Alright, we're recording. Okay, I'm gonna go ahead and share my slides with you now. Go.  
  
Okay, cool. I'll just give it another couple seconds to make sure we've got everybody who was already waiting for me to start the class. And just as a reminder, or if you weren't here last time for our first live session. If you have a question or if there's something that's unclear at all while I'm going through that material to options available to you, you can either go ahead and write it in the chat and I will see it and answer your questions as soon as it's feasible. Or you can use the raised hand function in zoom. And then I will see your name pop up and I will call on you to unmute yourself and ask your question out loud. Please keep yourself muted. If you're not asking me questions that we avoid. Background noise and stuff makes it a little easier for everyone. But you should all be able to mute and unmute yourselves as necessary when you need to. Control is on the bottom left, your zoom screen. Okay, I think we should go ahead and get started. Before we get to the material. I wanted to I know there were a couple of folks here from Monday's class and they may be here now as well, who were not officially enrolled in the course yet because they were waiting they were on the waitlist and they were waiting to be added. I have communicated to my department chair that the court should be expanded to allow anyone who was waitlisted on Monday to join the class? I checked right before the course started today. And it looked like that cap had been officially expanded, but the people who were on the waitlist had not been moved into the course gets. So it's said that there were 66 spots available, but still six people on the waiting list. Okay.  
  
All right. So that's great. Okay, so hopefully people who are waitlisted are in the class officially. Now. If you've not already been added to the Moodle page, that should happen within a day or two. Sometimes there's a bit of a lag between being registered on my Concordia and being added to model.  
  
The first reading. First reading was very long and we're going to talk about that. Yeah, it's cubic. I would say give me a day or so. And if you still haven't been moved in, get in touch with me and I'll see what's going on. But from what I saw today, it looked like the cat had been changed and there were maybe in the process of shifting people in. Yes, I agree.  
  
The first reading was long and very hard to understand. As I said during the last class, this is the most complex reading that we're going to have for the entire course. And I apologize for making it the second one that was assigned and the first sort of major one that we're going to be talking about. So please do not despair if you really struggled with the reading for this week. I know that it was really hard, which is why I tried to give you a bit of a warning last time. Be aware that not all of the readings are going to be like that. I promised most of them are much simpler. They are all at least a bit simpler. And we are going to spend almost all of the class today talking through the reading in a in a fair amount of detail. Right. So because the reading was so difficult and because it's not only difficult, but also really foundational to a lot of concepts that we're gonna be talking about later on throughout this course. We are going to spend almost all of today's class really breaking down this particular texts in detail. Now normally I will not go into this level of detail during the lectures about an article that has been assigned for you to read. I will always give you the highlights and the main important points from our reading. I will not usually spend the whole class just kinda breaking the thing down. That is what we're going to do today. Again, because of the uniqueness of this particular texts and because of its importance as a thing that we're gonna kinda be building on for the rest of the course. So the majority of today's class, like I just said, is going to be the first bullet point on here. We're going to work through the paper. We're gonna go through section by section and we're going to make sure we understand what Paul nightingale is trying to tell us in his piece, what he's trying to accomplish here, what arguments he's trying to make and how he's trying to make them. So that's going to be the vast majority of this class is just making sure that we all understand the main things that main Gil is saying in this piece. I will then, after we've done that, I will introduce you to the first mini assignments that you're gonna be doing within the next couple of days. I will also give you an introduction to the reflection essays, which is not something that you need to worry about right this minute. Your first essay is due at the end of next week, so not this Friday, but next Friday. The 15th is when your first essay is going to be. Do I have posted on Moodle some guidelines and the rubric that will be used to grade your reflection essays. So please go ahead and look at that after class we will talk through not the whole rubric in detail, but I'll talk through my sort of expectations for the assignment near the end of class today. And I will close as always with some hints or the readings for our next class next Monday. So this is the plan for today before we start. Yeah, then you have a question. Just like the outline is the reflection essay. It's due says it's due on Thursday. It says Friday the 28th, but the 20th as the first. But there's an oath was Friday or Thursday that you wanted that to be o, It shouldn't be frightened. And I think that's the second essay. So I think the fiscal 15th and the second one, that was my mistake. It should be frightened to 29. I will fix that. So I just want to clarify. Thanks. Let me make a note of that. Okay. I have updated the Moodle page. It's not it doesn't have completely everything on it yet, but I do have the vast majority of the readings for the whole semester are posted. Definitely everything for the next couple of weeks in terms of readings, that's all up there. Now I have put up the deadlines for the reflection essays. Although that essay number two might also be wrong on Moodle, I will check that and see if that's the case. I have not posted all the mini assignments, but I've put up the one for today's class. Those I will probably just put up sort of day by day, but I'll always have them up before the class starts. And I'll talk more when we get to the mini assignment for today, I'll talk more through my kind of general policies around these. Many assignments overall and how they will work. Generally speaking, any other general questions about the course or the policies or course registration or other kinds of things like that that are unclear that might be useful for everyone in the class to hear. I'm sorry, could I could I come back on what assignment one? The mini assignment one. Yeah. So these are the this is I have not explained that yet. I'm this is just the outline of what we're doing today. I'm just saying that we're going to work through the paper first and then I will introduce the first mini assignment to you. When we get to that point, I will explain exactly what I want you to do. But basically I have posted a discussion forum in this sort of section of the Moodle that's about today's course in particular. And that's where you will put in your responses to the Minnesota. But I'll explain what I want you to do when we get to that point in that class. Any other general questions? No.  
  
No. Okay. Well, I think we're going to dive in, men and like I said, feel free to ask questions if you have something that's unclear about the material. If you want to ask them out loud, please use the raise hand thing and waits for me to call on you, but I will do that as soon as I can. Okay, so this paper pollinating L If the pivot called What Is technology? Six definitions and to pathologies. And yes, I know that it was quite long and I know that it was probably quite confusing for you to get through. That's why we're going to discuss it during the class in the way that we are. So just as I kind of demonstrated at the end of Monday's session before we got to talking about what is actual argument is, I want us to understand a little bit of the context of this scheme. In this case in particular, I think knowing a little about the context of it helps to make his argumentation slightly clearer and it gives us a better idea of why he's decided to approach this in the way that he has. So I'm going to briefly go through these kind of contextual questions, who, what, when, and where, before we get into talking about what he's actually telling us, who, who is the author? Pauling gale is a professor at the University of Sussex in England. He was originally trained as a chemist and he now does research in sort of science policy in responsible management of innovation and technological developments of he is someone who has scientific backgrounds now working in this kind of policy realm. He's the deputy director of something called the Science Policy Research units, which is the unit within the University of Sussex that does research on science policy, basically on how best to support the development of scientific and technological projects. So this is the kind of work that he does. Now he's working in this sort of public policy, social science realm, has a scientific backgrounds, and that's who he is. He is an academic. As a, as part of his position in the Science Policy Research Unit. She works a lot with people outside of academia as well, but he's writing here primarily to an academic audience, which is part of the reason that this might be tough to get through, reuses them jargon. He depends on the fact that his audience will understand certain things that have certain knowledge that I don't necessarily expect you to have. And he's writing this for an academic audience, but she's not writing it for a specific group, right? He's not reading it. You just for other policy researchers whose readiness for people in different fields. And we can tell this because he's pretty upfront about it right off the bat. He, in the abstract and an introduction to his paper, he tells us that he's going to be talking on sort of trying to combine different reds is research trying to bring together work that has been done by other people who study technology from different points of view. So people who are historians of technology, people who are sociologists or philosophers of technology, people who think about science and technology in different ways. And what he's trying to do here is bringing together work that they have done. Bringing together these different threads of research to try and come up with some kind of more comprehensive understanding of what technology is and what functions are in our lives. So this is who he is. A bit about, who's audiences, the subjects. He doesn't really have subjects in this piece who are people who subject is technology as a very broad category. We'll talk in just a minute about kind of where he draws his examples from and sort of what kinds of cases he's using. But in terms of people, he's not really writing about people, he's writing about ideas. So what is the subject matter of this one is pretty easy because it's titled, tells it to us right off the bat. What is technology? He tells us the question that he's asking and he tells us sort of the answer that he's giving and then she tells us he's going to get it giving us six definitions and to pathology. So we know what he's trying to figure out and we know that his answer is going to be split up into six different ways that you would consider to these valid ways, good ways of thinking about technology. And two that he says are pathological too, that are wrong too, that he thinks are not useful and that we should not consider or should try to avoid when we're thinking about technology and wave does in our lives. This is what he's trying to. What is the genre or medium for what type of text is this? Well, it says on the first couple pages of this, this was a research paper that has been written as perturb, a particular paper series that's been put out by the Science Policy Research. In other words, this means that it's an academic publication, but it's not been published in a book. It's not been published in an academic journal. This is something that this department is research unit within the university that pollinate. And Gilbert for a handful of curated and put together a series of papers, a series of essays or articles from different authors about sort of different topics that all approach a kind of central scheme, an academic paper. We don't know for sure whether it's been, you know, peer reviewed or what kind of review process it's gone through, you'll see that there are some part you've seen. I'm sure that there are some parts of this that are a bit, I feel a bit like a first draft. Maybe not a first draft, but maybe a second draft. There are some typos in it. There are some things that are organizations kind of a bit weird. So there are some sort of difficulties with this paper, aside from the fact that it's just talking about complex ideas, but it is sort of a recognized publication. It's something that's been put out by this unit within the university that Paul named Gilbert score It's definitely written in an academic style. We can tell this from the language that he uses. We can tell it from the way that he uses citations, the way that he refers to other work. As I said, it's not targeted towards people in a particular discipline. So if you've not sort of relying on jargon or knowledge from one particular place. But as I said before, he does that his readers sort of knows some of these works that he's referring to from history of science and technology, sociology and philosophy of science and technology, previous policy work, other kinds of publications that are in these multiple fields and disciplines that he's drawing from when. So Publication Date is also very easy for us to tell because it says this right on the first page of text. This was published in October of 2014. When do the events or the story take place? This one slightly more complicated because of the kind of, I don't want the strange but sort of a unique way that making deals, deals with time. In this part of this text is a historical narrative. Part of the, part of the story, part of it. The events that he's talking about here are describing a change over time, changes in the relationship between science and technology, changes in our definitions of what technology is, but not all of it is doing that. So it's not one straightforward historical arc or historical narrative. There are parts of the texts that talk about change over time and parts that don't. And then there are sort of, sort of multiple different historical narratives. There's a short historical narrative at the beginning when he's talking about the word technology and how that word is developed in the English language and where it's come from and how its meaning has changed. There's a second kind of bigger arc later on. And there's a part in the middle that's not really talking about changing over time. It's sort of a theoretical exploration of what technology is. So the second question becomes kind of difficult for us to answer in a straightforward way. In one sense, he's not talking about things that have happened at a particular time in other parts of the text he is. And some of that goes back to antiquity, ancient Greece, ancient Rome, some of it's much more recent. And sometimes the kind of jobs around between these places. So there's no particular sort of historical events or historical context that I want you to note about this. There's no sort of we need to be thinking about the fact that this was going on when he was writing it, we can be aware that this is five or six years old, so it's not too far removed from our current technological contexts that we are living in. But it's not ultra reasons. And we especially should keep in mind the way he uses time and historical narrative throughout his text. Last one where so we know that it was published out of the University of Sussex, so in England in the United Kingdom where he works. Again, similarly to the kind of historical question, there's not one place where the events that are in this article take place. A lot of it is not about Events. Again, it's about exploring theoretical understanding. He does talk about some things that have happened. And I think the things he chooses to talk about, the historically, the events that timing points, if he chooses to talk about, has probably been influenced by the fact that he's writing in this European anglophone contexts, right? This is a very Western focused article. He's not using examples really that are drawn from outside of Europe or perhaps North America in some cases, which of course doesn't invalidate the claims that he's making. But it's important to consider the approach he's taking in terms of geography and sort of contexts that he's drawing from in addition to it. Ok, that's all that I wanted to say about, about contracts, which so far has probably not helped you understand the nuts and bolts of this article because it wasn't meant to do that, but hopefully has given you some kind of idea of who this person is, why he is trying to do this thing, and what kind of audience he's writing. So with that being said, we're gonna try and go step-by-step through this piece and understand what he's doing. Which we can start by just looking at this sort of sections that he splits this piece. And I don't believe that he has chosen a particularly, particularly transparent way of organizing this piece. I think he could have done, I think he could have done a more thorough job of kind of splitting this up in a way that guides the reader through his arguments. Just see a question here. I didn't understand the geography part. Okay. But yeah, I was just trying to emphasize that I think we can see the fact that Paul nine, Gail himself is a researcher in the UK reflected in the types of examples and the types of technologies that he's talking about when he uses historical case studies or when he talks about particular technologies or particular historical events, exciting things that have occurred in a Western context. So when he talks about ancient history, he's talking about Greece and Rome. When he talks about the industrial revolution, he's talking about changes that occurred in Europe and North America. Specifically, when he, when he refers to particular examples, this is the kind of context that he tends to draw on his, his cases from. So he's, he's framing this as a very general argument about the nature of technology. And I think that that's, that's valid. I'm not taking taking issue with his generality that's in this piece. I just want us to acknowledge the context that he's, he's writing from and how that has likely influence the types of stories and examples and citations that he's chosen to use here. Does that make sense? Okay, cool. Okay. Alright, so we can look at the way that he's broken this down and try to understand his sort of argumentative approach based on that, no, I have not put all of his different subsections aren't here. I didn't think that was necessary, but these are the mean ones. That introduction. He's gonna tell us what his goals are. She's gonna tell us that lots of people write about technology and think about technology and study technology in different ways. But there's not very much work that tries to synthesize what all these different people have said. There's not a lot. A reading of study that takes on policy research about technology and philosophical work on technology and historical analysis on technology. And brings it together to try and save, to make a larger point about defining technology, about explaining in sort of more basic terms what technology means. So when it's introduction, he's telling us that this is his business, his goal here. This is what he's trying to do. He's entering weave together these different threads of scholarship and give us a kind of holistic demonstration of different ways to understand technology and a synthesis of ways that different people have understood technology and these different scholarly traditions. In the introduction, he tells us that's what he's going to try and do. And then he tells us sort of, sort of, not very clearly, but he sort of tell us how, how he's gonna do it. He talks in the introduction about using a sort of continental philosophical tradition than an analytic philosophical tradition. Don't worry too much about that. That's really beyond the scope of this course. What he's talking about. There are different, on different sorts of approaches to philosophical reasoning we can talk about on people or scholars who are continental philosophers who sort of tend to conduct their philosophical work in a certain way. Versus Anna, analytical philosophers who approached philosophy in a different way. You don't need to understand. Of course, it's interesting, and if you want to talk about it more with me, you're very welcome to. But don't worry too much about that kind of terminology. For the purposes of this, what is important to understand is that all of these sessions talking about technology somehow, but they talk about technology in different ways. So he starts off by talking about what he called empirical features of technology. Now empirical, If you're not familiar with what that word means, something that's based in experimentation, or It's something that we know because we've done it. So some laboratory-based scientific experiments are empirical exercises. We're trying to show something based on particular data that we have generated that's an empirical process. So when he says he wants to talk about empirical features of technology first, he means things about technology that we know through our experience of it, through our use of it. He's not going to try and your eyes here, he's going to try and say sort of looking at data, looking at the things that we know, things that we have experienced about technology. Here is what we can say technology is, this is how he starts. After doing that, he then moves into a kind of more theoretical realm for a big chunk of the paper. So it has these two sections that are called theory and theory to, and these kind of move away from this empirical explanation that he's given at the beginning to give us some kind of approaches that come from reasoning approaches that sort of signals about Technology that come from theory and really what both of these sections are doing. So the theory section and a theory to section are both explaining the difference that he sees between science and technology. Science does this, technology does this. This is what's different about them. Both these three sections are doing that. They're doing it in two different ways. And we're going to talk about what those ways are shortly. So the bulk of the paper, most of the paper is made up of those two sections, fury and especially Siri, to where he really goes into a lot of detail trying to explain these theoretical differences that he sees between what science is and what technology is. So the person who asked me during our last class about what I think the difference is between science and technology isn't necessarily exactly might opinion. But this is one sort of very thorough presentation of what Paul nine k\_l and other scholars to see as the differences between these two things. I think it's interesting to also compare these, this kind of differentiation between science and technology to Peter Denning's argument from the article that you read for last class about computer science and his questioning of whether computer science as a scientific enterprise or not. But we'll get to that a bit later. Ok, so after he's gone through this, these two different theoretical distinction between science and technology. He then this is where this sort of historical narrative comes back in. He then moves into saying, well, maybe there is this distinction between science and technology. But in our modern world, we also see that that distinction maybe doesn't fully apply anymore, or maybe it does apply. But maybe these things, science and technology, overlap more in our modern world than they did previously. So the latter kind of part of this paper, this whole section about modern science and modern industry, he's trying to demonstrate a change over time, a historical shift that's about the interactions between science and technology and then about what the corresponding sort of new definitions of technology can be in this kind of modern and scientific in modern industrial worlds. And then he closes the discussion and conclusion, but kind of summing up what you've told us about these six different definitions of technology and presenting us with his two pathologies, his sort of bad ways that we should avoid about thinking about what science and technology are. That's the broad overview. Now we're gonna go through it again in much finer detail. So again, feel free to ask questions if there's anything here that you're unclear about. So I'm not going to go through the introduction in detail. Basically there he's just laying out what he's trying to do, which again, is weaving together sort of different kinds of scholarship to come up with some kind of cohesive, holistic understanding of what technology is. And like I said, he's going to start doing that by talking about what he calls the empirical features of technology. Things that we know about technologies through data, through our experiences of what technology does. And there's four of these. The first one is that the word technology is relatively new. And this is really, this is like an etymological exercise is going into the origins of the word technology. In both this empirical feature and the second empirical feature are really both about the word technology and when and how it emerged and what it means. The first that he wants to make about technology is that it's not a word that we've been using in English for, for very long. Either very first appearance of this word ever was in the 17th century. 16 hundreds in this book that you see on the left of the slide here. Call it elements of technology, which was actually subsequently retitled when it got printed again. So this was really not a word that within widespread uses is the first time it ever appeared, but it was oh, no, sorry. That's not what that is. That's making 29 outs. But it was used for the first time in the 17th century. This was the first kind of well-known use of it in a publication. But it was not a word that people use a lot. It was not something that was widespread. It did not have an entry in the Encyclopedia Britannica, which, you know, is a thing that people, old people like me used to use when we had to look up facts in books and not on the internet. It didn't have an entry in the Encyclopedia Britannica until 1974. So the first he wants to make about technology is that it's not a term that we have used for very long. And it's especially not a term that we've used frequently for very long. So people who have not been out there talking about technology, using that word for a very long amount of time. It's a relatively new thing really, especially in the second half the 20th century was where people really started to use this word and more often and started to use it in the same way that we use it. So this is not something, not an idea or a meaning that's existed forever, even over the short time that it has existed. This is his second empirical feature. What it means has changed. So the root word of the word technology in English and also in French and many other languages, is the Greek term technique. Technique was a term that the ancient Greeks used which meant some kind of skill in the arts. And the arts had a very, a very like why meeting there. What we think about as fine art today would be considered part of the arts. But also things like basket weaving, anything up to sort of building bridges and roads. And he kind of practical skill like that was a sort of practical arts. And what's covered under this definition of technique. So if anything could have crafting, making things that we would now consider to be engineering, was with all covered by this sort of idea of technique skill in the art, skill in the practical arts. Plato, who usually the picture up here on the, on the slide, had a sort of hierarchy of different kinds of skills and knowledges. Because he himself with a philosopher, probably he of course, put sort of reasoning and philosophical skill at the very top of that pyramid, at the very top of that hierarchy, saying that, you know, the most evolved way to, I think the most evolved form of man is to be a philosopher. Below that was things like these sort of technique categories, practical skills, skills in the arts, be that basket weaving or British making, this kind of practical crack craftsmanship. And then below that was the idea of kind of manual labor, labor that was not recognized as being particularly skilled based. So this is where the word technology comes from. But when we first saw it, Technology as a term emerge in English in the 17th, 18th centuries. It was, it was rooted in this idea of technique meant something very different than it does now, which I briefly mentioned. Basically the word technology for the first couple centuries that it was around meant a kind of guide to doing a craft or a guide to a particular skill. So a book about glass making would be a technology of glass making. This book cover here about making a stained glass. Stained glass kaleidoscope would be a technology of stained-glass kaleidoscope making. Basically a technique ology. If you're, if you're linguistically and climb and you want to think about it that way. W of technical study of some kind of practical skill, hackable art. So again, it wasn't until much later that the term sort of change into the way that we understand it nowadays. So his first two empirical things about technology, or that the idea and the word are relatively new and that they've changed. So it hasn't always meant what it means to us now. Third, empirical future. He says that we can observe through our knowledge of how technologies have been created in the past, that technology and applied science are not the same thing. Technology is not an applied science. These are not equivalent terms is what nightingale is arguing here, which as you may notice, is contrary to a lot of kind of popular understandings of technology. A lot of the time. If you look up technology and a dictionary today, it will say something like the application of scientific knowledge for practical purposes or something akin to that. Nine gills arguing that this is not the case. He's saying technology is not the same thing as applied science. There are certainly some cases weren't specific technologies are developed through the application of scientific knowledge. But most of the time, or at least a lot of the time, really important technologies that are now kind of widely used and widely depended upon were not developed as a result of existing scientific knowledge. They were developed through a process of experimentation, a process of tinkering. And it was only much later on, after these technologies were already being used in lots of different places that we sort of figured out the science behind them. So he uses two very famous examples to illustrate this idea of the steam engine and the airplane. The steam engine, he says, was developed before. People had a thorough knowledge of thermodynamics and the steam engine was created before. We understood the details of exactly how and why it works the way that it did. Similarly with the, with, with early aircraft. These were developed and indeed flew before we had anything near the understanding of aerodynamics that we have today. The Wright brothers guys who made the first airplane were trained as bicycle mechanics, right? These were not scientists. They didn't figure out how to make a plan that could fly, because they had scientific theories in their head. And they Applied them to something. They figured out what would work through trial and error, through design and redesign, through testing and calibration. When they feel, saying here is that technology does not necessarily come from applying science. It does sometimes, but not always, are not even usually. So it's wrong, he's saying for us to think about technology as applied science, even though that might be where technologies come from, sometimes that's not what technology is. Finally, his fourth empirical feature. He says technological knowledge is tacit knowledge. Or tacit knowledge is a very important part of our understanding and use of technology. What does tacit mean? This might be a familiar term to any musicians in the class. You might have seen the word tacit spelled with an e instead of an i. Basically in music meanings, silence or heard the music where you're not plane. That's basically what it means in this sense. To tacit means something that's silence or that's unspoken. So tacit knowledge is knowledge that we have not because someone has told it to us directly, or because we read it in a book, or because someone has given us a specific set of instructions. It's knowledge that we have through our experiences, knowledge that we absorbed by living in the world that we live in and sort of interacting with things. Why is there a picture of a baseball player on this slide? It's to remind me to tell you a story to try and illustrate what tacit knowledge means. So we can have all kinds of different tacit knowledge. It doesn't necessarily have to be technological. So what will weigh that helps me to think about this is to recall an experience that I had with my mother-in-law in trying to explain the game of baseball to her. So for this, you need a little bit of my family history, which I promise I will keep brief. I grew up in British Columbia and from the West Coast of Canada. Originally. My husband is from Australia and his parents alive from us small town about an hour outside of Vienna. One time, years ago, his parents from Austria were visiting my family in British Columbia. My parents decided that we should all go to a baseball game together. So I promise this is relevant to the course, isn't just a weird digression. So we're at the baseball game and I'm trying to explain what's going on to my mother-in-law and sitting beside me. And baseball is not a popular sport in Austria or indeed in most of Europe. And my mother-in-law is not particularly interested in sports at the best of times. So she had no contacts. You had no tacit knowledge for what was going on here. And this made it very difficult for me to explain to her all the things that were happening on the fields. Though I am not an expert in baseline. I'm not a baseball player. I don't I've not read a rulebook of baseball, but I do have tacit knowledge of baseball. I've been to baseball games before. I've heard people around me talking about baseball. I've seen baseball on the TV in the background at a bar or a restaurant or someone's house. I've seen movies about baseball. I have some sort of implicit, tacit understanding of the game, even though no one's ever taught me how to play it directly. And I've never read through any kind of blue book that explains what baseball it's I know generally how it works through my experiences. She was missingness. And not only was she missing that, she was missing a lot of kind of tacit knowledge about sports in general that might help someone understand a new sport that they hadn't been exposed to before. She wasn't familiar with sort of standard ways to read a scoreboard. Are sort of standard places to look for information when you're at a sporting events. There are not, not sort of well-known words in German for all of the names of positions and things. So I was trying to come up with new words to invent, to explain to her what was it, what was happening? All in all, my tacit knowledge of baseball meant that I understood what was happening, but I had a difficult time explaining it to someone else. And her lack of tacit knowledge of baseball or if sports made it really hard for her to understand what I was saying. So nightingale is talking about tacit knowledge, obviously in a technological sense, by saying that often the way we understand technologies is through our tacit knowledge of them, fewer experience of them, through our use of them, through watching other people use them, or sort of being aware of their existence. And you might think of like a baby or a toddler kind of playing with it, a tablet or a phone that kind of learning how to use those kind of digital technologies through cooking at them or through watching their parents or their older siblings use them. This is what making gills getting at kind of understanding of something that doesn't come from explicit instruction, but that we gained through our, through our experiences and through our kind of observations and experimentation. Okay, so this is what he's saying about on the first part of his argument, empirical features of technologies and what we can learn based on kind of evaluating our experiences and our knowledge of facts around technology. Are there questions about this before we move on? Well, wait a minute in case anyone's typing something, I'm not seeing anything come up. So I think I'll move on for now. Don't hesitate to pipe up later if I've missed something. And this is, I think is relatively straightforward questions. So tacit knowledge, basic knowledge, and that's not necessarily true. Sometimes tacit knowledge can be quite complex. And the point is that it's not something that someone has told edifice explained to us directly. It's not something that we've sort of specifically read in a book. It's something that we sort of know through our experiences and our surroundings. And sometimes that can be quite complex. So it's not always basic knowledge, but it's knowledge that we've not specifically learned in a course or read in an instruction manual or been taught directly knowledge that we have fewer interactions. Cool. Other questions?  
  
Other questions? Okay. I'm gonna move on for oh, no. Intestinal to frequently used term. And yes, it is a frequently used term. And then social sciences, especially among people who think and write about technology. The idea of a is also related to other terms that are also frequently used, like the idea of interactional expertise is a very similar idea. Gaining knowledge or expertise about something through working with it or working on it with other people or being exposed to a certain environments. So yeah, tacit knowledge is nots and not a term that polynomial has come up with himself. It's a sort of bitly idea. Okay? At the risk of saying that for a third time while someone else is typing in a question. I am going to move on for now. Ok, so based on these empirical features of technology that has given us, he uses this to come up with his first few definitions. So again, what he's doing here and what he continues to do in the theory sections are, oh, sorry, I'm no sorry. This is his first theory section now. So he's, he's moving from the empirical features of technology to a kind of theorizing about the nature of technology and what it is. Question what is the each act? I'm can you remind me where he uses that term? You can unmute yourself and just talk if that's easier. Speech act. Okay? No problem. Let me start talking through the nature of technology. And if it's still unclear, You can ask again because I I'm trying to remember exactly what he says about that. And it's not coming to me right now, but I don't think it's going to be super relevant to understanding his main points. Okay, so he moves into sort of a theoretical understanding of what technology is. And again, what he's doing here, at least for now, is trying to differentiate science from technology. So he started to say, sinus work like this and technology works like this, and this is why they're different. So his first fundamental differentiation between science and technology, he makes by noting that technologies are meant to generate functions. They're not meant to be true or false. So this is the first way that he tries to distinguish these two ideas. Science or a scientific fact is meant to be something that's objective. We're meant to be able to use scientific knowledge to evaluate whether something is true or false, whether it's right or wrong. Now there are some philosophers of science who would disagree with this kind of characterization of scientists, purely objective, that we're going to leave them aside for now and just go with what Nagel's telling us. So he's telling us scientific knowledge is going to help us evaluate whether something is true or false, whether a particular understanding of the world is right or wrong. Technologies don't do that. Technologies can be true or false. They can only, he says, be appropriate or inappropriate to whatever context they are being used in. In other words, it's impossible for us to evaluate a technology as good or bad without knowing something about the context of that technology, about the reason it's being used or the places in user, the person it's being used. By Frank. He distinguishes here between the mass of an electron, which is given a value that under certain conditions is always going to be the same versus the technology of a shoe, right? This particular shoe on the slide might be appropriate for some contexts of wildly inappropriate for others, right? We can't say that this shoe is a good or a bad technology without knowing who's using it and under which circumstances, we can't say that this shoe and a shoe is true or false or right or wrong. We can only say that it functions or malfunctions for the context that it's in, right? We can only say that it's appropriate or inappropriate to the particular circumstances that we are trying to use it in. So this is the first distinction he's making between science and technology. Scientific knowledge is about true or false, right or wrong. Tech, technology and technological knowledge are about appropriate versus inappropriate right for the given situation or wrong for the given situation, not just right or wrong across the board. This is where he tries to draw this distinction between mind world relations and World mine relations. I know that part's kind of confusing. Also, this is also not like super important to this course on understanding this article. What he's trying to say there is essentially to draw the same distinction or abate similar distinction between science and technology. When he says mine to world, he says that the point he's trying to make is that when you develop scientific knowledge, we're observing something about the state of the world and then changing the windy stink to match some objective facts. So we know that it's raining outside. The development of scientific knowledge in that case is to shift the way we think to label that phenomenon of rain and say, look, it's raining, This is what rain is. This is what you would characterize as a mind to World relation or a kind of scientific equivalent or the way that we generate scientific knowledge versus what he calls world to mind, which is how he sees technological developments. In that case, he says is about changing the state of our environment, changing the world around us in order to match some need or desire that we have internally. So I can think I'm thirsty. I can then develop some kind of technological device that will help me state my thirst, right? I'm changing something about the environment around me to make or obtain some kind of drinking vessel and put water in it somehow in order to deal with some kind of internal state. I'm changing the world around me to fit my mind or perhaps to fit my body. I'm versus changing the way I'm thinking or behaving to fit some kind of external objective state of the world. This is what he means by the mind to world, world to mine thing. I think this is where he talks about the speech act also, which is not an important, an important term to understand by itself. But this is the kind of argument that he's making about this. Basically, scientific science or scientific ways of thinking are meant to be right or wrong. Technological development doesn't work like that. Technologies can be appropriate or inappropriate for the purpose that we're trying to put them too. So this kind of early on in this discussion where he comes up with his first two definitions of technology. Now in terms of his theory, I've already gone a bit past the point where he comes up with these two things in particular. But these are his two sort of most basic ways to describe what technologies are. His very most basic one is, of course, is first definition. Technologies are entities that produce artificial functions. So I want to draw your attention there to the word entity. Entity doesn't necessarily mean a physical object. It could also be a process. So doesn't, it, doesn't mean that an algorithm, for example, couldn't be a technology. An entity is just a thing. It doesn't have to be something that you can, some kind of entity that produces an artificial function. The word artificial is also very important. They're artificial implies man-made, something that wouldn't have happened without intervention. We could argue about whether that intervention necessarily needs to come from a human or whether animals, for instance, could also create technologies. And that is something that people have argued about at length. Mansfield isn't really addressed that. He just uses the term artificial and doesn't really discuss it beyond that. Artificial means sort of not, not something that wouldn't occur without some kind of intervention. And for our purposes in this course, we can say human intervention unless you're very invested in equivalent about that. So on a very most basic level, a technology is something that produces a function that it wouldn't have done without someone interfering with it does not occur naturally. Yeah, sure. That's a good way to think about artificial. This is the most basic way to think about what a technology is, is death. So he gives two examples than have things that are not Technologies. One, being a biological human heart. And I recognize that this image is actually not a real biological heart. But I have a model of a heart, which probably is a technology. I was intending it to be representation of a real heart that came from someone's body, which is, what do you think is not a technology? Because it is an entity and it produces a function. But that function is natural rather than artificial, meaning that for purposes of biological human heart, not a technology if fulfilled every part of that definition except the artificial part. Second example uses this on something that's not a technology, is trash. Garbage because it is an entity and it is artificial, uh, but it's not something that produces a function itself, it is instead the byproducts. Generally speaking, up some other function. Things that are sort of that are an outcome of something, but are not, are not the function, not not the entity itself, but some kind of byproduct or waste product of a function. Again, for Nightingale, according to this first definition, not technology. So entities that produce artificial functions is obviously a very wide category, includes many, many, many different things, but not everything. And he wants to make us aware of that. He goes on from there and you'll see that throat His peace. And throughout our discussion of his piece, what he's doing is kind of expanding his understanding of what a technology gets. So this first category, even though it's already very broad, it's restricted to things, individual things, a glass pen, a mechanical heart, an airplane. That can be very complicated things, but their individual entities. This first definition of technology doesn't allow for anything sort of beyond the entity itself. Question.  
  
Can any of these B natural? So yes, an entity can be natural. Biological heart is definitely an entity, but it's the only function that it's fulfilling is a natural one. Then that entity is not technology according to their name, gal. So it could be just means basically. So things can be natural or artificial. But again, by the definition of the function, the thing that it's doing has to be artificial. Afraid of qualifying him. Yeah, when we say that we produce artificial functions, what exactly is producing that? The function is a result of the entity itself or something that the entity is doing that the function doesn't just happen. It comes from the fame. Could you illustrate that with an example? I can try to think about it. I guess I'm I'm I'm not sure what part of it is it. Can you can you say more about what is confusing to you or what, what the question is. If you took an algorithm to be a technology that was using earlier, and that's our entity that's supposed to produce an artificial function. How understanding artificial function is a function that's been created from a human need, like we're saying above the philosophers. And so let's say this algorithm is giving us a number in order to process something. Okay? And his number, and that's the artificial postulates fulfill. What is it producing an artificial function, it's just fulfilling one. So what you are describing is exactly the difference between his Definition one and definition to definition. One doesn't imply any kind of desire or need. It's just a thing that does a thing, a thing that does something that produces some kind of artificial reaction or artificial function. So it could just be an algorithm that outputs a number according to that definition. That would already be it technology. If we want to think about it in terms of the second definition, then we would have to consider What the point of that number is, right? What is the problem-solving process that has given rise to this, to this entity. What is the preconceived idea or plan or sort of intended to future state that this thing is supposed to be producing. Or so definition ones is nothing about intention. It just says here's this entity and it's going to do and that's something that it does is going to be artificial. This is why he sort of adding the idea of technologies are something that are produced by problem-solving processes for a particular reason to his second definition, because he doesn't think that that's an important part of understanding what technologies are, is knowing the sort of the reason that they had been created or the change that we want to see in our environment as a result of that specific artificial function. So I don't know if it's empty, your question about what the word produce is doing there, but it seemed like that's what you're getting at. Yeah.  
  
Yeah. I guess I clarify. Is it a bit? I hope you'll help them move on. Okay. So first definition, very basic, very general. Second definition acknowledging it. I'm sorry. Second definition acknowledging the, the, the idea that we have a reason to produce technologies. Acknowledging this world to mine relation that he discussed earlier. Acknowledging that the reason we create technologies generally is because there is some change in our environment that we want to see. There's some future state that we have imagined that we want to try and reach through the use of something. So he put in us with this new sort of slightly more complex way of thinking about technology as something that will help us achieve a goal. And it's something that's been produced through some kind of problem-solving process. So I should say now, if I haven't said it earlier, that the idea behind presenting us with six different definitions is not to say that one is better than the other. They certainly get more complex as we go on. But the reason why he given us these different definitions and the reason why I can keep sort of labelled them as like an engineer's definition and a sociologist definition. Or because it might be, it might be useful or necessary to think about technology in these different ways, depending on the problem that we're faced with or the context in which we are thinking about technology. So this is why he's given us six ways to think about it. Because he says Technologies, they serve different purposes for different people. They act differently in different contexts depending on what we're trying to do or what we're trying to accomplish. It may be helpful for us to think about technology that adds something that's trying to achieve a particular desired state in the world. Or it may just be helpful for us to think about something as a thing that produces some kind of function, some, some kind of outcome. So as we go through these different definitions, try not to think of them as being a hierarchy. Tend not to think of them as like improving on each other. They certainly do get more detailed and more complex. But 90 goals not giving us six definitions because I think he's trying to improve upon them. You've given us definitions because they began trying to explain different aspects of what he thinks technology is, starting at a very basic level and kind of moving on from there. And move on from here is exactly what I'm gonna do because I know we spent a while on this. So he then because pretty much straight into his next three. So very close to the beginning of this piece, he's given us four of his six definitions. And then almost all the rest of the article is devoted to motivating his last two. We're gonna stick with these ones for now. And so the third definition, technologies are comprised of artifacts that generate artificial functions is much We've had already. Although he switches for reasons that I don't quite understand, from the word entity to the word artifacts here. Artifacts that generate, generate artificial functions techniques and the wider institutional regime required for them to operate. So here he's moving beyond the beyond the entity beyond the particular pen or airplane or steam engine or whatever it is that we are thinking about to include in his definition of technology and the knowledge that we need to use to operate these things. The set of regulations or rules or normal practices that exist around the use of a technology, other technologies and infrastructures that might be necessary in order for a given thing to execute its intended function. He's basically acknowledging here that technologies, it's not always helpful for us to think of them just as an individualist thing, because they do rely on all kinds of other things in order, in order to work properly. They rely on us having knowledge of how to use them. And they rely on sort of sets of standards and accepted practices about how they ought to be used and why and under which circumstances. They rely on other technologies existing. They rely on some kind of infrastructural order around them. So what he's saying here is that when we think about technology, it's important that we don't just consider the stain or not even just the thing in its intended purpose, but also the kinds of other policies, regulations, other technologies, other things that exist around something that allow it to operate properly. And his fourth definition, he said, he said that technology is the outcome of a distributed coevolutionary process in which functions, knowledge artifacts in their environment and mutually adapts to each other. And here he's saying that technologies can be changed over time. This is maybe an obvious point of view. Just put it like that. Really, what he's trying to illustrate here is what he is saying in this simplified example that he uses of the fact that a CD can be used to store information, but it could also be used as a coffee coaster. It could also be used under the foot of a table to stabilize it. People can put technologies to new uses that are not the ones that they were designed for. Therefore, it can sometimes be overly simplistic to, for us to think about technology as a thing that was designed for a particular purpose because those purposes can change. And sometimes they can just change through the US that we are putting the technology to. Other times they can change because the technology itself becomes adapted to its environment. So he's saying here, not only can people use technology for purposes other than the ones they weren't designed for. But design of technology changes over time as the technology and the environment that it's in sort of mutually adapts to each other as a technology and its context both change in order to better accommodate the other one, that technology is going to become something different. So another sort of more complex way, again, for us to think about technology is the outcome of this, what he calls coevolutionary process. The outcome of either someone putting a technology to a different use, or the technology itself and its environment could have mutually adapting to each other. Okay, This brings us to the end of his first theory section. And Adelaide said to four of the six definitions, are there questions about this part before we move on a little bit longer? Or would it be fair to say that definition for is analogous to saying that technology is the definition of a technology is dependent on its function in time. So as the function of all the definition of moles, Yes. I think the Fed if thing. Yeah. Yeah, I think that is true. What do you thing here is that it's not just the entity, not just the artifact itself that changes with technology can also change the environments that they are. And that's what he says, co-evolutionary and mutual adaptation that we think, yes, of course, the technology itself, it's just sort of entity itself, can change. And it can also change the environment that it's in. Any other question?  
  
Any other question? Both changing each other. Yeah.  
  
Yeah. Yeah. Yeah. But looking thing here, any other questions?  
  
any other questions? Okay. I'm gonna move on for now. I promised the rest of this is going to go a bit faster, but I know it's been going a little slow for this first part. Okay, moving on to his section that he calls theory. To what he's doing here is again, again, going back to the idea of trying to differentiate science from technology. So again, trying to say science works like this, technology works like this, but he's gonna do it in a slightly different way than he did before. And that is then going to segway into calming gills.  
  
Description of Technological design happens. So he's going to start by saying, here's another difference between science and technology. And he's going to move from that into sort of detailing how he understands technological design processes. So this differentiation that he's making between science and technology is that when we start a scientific process, we know what our starting conditions are, but we don't know what our end result is going to be. So if we imagine a sort of perfectly efficient, hermetically sealed laboratory where we can perfectly exactly defined what our starting conditions are going to be. We're going to do that in order to sort of generate unknown outcome. We're going to put, put out, put elements together in a way that we understand very well, do something to them, and then see what happens. It performed a scientific process. Technological design processes, he says again, do not work like that. They worked the other way around. So when we start to design a technology, when we start to think about how we can adapt the world around us to fit our needs or our desires. We know what we want. In the end, we know what we're trying to accomplish and we don't know what kind of starting conditions we need in order to get there. So we know I'm thirsty, so I need to create something that will help me drink water. But I don't know where to start from necessarily. So what he's saying here is that in order to get around this problem is fundamental problem of technological design that we know what we want to end up with, but we don't know how to get there. He says, people who make technologies get around this by using what he called operational principles. So this is a main, Again, this is not his theoretical construct. This is like a general term, but he's giving us a description of it here. He says, when we need to sort of design that technology, one of the first choices we have to make is the type of operational principle that we are going to choose that will define the basic way in which technology works. So he gives the example of an airplane, and we know what the end goal, but what the objective of airplane design is, right? With flight, we want to create some kind of entity that will produce the artificial function of flight or being able to transport people or goods through the air over long distances. This is the end result though that we want. We could have picked, we could pick a number of different operational principles that could get us there, right? So if we're, if we're talking about a classic kind of fixed wing aircraft like the one you see in the picture on the slide. We could say that the operational principle behind that fixed-wing aircraft is the idea that we can generate lift through taking a given surface and leveraging the air resistance that exists in applying power to it. We know that that is going to result in r m goal of flakes, but it's far from the only operational principle that we could have picked, right? We could have designed a hot air balloon instead that would give us the same end result of flight and potential transportation, but in a very different way. We could have tried to design an aircraft that would have flapping wings like a bird and not rely on this kind of fixed-wing principle. Again, same end goal in mind, totally different place to start. We could have tried to build a jetpack that we could strap on our backs, right? Lots of different ways that we could go about this. So the argument that I was making is that the set of operational principles that we choose, the basic definition of the technological avenue that we're going to try to pursue is the sort of major design decision that we are making. One design decision among many, but a very, very important one. So a fundamental part of technological design is the choice of operational principles. Secondly, he's gonna say that making those choices, making those decisions about which operational principles to pursue, that that choice is going to be affected by our values. This is what he means when he says value. In value infused choices. We're not making these decisions in a vacuum, right? When we make, when we, when we choose things, when we decide on a set of operational principles, when we choose sort of which direction to start to build a technology in, that's a choice that we have to make. And that's the choice that's going to be influenced by our previous experiences, by education, by the other technologies that we are familiar with, by the things that we think are most important. So if we, you know, we could say that we really want to emphasize efficiency, which might lead us to one particular set of operational principles. And we decided that we were trying to optimize pleasure or number of people or weight of goods that we would be able to transport or speed, we might end up with a very different technology. And in the end, that came from a very different set of operational principles. So what he's trying to convince us all up here is that when we design technologies, we make choices. We have to make choices mean inevitably make choices. And those choices are infused with our values. They are affected by the way that we think and the way that we understand the world and the experiences that we have had. Two people are not necessarily going to make the same choice about technological design or about operational principles. They might, but they might choose very different things depending on who they are and what their experiences are, and what they're trying to achieve beyond the particular sort of main goal. Is that clear for everyone? So far, this is important because this argument about values and operational principles is something that a lot of his other argumentation will sort of rest on top of, okay, so far so good. Alright, so given the sort of basic principle that technological design happens through a series of value laden choices. And often those 2000 about which operational principles we are going to pursue. He then goes on to describe in more detail how he thinks technological design processes happen. And I know this class is taking a bit longer than I said are normally would last week. I'm going to try and go a bit faster through through the rest, but we are gonna go probably till, I would say half past four today. Rather than just support just so everyone knows. And again, I know I've said this five times already, but most of the stuff he would read for this class is not going to be like this and it's not going to require this level of kind of in-depth discussion during lecture time. Ok, so then go argues that design processes for technology involved a kind of hierarchy of operational principles. We have to make these operational principle choices at different stages throughout the process for different parts of the design. That was all about choice. And then it's about what he calls redesigned cycles. Making a choice, testing it, building it, seeing how well it works, and then adjusting things, adjusting our operational principles, if we need to, adjusting our approach, designing, testing, producing again, and then repeating that entire processes until we end up with something that we are relatively happy with. So here's where he moves from his theoretical discussion to his kind of big historical narrative. Because he says basically technological design has always happened this way. Always happen through choices about operational principles and then redesign. But within that, within that process, the process of technological design has changed in significant ways over the years. So there's a historical story here. There is a change over time, but has to do with technological design that is important for us to consider. And that will eventually bring night yield to his last two definitions. So he's saying that he's making a general points about this idea of redesigned cycles and choices and values and operational principles. But within that general structure for how technological design works, there have been some historical shifts. So the first kind of type of technological design process, he talks about what he called artisan production. And this is where the design of something, the testing of it, and the eventual production of something happened all at the same time. In other words, when you're trying to build something and you don't have sort of complex plans, you certainly don't have like a separated testing procedure and out to make sure that something works. You are building the thing, designing it, and producing it all at the same time. You're not working from plans, you're not working from visuals. You're making a thing and as you make it, you're going to see whether it falls down or not, whether it works successfully or not. He then describes a historical shift away from this kind of artisan production to a kind of engineering approach, what he called an engineering approach that can use complex visual plans to separate the design process over here from the Keck testing and production process over here. So rather than trying to do all these things at the same time, we have a process of design. We're where we come up with some kind of detailed plan about how something's going to work. And then we make the thing. And as we're making it, you see whether it works or not. So we still don't have complete separation between these different ages. But we can sort of separate out the initial planning process from the process of making something and then seeing if it works. From there, he takes us to what he calls a modern engineering process that sort of is heavily invested in models, not only for design but also protesting. So we can really separate, separate out these three different phases. He says. Now when we build something, that was, when we build something complex, first we make a design, then we test that design using models, and then we actually produce a thing once we're already very confident that it will work. So I've tried to illustrate this shifts here and it's a very imperfect illustrations, but I've tried to give you an idea of a kind of medieval cathedral. And of course, there were visual plans made for medieval cathedrals. It's not as if people were just went and started building stuff without any idea of how they were going to do it, but nevertheless tried to use it to demonstrate because it's an example that Yael mentioned also. So moving from building something while being unsure sort of exactly how it's going to work at the beginning of the process. To having some kind of detailed visual plan in mind before something is built. To a place where you can do a lot of testing before you begin to build an already. Be reasonably certain that something's going to work relatively well before you've gotta build it. He says that this shift has taken us to his definition. So because of this modern design process that now it exists, because of the ability that we now have to separate out the design and the testing and the production of something. We can now think of technology as something that, that can have many instances where sort of we can think of technologies we're testing continues even when finalized products have been created and brought to market. This is really what he's talking about here. And I know this is a very long and unwieldy set of words. He says.  
  
Technology's own knowledge concepts, experimental processes, tangible and intangible artifacts, and wider socio-technical systems that are required to recognize technical problems. And to, I won't read all of these words, but to conceptualize blablabla and maintain effective solutions to these problems as they change through time. So this is, again, it's adding a time dimension, but it's moving beyond the time dimension that he previously identified. Previously said specific entities, specific artifacts change over time and they can also change their environments over time. Now he's saying the technology becomes a sort of a mix of the design and the actual product that has been created. So for instance, we can think of the iPhone as a technology, even though we know that there are many iterations of this thing that had existed. There are older iPhones and there are newer iPhones, and they all belong to this category. The newer ones have been modified as a result of sort of testing and use and further development that went on with the, with the earlier models, right? It's all still one technology. And in this sense, Thinking about it.  
  
It's all the same basic thing. It has the same intended function. It has the same sort of form at a very basic sense, but it is now a part of this long-term extended process of redesign cycles where things are being tested and new iterations are being proposed even as kinda completed technologies are out there and existing and being used. So his first four definitions are more or less independent of history. His first four definitions can apply to any technology at any point in time. His fifth sixth definitions are more located on a more historically specific. So definition five applies to anything that has been created under this kind of modern design process where we can separate out testing from design and production. Definition six up, come back to this slide in a bit. Definition six is very similar in that it's historically situated. But what, what he tries to do with definition six is He's defining a systems approach. So he's talking about the sort of convergence and overlap of science and technology and modern industry uses whole section on how science and technology interact. Where you heat at one different ways in which science and technology affect each other in the modern world is by modern key here means that a post-industrial revolution, the first two things he only mentions very briefly, the second tube, he sort of devote some more time to, he talks about the models and the modeling processes that brings science and technology closer together. And in particular, he talks about how both scientific advances and social advances in terms of division of labor have changed industrial processes and allowed technology to advance at a greater rate. And very importantly for his sixth definition has led to what he calls a systems-based understanding of technology, which is really what he's trying to get at in his sixth definition. He's defining technology as an entire system here. So moving away from individual artifacts, even moving away from kind of different instances of a particular type of artifacts to talking about an entire industrial technological system. So we can talk about kind of a nuclear power plant technology under this definition that exist in modern industry and represents this kind of move away from individualized pieces of machinery to a larger system. On we could talk in a kind of different sense about sort of automotive technologies as being a system. In the sense that there is a complex, complex, losing words here, complex relationship between production and infrastructure. And US over a large, a large area, large kind of Space and time. And that this exists because of the interactions between science and industrial production that he talks about in this section on modern science and modern industry. So basically his fifth definition is talking about the ability for sort of one technology to span multiple iterations and to describe a process of like a long-term process of change over time. His definition is talking about technology as a larger system. So beyond this one thing or one group of the same type of things to a larger set of interconnected. Not sure how much sense that made. I got a bit off track there for a wild. One important thing to note here, like I said before, these fifth sixth definitions are located at particular times in history. The other four are not. These fifth six ones are the result of this entire kind of discussion that He's given us about, about redesigned cycles and changes in the technological design process and interactions between modern science and modern technology. All of that discussion was in the circus of arriving at these two sort of more modern understandings of West technology is. He then comes to talking about technological momentum and lock-in. I'm going to leave this for now and not discuss it because we're going to talk about it at length on Monday, because this material is extremely connected to the conversation we're going to have. Then I promise I will come back to these ideas. But for now, we're going to leave aside the idea of technological momentum and technological lock-in. And I've promised we will discuss it later. I'm instead going to bring us now to his discussion and conclusion. And I first want to sum up the sixth definitions that He's given us. I've tried to vastly simplify his language here and just get at the kind of kernel of what I think is important about each of these six definitions that you've given us. And I think it's helpful to think about them together this way. I'm indeed that's looking, wants us to do. He wants us to sort of consider all these different ways about thinking about technology and to realize that some of them may be more appropriate for different kinds of analysis. So we can think about technology in the most basic terms as an entity that produces an artificial function. We could also think about it beyond that as something that is be specific outcome of a problem-solving process. So a thing that is intended to fix something, to change something, for us to modify the world around us. We could recognize that technologies are a combination of things and techniques and knowledge and sort of larger structures and infrastructures and regimes that exist around them. We can think about technologies at the outcome of a process where all of these things coevolved with the ability of technologies to change over time and to change their environments over time. In that case, we can think about technology not only as one specific outcome of a process, that the continued evolution of that entire process. And then finally, at its largest and grandest scale, we can think about technology as we continued evolution of large technical systems. So not individual entities, but large systems made possible by the convergence of science and industrial production. This, in a nutshell, is what named Bill is trying to give us all these different, possible at all for him a useful ways of thinking about what technology is. He also tells us at the very end of the piece to things that he thinks technology is not. So two ways in which he thinks it is dangerous or pathological. But think about technology. He warns us that technology is not just gadgets. And by that he means technologies, not just the material thing that we should not think about. The things that they be, the effects that technology has, the function that it produces. You shouldn't think of that as a result of what he calls the intrinsic physics of the thing. So it's not all about material, right? He wants us, I think the thing that's most important to him in this piece is trying to get his rleader to understand that technology is all about choices. It's about sort of this intentional design process that involves his value-laden decisions about how technologies ought to be built. And we can't reduce that to the material properties of a same technologies, not just material and technologies are also not inevitable, right? That we can't separate technology from the context that it's being developed and being used. And it's not the case that technologies would have developed the same way on different people were involved in making them, or if they were being developed at a different place or different time. There's nothing that is kinda just how things are about IT. Technology, again, it's a result of a, of a, of an extended process, a result of a series of choices. And those choices have people behind them, and those people have values and ideas. And so he gives us this sort of final, his bad definition, who's like dark definition of technology, that pathological one that he doesn't want us to pay or what they know about it, but not think this way. Technology as a way of seeing the world in instrumental end means terms that projects a bogus scientific objectivity, hides the power of technology, and mistakenly presents things as natural when they are not. So he wants to tell us, technologies can be powerful. Technologies can change their environments. At, as he said, technologies are not natural. They are produced, they are produced by people. There produces a result of this process. That process involves lots of choices. Thinking about technologies as sort of powerless and natural may seem scientifically objective, but actually is not what he's saying here. When he says projects a bogus scientific objectivity, he's, he says that sometimes people will sort of present technology that neutral or as powerless under the guise of being objective. He said this is absolutely not Bina Objective. This is obscuring the truth of what technology is. So He wants us to acknowledge again, the choice and the power behind technologies and the fact that they are made, they are artificial, they are not natural. So this is a warning to us that he closes with. Alright, so I know that was a lot. These are the big points that I want you to take away. Some of the smaller stuff is obviously important too. But on a sort of high level, this is what I want us to get from named Gil. The meaning of technology is not as old, Northern as constant as we tend to think it is. It's a relatively new term in the way that it's meaning has changed. Technological knowledge depends on tacit knowledge. So it depends on our knowledge that we've gained from our experiences and our surroundings. Technological designs and development depend on choices that people make. And those choices are value laden. That's what on infused with values, value laden means the same thing. Affected by our values, affected by beliefs that we have about the world. There are multiple valid ways of thinking about technology because it's when he's given us six definitions. Each of them may be appropriate in different circumstances. And finally, beware of oversimplified, falsely objective understandings of technology. Beware of thinking about technology. It's just material or if inevitable, or something that is naturally occurred. And this is what I want us to get from naming gal. Okay, I'm going to skip this slide and I'll come back to it. So I want to actually a general question about this first before I go to the mini assignment and the rest of the class. And he major things about this that are not clear. Okay, moving on for now, I will get to your specific mini assignment. First, I want to say a couple words in general about many assignments. So as I introduced during our last class, you will have ten mini assignments to complete stirring this course. There will be one corresponding to every class. You did not have one on Mondays? We did not have one for our first class of one you'll give me today is the first one. And we will also not have one For our last class, and we will not have one on the day of the quiz. But other than that, every Monday and Wednesday that the class meets, you will have immediate assignment to do. These are intended to take the place of the in-class activities and discussions that we would normally have. So I note today's lecture is gone a bit long. It's still definitely not gonna go until 531 of this course is taught face to face. It's 2.5 hours, two hours, 45 minutes long. And we incorporate a lot of non lecture activities into the class. So the mini assignments in general are my attempts to give you a way to engage with the material that's different from just hearing me talk at you about it through through zoom. So these will be different assignments for every class. I'm not going to ask you to do the same thing every time. I will be giving you different products every time I will always give you instructions during the lecture and I will post instructions on Moodle.  
  
Also. They should be completed within two days of the course. So my suggestion is to do them right after the lecture ends. Will the material is fresh in your mind. And so you've got kind of the experience of being in like 2.5 hour long class. You don't have to do it that way. Assignments that I give you on Monday will be due by 245 on Wednesday. So before the next class starts, assignments on Wednesdays will be due by the end of the day on Friday. I didn't give you a particular time. I don't particularly care what time on Friday you I will not look at them until Saturday at the earliest. So you can do them by 245 or you can do them before midnight. It doesn't really matter to me. So I guess technically you have a bit more time for the Wednesday ones, but it's not a huge difference. Basically, you have two days to do them, all ten assignments, again, as I said on, and they will be graded for completion. So for every assignment I'm gonna go through and check who did it. I will give you a tick mark if you've done it. As long as what you've written is not complete nonsense. But I can see, if I can see you've made any attempts to complete the assignment, I will give you a 100% for that at the end of the semester. And we'll pick two of the many assignments randomly, and I will grade them for quality. So I will be evaluating just for two out of the ten, how well you've done them. So you get half the marks. 10% of your final grade is gonna be just have you done these? An additional 10% is going to be how well you did to random particular assignments that I will grade at the end of this semester, I'm making an exception to my normal late policy for these. I'm just giving credit across the board for any late assignments rather than the kind of 1 third of a letter grade per day deduction thing because I'm I'm only going to be giving the completion grades will be like checkmark or no checkmarks. So it doesn't really make sense to change a letter grade. If you had it in late, you'll get half credit. If you have some kind of extenuating circumstance and you really can't do it within two days, let let me know and I can talk about not producing your grade, but in general, do it within two days of the lecture. You'll get full credit for completion. If you do it after that, you'll get half credit. That's how this will work. Questions about this in a general sense before I get to describing the one for today, okay, let's talk about the one for today. So today's mini assignment is asking you to sort of engage a little bit more with some of the Nightingale's definitions of technology. So the first thing you gotta do for this one is to pick a technology that any technology that you want. It can be simple or it can be complicated. It can be physical or it can be non-physical. It can be kind of a category of technologies, or it can be one particular object. It's totally up to you. I put some examples on here of different, radically different types of technology. Instagram, a coat hanger An Oculus Rift headset, birth control pill of vacuum cleaner, a spaceship, Google's search algorithm, and the Lyman scooter, just to name a few. You don't have to pick one of these. You can pick anything you want. This was an example of the range of things that you can pick, pick a technology. Your assignment is I'm to choose three of nine gills, six definitions. And you don't do all six p63, pick whichever three you want to explain how the technology that you have picked corresponds to three of nine gills, six definitions. By this I mean, if you pick definition one, which I would suggest that you all pick because it's the easiest You explain. What about this? Technology is an entity, what its function is, and why that function is artificial. So what is the entity? What is the thing that produces the function that it produces, and what is artificial about that function? Basically explained how this technology is a technology according to the definition that you have picked. So do that for three definitions for the technology that you have chosen and post these explanations. Are these justifications in the discussion forum that I've created for this mini assignment on Moodle, you will have to write a lot. This is not a formal essays, so you don't need to include citations. It doesn't, your writings skills are not being graded here. What will be graded if I choose this one to evaluate for, for, for, for quality is essentially your understanding of that and gills definitions and the success with which you demonstrated that the technology you pitch does belong to these things. So I'm expecting a couple of sentences, maybe a short paragraph for each definition. It doesn't have to be super long. You know, it could just be two representatives for each definition. Obviously, the sort of more basic definitions would probably lend themselves to shorter explanations. But so it's, it's really the exercise here is a thinking exercise. Let more than a writing exercise. They're really not grading the quality of your writing. I'm grading the quality of your understanding if this gets fixed for a quality evaluation at the end. So think about this picket technology. Have a look at the day definitions. Post your response on Moodle. Please just write your response directly in the forum. Don't upload a file and makes it easier for me to check it that way. You're of course, welcome to rate it in whatever program you want and then just copy it into the thing on Google if you want. And this is due by the end of the day on Friday. Maybe eight questions about this. So obviously the assignment will be posted on the notice that you decides that you had today during the presentation without BIM models? Well, yes, the slides are on that time and formula Moodle. And I am also recording the lectures and putting those, making those accessible through middle to nominally for anyone who can't attend them live, but also for anyone who wants to review anything I said. Fantastic. Thank you. Other questions about this. Ok. So that's her many assignments finished today or in the next two days. Last thing for today's class, Reflection essays. So we've got, this is your first one of these is not due for another week and a half. So it's not something you need to think about immediately. I think since we've already gone on for quite a while today, I will just give a brief introduction to this and we can talk about it and maybe we'll refresh everyone's memory is about this. Next week. I have posted a handout on Moodle about the reflection essays that also includes the rubric. So I have not duplicated everything from that handout on my slides, but I would encourage you to read the handout as well. Basically, reflection essays are an opportunity for you to reflect, as the name would suggest, on the readings and the class discussion and to communicate your own thoughts about the class topics to meet. So I'm looking for your own opinion or I mean, I'm looking for an argument from me. You don't have to argue a point of view that you agree with. Although it might be easier for you if you do. There's no right answer or specific opinion that I'm looking for. I'm not grading what your opinion is. I'm grading how well you have communicated it, how well you understand the course material, how sort of logical and clear your reasoning and evidence. So generally speaking, I'm not prescribing a particular essay format, but I will suggest one that is the easiest one to do. Generally speaking, your essay should have a beginning, a middle, and an end. Like any good piece of writing, they should also be making one central arguments. So there should be one mean overarching point that you are trying to make in a reflection essay. And then you should have probably two, maybe three reasons that support the point of view that you are advocating for. It's important that you include proper in-text citations and a list of references at the end of the document. The handouts contains a link to the Concordia Library website, and it's sort of description of different citation styles and details about those styles. I think I will talk a bit more about those during Monday's class. Just for time reasons, I'm going to make sure that everyone is clear on what it means to include into the kitchens and the list of references. But for now, just know that you need to have them and that there is a link to the Chicago Style Guide in particular. Although you're welcome to use IE I Tripoli or MLA or APA, or any sort of citation style that you are most comfortable with for these essays, as long as you are using it consistently. I just saw two people raised their hands and it's not telling me what your names are, so okay. Question about topics in the chat. I will get to that in just a minute of the next slide. If you're one of the people who raised your hand, go ahead and ask whatever you want to know.  
  
Her can go first. Do you have another question? Or was the Hansel raised from Alice from Assam? Sorry. Okay. Alright, Daniel, go ahead and just, just to confirm again, I might've missed heard at the mini assignments that you give the request of the one on on Monday, Tuesday, Wednesday, and the one on ones is due Friday. Yeah, exactly. Okay. Perfect. I heard writes them because because in the syllabus it's a view in the next class I got. So yeah, that's true. I guess that's true for the Monday one slipknot that when k one, I will update the filled to fix that. Okay. So Wednesdays are due Friday and again ok. Perfect.  
  
Perfect. Thanks. Ok. But again, that's the mini assignments, not the essays that we're talking about. Now being essays are a different assignment. Your first essay is not due until finally the 15th, but your first mini assignment is due this Friday, V8. In terms of topics for the essay is probably the most difficult part of the essays is choosing a topic. Because unlike the mini assignments for the essays, I will not give you a specific prompted. It's up to you to choose what you would like to write about for the essays. And most people find is the most difficult. Part of this is figuring out what they want to write about and how to kind of develop a concise arguments. My suggestion for how to do this effectively, how to pick a topic. It's first of all, to pick an aspect of the readings or the class discussion that somehow stood out to you. And then you think about why it stood out to you. Did it stand out because you strongly agreed with it or because you disagree with it even made you angry or father you?  
  
Maybe. Was there a concept or a term that was brand new for you that you thought was interesting or just noteworthy? Did you find that there was something missing from an author's argument? That the argument was a less than convincing for some particular reasons, that there's something that the author that you think they ignored or that they could have added or changed that might have strengthened their their arguments. Do you see a connection between either between two or more ideas or texts from the class, or between something from class and something else that you would have experienced or know from other contexts. I think about your reaction and then try to develop that reaction into an argument. So in to a particular point of view, into a thesis that you can defend with evidence. There are more details on the handout, but I don't have any slides about length. Basically, these are relatively short essays. They should be about 600 to 700 words, which is about to double-spaced pages of rating. You are not sure about a topic or if you have like a question about your particular assignment, you're welcome to email me about it and or sort of meet with me one on one to discuss and try and help develop your idea. A good, good question in the chat, and I took it from a reflection essay, overlap with mini assignment work. Yes, it can definitely overlap. I don't want you to just repeat what you've done from the mini assignment. But if you thought a main assignment prompt was really interesting or could have been, could be something that you could develop into. It's like a more detailed argument than Yes. You can talk about the same idea that you have discussed in a mini assignment. Just don't copy the text from one to the other. That would not result in a very effective reflection essay if you did that. But yes, absolutely. Feel free to take ideas that you've worked on in mini assignments and expand them into into essays?  
  
them into into essays? I'm trying to remember. No, I don't have any. No, I don't have any more slides about this. Please take a look at the EPA guidelines. And again, I will talk them out. I will redo this and I will add some more details, especially about citations during Monday's class when the due date for the essay first. As it gets closer on, if you have questions about this, now feel free to ask them if you have it. Individual questions about a particular idea that you're trying to develop. Uninhabited top. About what? Talk about that with you one-on-one for now though, because I know we've been going for a while. I'm just gonna go through the hits for next week and then I will stop the recording. But Hangout if other people have questions. So next week, the FEM for next Monday's class is, I call it the technology society relationship, which is quite broad. In basically, we're gonna be discussing different theories about the relationship between technology and society and these sort of distribution of power within that relationship. In other words, we're gonna be talking about questions like how much power do technologies have to influence society and influence the world around them? How much power do we have as people or groups of people or an entire societies to dictate the course of technological development. This is a kind of set of questions we're going to be talking about. So we're going to be coming back to ideas like technological momentum and technological lock-in that Nightingale has mentioned as part of this larger current conversation. And we're gonna use some theory and some examples from the two readings that are assigned for Monday in order to talk through this thing. So you have two readings from Monday. One is by a guy named Langdon Winner. It's called Do Artifacts have Politics? The beginning of this piece is a big theoretical and we will, I will give you some context during the lecture to help you better understand that theory. But really what I want you to get from this R&B examples that he uses to illustrate the different ways in which he says technologies can have politics to use his terminology. So spoiler alert on the answer to the question. And his title is Yes, he does think that artifacts politics, he does think that technologies are political. And what he does in this piece is described some different ways in which he thinks that can occur, in which he thinks technologies can have politics. This text is quite old. It's from the early eighties. And it's, it's a, it's a, it's a classic. It's a very well-known and widely read and widely discussed article. So I'm pairing it with something that's quite a bit newer, although not super new. On this piece by Lawrence Lessig called for puzzles from cyberspace. This is a part of a book that Lawrence Lessig wrote called Code 2, which is concerned with kind of regulation of the Internet among other things. And I've assigned it because I think the examples that Lessig misguidance kind of dovetail with some winners, examples of interesting waves. So when you read the winner piece, which I would suggest reading First, I would suggest that you try to understand the different ways in which one he says Technology can have politics. And then when you read Lessig priciple, just enjoy the stories and the puzzles. I think they're kind of interesting scenarios, but sort of beyond that, trying to think about how these stories that he presents relate to the arguments that Langdon Winner hasn't made in both of these pieces are markedly less complex than name Gil especially lessons. Lessons is very readable. There's a bit theoretical, but he uses lots of practical examples that you can kind of hit hang onto that helped those three because arguments, so the less than p should be quite a bit simpler to read them named Bill winners piece should also be simpler. But to give yourself some time as there are two things to read from Monday's class. Okay. That's all I have for today. Thank you for bearing with me through this lengthy discussion of a very dense piece of writing. Thank you for reading through it. I am going to stop the recording now, but I will hang out for a bit and I'm happy to answer questions that anyone has.