

Defining 'Technology'

1. The Problem With Definitions: One thing philosophers are good at pointing out is that it is really hard to define the essence of something. For instance, think about a sandwich. What IS a sandwich? Let's give it a shot, by way of a dialogue between Euthyphro and Socrates:

Euthyphro and Socrates: The Sandwich (by UMass professor, Marianna Ritchey [here](#))

— Well, Socrates, I am happy to tell you what a sandwich is, as I have great knowledge of these things as you know.

— Thank you, Euthyphro, I will be glad to listen to you, for you are a learned man and I am just a poor beggar. So tell me, please, how can we know that which is a sandwich, apart from those things that are not sandwiches?

— Socrates, it could not be more simple. A sandwich is anything edible held in a container that is also edible.

— I see; that is very clear indeed. So this taco is a sandwich.

— No Socrates, that is a taco. A sandwich is something quite different, as you may quickly see by noting that they are called by different names.

— And yet, Euthyphro, here we have some soy ground beef—surely this is edible—and as you see, it is held in this container, which is a fried tortilla, and which I eat along with the material inside. Surely this is a sandwich!

— Well, Socrates, that is not quite right. I will try to be more clear: a sandwich is that which is edible, held in a container made of bread, surely.

— So then this hot dog, of course, is a sandwich. Thank you, Euthyphro!

— Well Socrates... a hot dog is something very like a sandwich, and yet it does not seem to me to be exactly a sandwich either, somehow. I see where you have misunderstood—let me clarify. A sandwich consists of some edible material, in between TWO pieces of bread, which must be separate from one another.

— I see; that is very clear indeed. So this pizza placed face down atop this other pizza, this is a sandwich.

— No, Socrates, I see that you do not understand at all. That is nothing like a sandwich.

— Now Euthyphro, how can this be? For truly here I see edible items—those are cheese, tomato sauce, and vegan pepperoni—and they are indeed to be found in between two pieces of bread—that is the pizza crust. How can this not be a sandwich, then?

— Well, Socrates, you have twisted my words around somehow. I did not mean ANY edible items in between ANY type of bread; I meant something rather more specific.

— Now Euthyphro, you are teasing a poor old man. You told me you would explain what a sandwich was, so that I might learn from your wisdom, yet now you seem to have told me nothing at all.

— Socrates, I will try to explain so that you might understand. A sandwich must be easily held in the hands, whereas two pizzas atop one another, as I'm sure you can see, are quite impossible to hold easily in the hands, as the whole is much too large and floppy.

— Ah, thank you Euthyphro, now I feel we are getting somewhere. Truly, now I think I understand. If a sandwich is something edible in between two pieces of bread, with the whole composed in such a way as to be easily held within the two hands, then obviously three pieces of bread, held together in the hands, is a sandwich.

— I do not see what you mean, Socrates. Surely a stack of pieces of bread is simply a loaf of bread, as any man knows.

— Now Euthyphro, you seem to be teasing me again, for look, here is a piece of edible bread, placed in between two other pieces of bread, the whole of which, you must agree, I hold quite easily in my hands, withered and shaking though they may be.

— Well Socrates, it is true, now that I think on it, that these three pieces of bread do in fact ascribe to my earlier definition. And yet, anyone could tell you that this is not a sandwich.

— Then Euthyphro I think you must start over, if you are ever to help me understand. Come now, don't keep an old man waiting. Surely one as learned as you should easily be able to explain what a sandwich is to a poor old fool such as myself. Please begin again, and this time try to be more clear.

— Socrates I really must go, I will be late for my appointment.

Defining things is hard! Especially because, a GOOD definition is generally thought to be one that identifies the features of some particular concept or category, where:

- (i) Every member of that category has these features. (*necessary conditions*)
- (ii) Everything that has these features is a member of the category. (*sufficient conditions*)

It seems that, for any definition of 'sandwich' that you attempt to give, which meets criteria (i) and (ii), there exists a counter-example; i.e., something that meets those criteria, but does not seem to be a sandwich (in which case your definition is too broad); or else something that IS a sandwich, but does not meet those criteria (in which case your definition is too narrow).

Socrates famously used this style of reasoning in order to demonstrate that we do not have a very firm grasp on the meaning of things like justice, virtue, beauty, and so on. As we'll see, 'technology' probably also belongs on this list.

2. Three Definitions of 'Technology': When we hear the word 'technology', we probably picture computers, iphones, robots, and so on. But, surely technology is not limited merely to things that run on electricity and have computer chips in them. For instance, isn't a suspension bridge a sort of technology? How about a loom, or a bellows, or a butter-churner? (think of Colonial Williamsburg). How about an arrowhead? or fire? Let's consider three proposed definitions:

- (a) **Technology as Hardware:** 'Technology' refers to any physical objects that fits some particular description (perhaps, a thing that does not occur in nature, is created/built to fulfill some intended function, etc.); e.g., tools and machines.

Questions: Some things to think about:

- *ANY physical things?* What about beaver dams, bird's nests, ant hills, or tools that apes uses (like sticks used to fish termites out of the ground)?

[We might think that technology must somehow "transform" the things found in nature. But, a stick is still a stick. A beaver dam is still a pile of logs, etc. So, they are not technology. But, then, a log cabin is NOT technology? It's still just a bunch of logs. And a beehive or a spider web IS technology? Bees and spiders DO transform materials in order to make these things.]

- *Does context matter?* What if the thing is no longer used AS technology? For instance, is a plane abandoned and deteriorating in a rain forest still technology? Are a bunch of CD's glued to a wall to create art still technology?

In short, does the CONTEXT of a thing matter? Does its use/function matter? Perhaps technology does not MERELY include the physical object, but is rather a **system**, including the object + its function + its context + the people who use it, and so on?

- *NON-physical technology?* Is all technology "hard"ware (i.e., physical, or made of matter)? Could **language** be considered a technology that we invented in order to better communicate with one another? Could *ways that things are done* be considered technology (i.e., do **techniques** count as technologies)? [For example, we regularly say things like, "What is your technique for relieving stress?" (or for persuading others, or getting this jar open, and so on)]

- (b) **Technology as Software:** The above considerations about language, techniques, etc. has led some to propose the following: 'Technology' refers not to the physical things themselves, but rather to a kind of activity; namely the usage, creation, modification, alteration, and knowledge of tools, machines, or systems that are employed to achieve some specific function.

This is in fact how the word 'technology' was primarily used up until around the 1800's—In the ancient Greek, it is literally translated as *the study of a skill or art or craft* [**techne** = skill, art, craft ; **-ology** = the study of].

- (c) **Technology as Applied Science:** 'Technology' refers to the application of scientific principles to produce artefacts. The idea is that technology emerges out of science. Scientists propose principles and laws, test them by experiment, and then engineers and inventors apply their findings to construct new technologies.

Problem: But, surely not all technologies are the result of taking scientific principles and applying them in the production of things. For instance, inventor Thomas Edison did not know the principles of electromagnetism. Or, going back further, our primitive ancestors knew nothing at all of science when producing their artefacts. And there are many examples of accidents resulting in new technologies:

Safety glass was discovered when a chemical solution was spilled on a piece of glass laboratory apparatus, the glass was accidentally dropped, and it did not break. Penicillin was discovered when a bacterial culture was accidentally contaminated by a mold. Paper chromatography was discovered when a scientist accidentally spilled some chemical on a filter paper, and the chemical separated into two components as it seeped up the paper. The Post-it was discovered when a technologist, Art Fry, using little bookmarks in his hymnal, remembered a temporary glue that a colleague, Spencer Silver, had developed back in 1968 that was too weak to permanently stick two pieces of paper together. ... Charles Goodyear's development of [vulcanized rubber involved] ... him accidentally leaving his treated "gum elastic" on a hot stove, and noticing that it charred like leather. (34-35)

So, it seems as if, often, the technology comes first, and THEN we conduct scientific inquiry in order to understand and explain it after the fact.

[Note also that, if we expand "application of science" to not be restricted merely to the application of scientific principles, but to ANY sort of investigation that involves trial and error, such as those above, then almost all inquiry counts as technology.]

3. Three Theories of Terms: When providing the definition of a term (let's use 'dolphin' as an example), what are we doing, exactly?

- (a) **Real Definition:** There is a REAL category (or species) in the world, to which we apply the label 'dolphin'. We do not just "make up" labels and slap them on things, but rather DISCOVER the true categories in nature, and then assign names to them. The goal is for our terms to "carve nature at its joints" so to speak. To provide the definition of a term, then, is to supply the REAL ESSENCE of a category or thing that exists objectively in the world, independent of our discoveries.

- (b) **Stipulative Definition:** The only sense in which there is a “real” category called ‘dolphin’ is the sense in which WE decided that there is. We aren’t DISCOVERING the “true” categories of nature. Rather, we are CREATING them based on our own stipulations about what terms we want to have, and how we want to define them. To provide the definition of the term, then, is to supply the REAL (but human-dependent) MEANING that we have given to some thing(s) in the world.
- (c) **Reportative Definition:** The meaning of ‘dolphin’ is not determined by stipulation, but rather by USE. To provide the definition of that term, then, is merely to describe how it is in fact used by people. Unlike (a) and (b), there is no “proper” usage of the term ‘dolphin’—only some facts about HOW it is used.

[Note that this is what lexicographers do when they include new words in their dictionaries. For instance, if the word ‘selfie’ gets added, they are merely reporting to us HOW this new word is being used by language-users.]

So, which is it with technology? Is there (a) a REAL, OBJECTIVE category of technology, and objectively right and wrong answers about whether something counts as technology or not? (b) a REAL, SUBJECTIVE category of technology, where we get to decide what counts as a right or wrong answer about whether or not something counts as technology? Or (c) merely a word, ‘technology’, which is used differently by different people, with no right or wrong answers about who is using it correctly and who is not?

4. Other Questions: Other things to think about, regarding the nature of technology:

- **Is technology neutral?** We often think of a piece of technology as a mere, inanimate thing that is not instilled with anything moral, or political. It is morally neutral, politically neutral, and so on. For instance, Noam Chomsky once [said](#),

Technology is basically neutral. It’s like a hammer. The hammer doesn’t care whether you use it to build a house or whether a torturer uses it to crush somebody’s skull, the hammer can do either.

But, is this right? It sounds like those who say, “Guns don’t kill people. People kill people.” However, others point out that nothing exists in a vacuum, and that DESIGN, INTENDED PURPOSE, and SOCIAL NORMS affect HOW things are used. Simply put, if you want to bake some cookies, a gun won’t help. If you want to murder someone, it will.

Is an atomic bomb morally neutral? Or rather, does its design, intended purpose, and normal use strongly encourage death and destruction?

Is a nuclear power plant politically neutral? Or rather, does its existence necessitate or “lock us in” to a political structure of centralized power, a system of enforced safety and regulation, and military protection? (after all, we must be able to ensure its use is safe, and also that others do not steal our uranium/plutonium)

Consider also the bridges of architect [Robert Moses](#), which were designed to keep racial minorities out of certain parts of New York City.

• **Are we in control?** Assume that the universe is uniform in its matter and laws of physics. For any intelligent beings in this universe, is it inevitable that they would discover fire, and stone tools, and develop a verbal or written form of communication, and develop the ability to navigate the land, and seas, and air—and even space—in machines of their making, and even one day create devices that are themselves intelligent? Those who answer ‘yes’ to this question hold some form of **‘technological determinism’**, or the view that technology is in some sense *inevitable*. WE are not really in control. Technological progress shapes US rather than the other way around. [*What do you think?*]