular, on-time attendance is the foundation of a strong participation grade. Each class period will include discussion of the topics and issues at hand, both in full (plenary) sessions and in small group breakouts. Students will be graded on the quality of their comments in class, defined as adding substantively to class discussions and linking effectively to others' comments in the class. (Quantity is also measured but quality is weighted more heavily.) Contributions to discussion can take multiple forms, e.g., speaking up in class after raising one's hand, responding to a "cold" or "warm" call, or linking to another student's comment to move the discussion constructively forward. Polls and in-class exercises also count towards participation. I may also set up some discussion boards on Canvas to continue certain conversations from class; posting your contributions there will count as participation based on the same relative weighting of quality over quantity. Finally, meeting with me once during the semester, online, is required (see below). Across all types, participation constitutes 30% of your grade.

Speaking up in a large group of people, either in-person or online, can be daunting but it is an important skill to learn. So is listening carefully to others while also planning what one wants to say. We can all improve our ability to make meaningful contributions via better listening and getting better at deciding when and how to speak. If you have concerns about your level of participation, please speak to me as early in the course as possible. That will give us time to figure out ways to help you participate more fully – and potentially in more different ways.

Group Assignment (20% of your grade)

In Hindsight is a small-group assignment in which **you research a past (i.e., not brand-new and/or not yet – or barely - implemented) technology**, report on the hopes and fears accompanying its introduction into the workplace or the economy more generally, and assess

(with the benefit of 20/20 vision looking back) the extent to which those hopes and fears were borne out – and, in addition, what unanticipated surprises occurred, for better or worse. You will be assigned randomly to groups with 2-3 members.

Your report will take the form of a PechaKucha – a format developed to encourage new ways of sharing content and stimulating conversation. PechaKucha's 20x20 presentation format consists of 20 chosen images, each shown for 20 seconds. In other words, you've got 400 seconds (6 minutes and 40 seconds) to tell your story, with visuals guiding the way. (PechaKucha means "chit chat" in Japanese.) **I must approve your choice of technology, via email.** Your PechaKucha can be put together quite simply; think of a PowerPoint presentation with timed slide advances and pre-recorded voice-over narration. Ample online resources are available; I will steer you to them. **The PechaKucha is due at 11:59pm on Sunday November 13th, posted on Canvas.**

Individual Paper (30% of your grade)

You will write an individual paper linked to the first two modules. For this paper, you will interview a relative, friend, or other person that you encounter frequently in your life at Penn, asking about a job that person has had (current or past) which has been significantly affected by technology of some kind (old or new; mechanical or digital; hardware or software; in the workplace or when working remotely). I will provide you with a general interview protocol, tips on how to select an interview subject, and training on how to approach the interview, which should last no less than 30 minutes and no more than 60 minutes. I will also provide guidance on how to structure the paper in which you write up what you learn during this interview. For a top score, you will draw upon the topics, themes, and concepts of the first two course modules in writing up your observations and reflections. **This paper is due at 11:59pm on Wednesday November 30th, posted on Canvas.**

In-class Quizzes – (20% of your grade)

In multiple classes, you will take an in-class quiz on Canvas to assess your absorption and comprehension of the materials assigned for that day (readings, videos, lecture slides). The quizzes will be short (10 minutes at the end of class) and consist entirely of multiple-choice questions; each short quiz will constitute 4% of your final grade for a total of 20%. **Quizzes will be given in classes 2, 4, 6, 7, and 8.** Scores will be posted on Canvas.

Required Readings and Media

Readings include excerpts of articles from professional and academic journals, long-form journalism, short newspaper or web articles, and chapters from books. In addition, video segments (short or portions of longer videos) are assigned for some class sessions.

We will use Canvas for courseware support. The syllabus, course slides, detailed assignment descriptions, and class session recordings will be posted there. Many of the short articles and videos in the syllabus will be accessed directly from links provided within Canvas, at the Files tab in the Course Materials folder. Readings covered by copyright will be made available via one

of two sources. Those accessible for free via Penn Course Reserve, due to the library's subscriptions, are available on a separate Canvas tab. Those that must be purchased are available via Study.Net, on a different Canvas tab. In the syllabus, readings are coded by source, e.g. (F) for the Files tab, (L) for the Penn Library tab, and (S) for the Study.Net tab.

You will turn in assignments (individual and team) by uploading your papers to Canvas, and I will return grades and comments to you electronically. Teams will be created randomly; you will find your team assignment on Canvas at the "People" tab. Finally, I will post relevant articles or web links that come to my attention during the course, on Canvas discussion boards, and I encourage you to do the same.

Academic Integrity

Please read and familiarize yourself with Penn's Code of Student Conduct and Code of Academic Integrity: <https://catalog.upenn.edu/pennbook/>. Regarding academic dishonesty, please note that plagiarism is not limited to copying an entire paper. Using quotes without properly citing them or using ideas without acknowledging their source also constitute plagiarism. Any form of cheating or plagiarism will result in disciplinary action.

Student Disabilities Services and Accommodations for Students with Disabilities

The University of Pennsylvania provides reasonable accommodations to students with disabilities who have self-identified and been approved by the office of Student Disabilities Services (SDS): <https://www.vpul.upenn.edu/lrc/sds/>. Please make an appointment to meet with me as soon as possible in order to discuss your needs and accommodations. If you would like to request accommodations or have questions, you can make an appointment by calling (215) 573-9235. The office is located in the Weingarten Learning Resources Center at Stouffer Commons 3702 Spruce Street, Suite 300. All services are confidential.

Other Accommodations

Student athletes, parents and caregivers, and others whose commitments might affect their ability to attend class or complete assignments on time should also speak with me at the beginning of the semester about potential conflicts. You should also speak with me as soon as possible if religious holidays that occur during the semester will require you to miss class. If you unexpectedly experience a life event that presents you with academic difficulties, I can refer you to CaseNet to ensure that you get the support you need: <https://www.college.upenn.edu/casenet>.

Academic Resources

Penn students are extremely fortunate to have access to an extensive network of academic resources. A majority of Penn students take advantage of one or more of these resources during their college careers, and I strongly encourage you to do so as well. The Office of Learning Resources provides professional consultation services in university relevant skills such as academic reading, writing, study strategies, and time management. PENNCAP supports the

success of a diverse group of academically-talented students, many from low-income and first-generation backgrounds. The Tutoring Center offers Penn undergraduate students free, accessible, and convenient options to supplement their academic experience. For more information, visit <https://www.upenn.edu/programs/acadsupport>.

Additional Writing Resources

The Marks Family Writing Center operates under the assumption that all writers, regardless of their experience and abilities, benefit from informed, individualized, and personal feedback on their writing. The program's professional staff and trained peer specialists work with writers engaged in any stage of the writing process—from brainstorming paper topics, to formulating and organizing arguments, to developing editing skills. Appointments and drop-in hours are available. For more information, visit <http://writing.upenn.edu/critical/wc/>. (You will find navigation options when you mouse over “Marks Family Writing Center” on the menu bar.)

Well-Being, Stress Management, & Mental Health

If you (or someone you know) are experiencing personal, academic, or relationship problems and would like someone to talk to, reach out to Counseling and Psychological Services (CAPS) on campus. For more information about CAPS services, visit:

<https://www.vpul.upenn.edu/caps/about.php>.

MANAGEMENT 743: WORK AND TECHNOLOGY
FALL 2022
COURSE OUTLINE

Tuesday, October 25

Session 1: Introduction

How should we gauge the scale of impact of a new technology on work? Distinguishing *infrastructural* and *substitutive* technological change. The power of ideas: Taylorism, then and now. Policy dilemmas spurred by new technologies. Course design, assignments, participation.

Readings and Media:

1. Stephen Barley, “What Is a Technological Revolution?” from *Work and Technological Change* 2020, pp. 1-16. (L)
2. [“Digital Taylorism,”](#) *The Economist*, Sept 10, 2015. (L)
3. Davide Castelvecchi, [“Is facial recognition too biased to be let loose?”](#) *Nature*, 2020. (L)

MODULE 1: Technology and Its Impact on Jobs and Skills

Thursday, October 27

Quiz #1

Session 2: What Types of Technology Are We Considering? Why Fear Their Impact?

New technologies at work are often accompanied by both hopes and fears. Is the latest wave of automation and ubiquitous computing going to free individuals to be more creative at work and able to experience new and more fulfilling jobs? Or will these technologies make work worse – more routinized, less autonomous, less creative – whenever they aren’t actually putting people out of work by eliminating jobs? What expected outcomes of new technologies tend to happen? What unexpected outcomes occur? How can we assess their relative magnitude and impact?

TECH VIGNETTE: The Luddites

1. [Almanac: The Luddites](#), March 11, 2010, CBS News [1:30] (L)
2. [“When Robots Take All of Our Jobs, Remember the Luddites,”](#) Clive Thompson, *Smithsonian Magazine*, January 2017. (L)

Was the Luddites’ fight idiotic, ill-informed, ill-advised? Sensible and/or comprehensible? Would you have sided with them or against them? Have you observed or sensed Luddite-like thoughts or actions “closer to home” in time and space? How can past examples of technological innovations and their impact on jobs and skills guide our forecasts for present and future technologies? How does technology’s impact compare with other forces affecting employment?

Readings and Media:

1. Erica Groshen, John Paul MacDuffie, Susan Helper, “Labor market impacts from past innovations” and “Implications of past changes” from *Preparing U.S. Workers and Employers for an Autonomous Vehicle Future*, 2018, pp. 13-25. (F)
2. Robert Gordon, [“The death of innovation, the end of growth”](#), TED talk, [6:00-12:00] (F)

Tuesday, November 1

Session 3: When – and How – Do New Technologies Change Organizations? (SQ#1)

What makes the latest wave of technologies similar to or different from major technological breakthroughs of earlier eras? How best to assess whether a new technology will simply change how a task or job is accomplished – or when it will spur wide-ranging and long-lasting changes across entire organizations? What can we learn from past workplace automation scares?

Readings and Media:

1. Stephen Barley, “How Do Technologies Change Organizations?” from *Work and Technological Change* 2020, pp. 25-36. (L)
2. [“Robots have been about to take all the jobs for more than 200 years.”](#) Timeline.com, May 16, 2016. (L)
3. [“Why Are There Still So Many Jobs? The History and Future of Workplace Automation and Anxiety.”](#) David Autor, MIT Initiative on the Digital Economy, May 2017. (F)

Thursday, November 3 Quiz #2

Session 4: Technology, Skills, and Wages - Skill-Biased vs. Task-Biased Perspectives

A dominant hypothesis in recent decades on the different rates of earnings increase for individuals doing different types of work is skill-biased technological change (SBTC), i.e. that jobs affected by automation that can replace low-skilled workers are fewer in number and lower paid whereas jobs affected by automation that complements higher-skilled workers have grown in number and are higher paid. A competing hypothesis is “task-biased technological change” (TBTC) that shifts the focus to jobs and the skills that they demand. Jobs bundle tasks together and can have varied designs based on different combinations of tasks. Automation rarely affects an entire job, rather it affects tasks within jobs; it may completely replace humans for some tasks while only partially affecting other tasks, requiring a continued, complementary human role. Proponents of TBTC argue that it captures the actual process of automation more accurately than SBTC – plus it highlights choice points for engineers and managers in where and how to automate tasks within the context of a job that combines human and automated inputs.

TECH VIGNETTE: Trucking: Driverless, Automated, etc.

- Why is the automation of this one particular job—the truck driver—so momentous?
- Is the phenomenon of the automation of truck driving an example of skill-biased or task-biased technological change?
- How has technological change influenced difficult-to-automate parts of truck driving?

Readings and Media:

1. [“The Future of Work Looks Like a UPS Truck.”](#) Planet Money, May 2, 2014. [13:54] (F)
2. “The Work of the Future: Shaping Technology and Institutions.” [David Autor talk at UBS Center](#), December 2, 2019 [0:45-19:00] (F)
3. David Autor, Frank Levy, and Richard J. Murnane. “Upstairs, Downstairs: Computers and Skills on Two Floors of a Large Bank.” 2002. *Industrial and Labor Relations Review* 55(3): 432-447. (L)

Tuesday, November 8

Session 5: Comparing Scenarios of How Robots Will Affect Jobs and Skills: Past to Future

Depending on their scope of analysis, assumptions and methods, different analysts can draw dramatically different conclusions about how a given technology will affect jobs and skills. We do a deep dive into robots to illuminate these different scenarios and critically evaluate them, drawing on perspectives from this entire module. Of particular interest: sector-wide economic impact of robots for adopters and non-adopters; AI-enabled robots making progress at difficult-to-automate tasks like grasping objects of different sizes; and “cobots” (collaborative robots) that “share” jobs with humans via each doing tasks that fit their capabilities well.

Readings and Media:

1. [Talk by Martin Ford](#), author of “Rise of the Robots: Technology and the Threat of a Jobless Future” [17:52], October 27, 2015. (F)
2. Lynn Wu, [“The Robots Are Coming: Is Your Firm Ready?”](#), Knowledge@Wharton, June 2021. (F)
3. Will Knight, [“This Is How the Robot Uprising Finally Begins.”](#) *MIT Technology Review* 121 (4): 15. (L)
4. Peggy Hollinger, [“Meet the cobots: humans and robots together on the factory floor.”](#) *Financial Times*, May 5, 2016. (L)

MODULE 2: Intelligent Technologies: How Will They Affect Work and Organizations?

Thursday, November 10 Quiz #3

Session 6: “This Time It’s Different”: What Distinguishes Artificial Intelligence (AI) and Machine Learning (ML) from Past Technologies?

Benedict Evans: “Machine learning lets us find patterns or structures in data that are implicit and probabilistic (hence ‘inferred’) rather than explicit, that previously only people and not computers could find. They address a class of questions that were previously ‘hard for computers and easy for people’, or, perhaps more usefully, ‘hard for people to describe to computers’. [We don’t] yet have a settled sense of quite what machine learning means ... for tech companies or the broader economy, how to think structurally about what new things it could enable, what it means for the rest of us, and what important problems it might actually be able to solve.”

TECH VIGNETTE: Wordsmith: [“explainer”](#); [real estate](#); [news stories](#); [website](#) (F)

Based on what this technology does well, do you expect professional jobs will disappear, or do you expect they will evolve? If you think some jobs may disappear, consider which jobs are most threatened. If you expect them to evolve, consider precisely in what ways they might do so.

Readings and Media:

1. [“Ways to Think about Machine Learning.”](#) Benedict Evans, 2018. (F)
2. Cathy O’Neil, “Bomb Parts,” from *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, 2016, pp. 1-13. (S)
3. Stephen Barley, “Current Thinking on Intelligent Technology, Work, and Employment,” from *Work and Technological Change*, 2020, pp. 69-79. (L)

**** Group Assignment (PechaKucha) Due
at 11:59pm on Sunday November 13th posted on Canvas ****

Tuesday, November 15 Quiz #4

Session 7: Gig Economy and Algorithmic Management

How modern labor contracting modes are evolving in relation to changes in corporate governance. Resemblance between the new modes and pre-industrial arrangements, e.g. the “putting-out” system of piecework at home. How trends towards “flexible labor” intersect with digital platforms to yield the “gig economy”. What are the varied motivations of “gig economy” workers? How much is choice and how much is necessity? Why does that matter?

TECH VIGNETTE: [Task Rabbit](#) (F)

- Under what circumstances would you choose to become a Tasker?
- Suppose one could develop a great reputation as a Tasker, enough so to reliably earn enough to eat, pay rent, etc. How would this bundle of tasks—performing dozens of different duties for different customers each week—differ from a conventional job?

Readings and Media:

1. Aurelien Acquier, [“Uberization meets Organizational Theory: Platform capitalism and the rebirth of the putting-out system.”](#) in *Cambridge Handbook on Law and Regulation of the Sharing Economy*, 2018, (excerpt), sections 1 and 2, pp. 5-12) (L)
2. Lindsey Cameron, “‘Making Out’ While Driving: Relational and Efficiency Games in the Gig Economy,” (excerpt), forthcoming in *Organization Science*, pp. 2-4, 10-15, 17-35. (F)

Thursday, November 17 Quiz #5

Session 8: The Metaverse – Game-Changer at Work or Just Playing Games?

While there is no agreed-upon definition, we can view the metaverse as a “system of systems” combining digital and physical worlds in new ways. While the metaverse has the potential to transform personal pursuits, e.g., gaming, shopping, and adventure travel, it can also change workplaces in powerful ways by enhancing the virtual worklife that many of us have lived in recent years. Proponents of the metaverse say we will be freed from the constraints of physical location while still be able to experience human presence in all of its richness, via avatars that are emotionally expressive, physically communicative, and capable of playful creativity. Skeptics see the potential for new methods of monitoring and control, i.e. further extensions of digital Taylorism. We consider what’s available now and what it portends for the future.

Readings and Media:

1. [The Guardian, "Can virtual meeting spaces save us all from Zoom fatigue?", 5/8/21 \(L\)](#)
2. [“Inside Facebook’s Metaverse for Work.” The Verge. 08/19/21. \(L\)](#)
3. [“Mesh for Microsoft Teams aims to make collaboration in the ‘metaverse’ personal and fun.” Microsoft. 11/02/21. \(L\)](#)
4. [WSJ, "Why the Metaverse will Change the Way you Work." 2/7/22 \(L\)](#)

Tuesday, November 29

Session 9: Dilemmas of “Work from Home” -- Performance Appraisal, Onboarding, Feeling Connected with Teammates – and Opportunities of “Work from Anywhere”

While the world has discovered how many knowledge tasks can be undertaken and completed via technology-mediation during “work from home” (including virtual classes!), certain core experiences of being an employee are challenging to re-create without the opportunity for face-to-face social interaction and one-on-one communication. We will consider how to “onboard” new employees in a Zoom world – and how to tackle performance appraisal (a complex process under the best of in-person circumstances) when you can’t directly observe an employee’s work process and have to communicate a nuanced mix of praise and constructive criticism virtually. We will also consider the dilemma of how to keep team members feeling connected with each other – and the problem of loneliness. Finally, we flip to look at the opportunities of virtual work, not just from home but from “anywhere”, i.e. the freedom to live and work where you like.

Readings and Media:

1. Julie Wood, [“How to Manage Performance Appraisals in the Work-from-Home Era,”](#) New York Times, December 21, 2020 (L)
2. Karen J. Bannen, [“6 Things That Worry New Employees About Virtual Onboarding,”](#) SHRM.org, June 2020. (L)
3. Constance N. Hadley and Mark Mortensen, [“Are Your Team Members Lonely?”](#) *Sloan Management Review*, December 2020. (L)
4. Pritharaj Cloudhury, “Our Work-from-Anywhere Future,” *Harvard Business Review*, November-December 2020. (S)

***** Individual Paper Due at 11:59pm
on Wednesday November 30th, posted on Canvas *****

MODULE 3: Technology and Policy

Thursday, December 1

Session 10: Ethics of Algorithms and Artificial Intelligence

TECH VIGNETTE: Amazon Prime’s Free Same-Day Delivery (L)

<https://www.bloomberg.com/graphics/2016-amazon-same-day/>

When an application of AI has unintended positive or negative consequences for different groups of people, constituting *de facto* bias or discrimination, who has the responsibility to identify, evaluate, and address (e.g., via more transparency or changes in the algorithm/AI code) those consequences? Consider Amazon’s roll-out of its Same-Day-Prime-Delivery service.

Readings and Materials:

1. Video: “Automating Inequality,” Interview with Virginia Eubanks, author of *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. PBS’s *The Open Mind*. Originally aired January 16, 2018. [20:25] (L)

2. Karen Hao, “This Is How AI Bias Really Happens—and Why It’s So Hard to Fix.” *MIT Technology Review*, February 4, 2019. (L)
3. Matthew Hutson, “Who Should Stop Unethical A.I.?” *New Yorker*, February 16, 2021. (L)

Tuesday, December 6

Session 11: Technology-Driven Inequality and Universal Basic Income (UBI)

The idea that technological change can drive mass unemployment and require governments to subsidize basic living expenses for many of its citizens is not new, arising in each era when automation scares arise. Proponents of such policies also see benefits in unlocking human creative potential when the necessities of life are met and people can pursue fuller self-development when freed from having to do demotivating, low-skill, low-pay work. We will work during class to generate “pro” and “con” presentations on UBI in real time that will then be presented. You will be assigned to “pro” and “con” positions randomly, after arriving in class.

Readings and Medi

1. Nathan Heller, [“Who Really Stands to Win from Universal Basic Income?”](#) *The New Yorker*, July 9 & 16, 2018. (L)
2. Excerpts from books and articles by: Annie Lowrey, Andy Stern, Charles Murray, Philippe Van Parijs and Yannick Venderborghts, Chris Hughes, Rutger Bregman (L)

Thursday, December 8

Session 12: When Technology Makes Us Worse – How We Can Make Technology Better

Technology, when partially displacing human labor, can sometimes create the conditions under which the human skills that are still needed to complement the technology are worsening over time. How should we deal with situations where technology makes us worse? Our tech vignette concerns the automation for flying airplanes, known as “fly by wire”. Nicholas Carr develops a full thesis of how “automation makes us dumb” across a wide array of technological examples.

TECH VIGNETTE: Fly-by-Wire on [AirBus 330](#) vs. problems with [Boeing 737 Max](#)

1. How is flight safety *enhanced* by this form of automation? In what ways does fly-by-wire *hinder* flight safety? Compare the first video, describing the “fly-by-wire” system for Airbus and the second video, probing the problems with Boeing 737 MAX.
2. An hour and a half into your trans-Atlantic flight, the flight attendant comes on the loudspeaker with bad news. S/he can either announce 1.) “The fly-by-wire system is completely down and will be for the remainder of the flight.” or 2.) “Both the pilot and the co-pilot are unconscious and will be for the remainder of the flight.” As a passenger who enjoys living, which would you prefer?

Readings and Media:

1. Nicholas Carr, [“Automation Makes Us Dumb.”](#) *Wall Street Journal*, Nov 21, 2014. (L)
2. Nicholas Carr, [“Why Robots Will Always Need Us.”](#) *New York Times*, May 20, 2015. (L)
3. Madeline Clare Elish, “Moral Crumple Zones: Cautionary Tales in Human-Robot Interaction,” *Engaging Science, Technology, and Society* 5, 2019, pp. 40-42; 46-52. (L)