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Socrates and the Maker Movement: Questions About the Ethics of Free Information

1. Introduction

We live in an internet full of free information. Free information is everywhere. Free information can also be dangerous. Information is no longer merely ones and zeros. Innovations such as the internet of things (IoT), 3d printing and augmented reality show that the barrier between the internet and “the real world” is rapidly dissolving. In the meantime, the Maker-movement, a subculture of hobbyists, and DIY enthusiasts are putting troves of potentially dangerous information online, free for anyone to reference- and use.

A temptation to regulate and restrict is rising with the jarring amount of “dangerous information”, information that could be used nefariously- with devastating effects becomes easily and publicly available. With this essay, I intend to show both the dangers and the merits of free information, especially as it pertains to the maker movement. I also intend to argue that with few exceptions, free information- even dangerous information cannot be ethically restricted.

1. The Maker Movement

Once again, a rising subculture of creative types is breaking old rules. In his book, The Maker Manifesto, Mark Hatch describes the relative ease with which members of makerspaces are able to produce prototypes for inventions. Where once, a prospective innovator had to work to please the likes of venture capitalists and angel investors just to earn the chance to show a prototype to a manufacturer, Makers use their own disposable income to fund their projects, considering the expense to be for a hobby. As such the maker movement is helping inventors to bypass throngs of middlemen. As an example, Hatch describes the stories of the iPad DODO Case and an “animal warming device” now used by the national Institutes of health to warm animals recovering from veterinarian surgery. This device was not created by a veterinarian or an engineer. It was rather created by a maker named Tim Jahnigen.

“If one uses disposable income to innovate, there is *no* economic cost. No investment committee, no stage-gated innovation process, no business plan competition, no incubator review committee, no venture capitalist, PE firm, or SBA loan committee. It’s just a personal decision to buy some materials, learn how to make something, and then spend the time building it. From an economic perspective, this innovation is free.”(Hatch, page

At the start of his book, Hatch provides a condensed version of his manifesto, which shows some of the values of the movement. Most relevant to this essay are rule two, rule four, and rule eight. Rule two is sharing, both original creations as well as information. Rule four is learning, and Rule eight is supporting the larger community.

The movement argues that making is fundamental to what it means to be human, Hatch refers to the creation story in Genesis to make this point- humanity is created in the image of a creative God. The movements focus then, is not really on the product that is created, but on the process of learning and creating that leads to eventual discovery and innovation. Hatch explains that because makers work with much smaller budgets than those afforded by professional design firms, makers enjoy minimal economic risk when trying and failing at an idea.

The movement has resulted in maker fairs, conferences for hobbyists to share their creations; as well as in maker spaces, community workshops that often allow members to share tools and meet together to work on a project, or even to host classes.

III When Making Gets Dangerous

For my own part, I have used YouTube videos to learn how to create model rocket engines. My family has a tradition that every New Year's Eve, we invite some relatives and friends to our house and set our Christmas tree on fire at midnight with a cluster of fireworks to go with it. In recent years we have been trying to create the illusion of a smaller "tree" blasting off and flying away like a rocket. We have had some success using model rocket engines to achieve this, however model rocket engines are expensive to use. Fortunately, there is plenty of information online concerning how to create one’s own rocket engines using very cheap materials.

To attempt this, I referred to particular videos from a YouTube channel called "the King of Random", a channel created by a YouTuber named Grant Thompson. The King of Random’s projects are presented in a way meant to be easily replicated by the viewer- the king of Random usually provides viewers with all the relevant dimensions and sometimes even templates needed to create projects. Some of the more dangerous items the king of random explains includes how to cheaply construct rockets and even fashioning weapons.

Using Thompson’s instructions, I was able to create a blend of "rocket fuel" that uses sugar and stump remover. The resulting "white mix" burns up rapidly when exposed to even a small flame. When packed into a piece of PVC pipe sealed with clay kitty-litter, the rocket fuel can produce thrust.

It is not difficult to see the dangers of this kind of play. If someone follows those instructions improperly, they could easily hurt themselves, others, and damage property. Inhaling dangerous chemicals, accidently igniting a rocket while trying to drill a hole for a fuse, and of course, launching the rocket in the wrong direction are just a few ways to mess up with potentially disastrous consequences. To the King of Random’s credit, Thompson urged his viewers to join their local rocket clubs before attempting the project he demonstrated in his video.

<https://www.youtube.com/watch?v=12fR9neVnS8>

One Channel, Blasted Science, made their own version of the King of Random's sugar rocket engines, while seeking to clarify some details that Grant Thomspon did not address. However, unlike Thomspon, who tested his motors in a secluded area far from other people or property, Blasted Science ignited at least one untethered rocket engine in the middle of a street in a suburb, allowing it to fly about the open air of the street.

<https://www.youtube.com/watch?v=QQGAcq_9zNg>

Both the King of Random and Blasted Science have put this information online for free. Anyone with a few bucks to spare and time to listen can build their own flying missiles.

Grant Thompson faced criminal charges in 2018, when a neighbor complained to their local police about an explosive device Thompson detonated in his yard. A court trial could have left Thomspon with as much as a fifteen-year prison sentence, fortunately for Thompson, his local authorities offered a plea deal, in which Thompson agreed to make a video about “physical safety and/or the legal risks associated with experiments that could be dangerous”. (<https://www.tubefilter.com/2018/05/21/grant-thompson-king-of-random/>)

Thompson was given a year and a half to produce this video, sadly the video never came as Grant Thompson died in 2019 in a tragic paragliding accident. (<https://www.nbcnews.com/pop-culture/celebrity/youtube-king-random-star-grant-thompson-dies-paragliding-accident-n1037116>)

It is clear that projects with the potential to be dangerous draw in some makers (including myself apparently). DIYers have a desire to explore, create, and innovate. As such, dangerous projects present opportunities to test their abilities, and learn in an exciting way. Dangerous projects might also allow makers to create objects that would not normally be sold in stores. This might create an illusion of originality for the DIYer. If companies are too reserved to create a dangerous product, makers might view it as inventiveness to discover and create the same concept on their own.

Like the King of Random and Blasted Science, many post their innovations, and projects online for anyone with such sites as Instructables, a DIY website with written tutorials for many different kinds of crafting projects, with decent wifi to see, and if they so choose- replicate. Posting information is encouraged by the maker movement, as it allows the maker to share the knowledge they have gained and thus support and build up a larger community.

In a university setting, checks and balances are used to ensure projects (even dangerous projects) are performed responsibly and with the right approvals. A university itself might even be considered a kind of buffer with the likes of admissions committees and weed-out classes to regulate what prospective students are given access to the knowledge they are seeking. I do not intent to suggest that makers are likely to ignore the rule of law or safety when pursuing a project. However, online there is no real buffer to keep dangerous information (how to make a missile out of stuff you can buy cheap, for example) of the hands of makers who would use it recklessly or harmfully.

This lack of checks and balances raises the ethical question. The only way a “buffer” could be implemented would infringe upon the maker’s right to free speech. This exactly has been the argument of Defense Distributed, a company created by crypto-anarchist, Cody Wilson. In 2013, Wilson produced the first near-fully 3d printed handgun. Wilson demonstrated his creation in a video that went viral with what Moses Znaimer called “The Shot Heard ‘Round the World”.

<https://www.forbes.com/sites/andygreenberg/2013/05/05/meet-the-liberator-test-firing-the-worlds-first-fully-3d-printed-gun/#7cbe621752d7>

Wilson named his plastic firearm “the liberator”, a reference to cheap handguns that were paradropped into Nazi occupied France in World War II. Defense Distributed posted the liberator’s design file for free online, and has since hosted many other CAD files from users on the sight. As of 1 June 2020, Defense Distributed's “DEFCAD” website hosts over 16,000 design files that can be downloaded and fabricated via a 3d printer or a milling machine for free.

Ever since the Liberator’s appearance in 2013, Defense Distributed has been fighting a near constant legal battle to demonstrate just how disruptive new technology can be in the law. The CAD files on Defense Distributed’s website include not only handguns but even parts for assault rifles. A 3d printed weapon has no tracking number. And can be fabricated discreetly.

Wilson first began publishing gun design files to purposefully spark up controversy. Wilson aims to undermine the “ideological forces of American gun control” (<https://defdist.org/>) and to demonstrate a philosophical point. In an interview with Moses Znaimer, Wilson said,

“The 3d printer to me suggests the historical transcendence of the state, of the nation state specifically. I think even in ways we might all agree, the nation state is dissolving, the traditional institutions are all dissolving. In their place what’s filling the vacuum is something much scarier, I don’t think that human liberty is coming into being. In fact, it seems to be something like a trans political permanent state of emergency: the secret laws, the technological kind of coo against democratic control... I think that technologies are defeating democratic control on both sides of this left-right paradigm. I think our vision represents the transcendence of the state toward the empowerment of the individual and not to his total domination.” (<https://youtu.be/E3lKXEuQTA4>

In 2014, Defense Distributed began selling the Ghost Gunner, a desktop machine built with printing 3d weapons in mind. Wilson has written ab book titled, “Come and take it” is a reference to “Molon Labe”, a laconic phrase said to have been used by Leonidas I of Sparta at the battle of Thermopylae, after Xerxes I of Persia demanded the outnumbered Spartan army surrender their weapons and later used by Texan settlers in the Texan revolution.

It is important to note that 3d printing does not yet complete all steps of the fabrication process. 3D prints must often be printed in small parts to then be assembled, and will take several hours to print successfully. 3d printing can be a tedious, careful process and not all parts are 3d-printable. According to Andy Greenburg, Wilson’s original Liberator handgun contained one small metal nail, (probably available in hardware stores everywhere) used as a firing pin, but was otherwise entirely 3d printed plastic.

In 2018, the United States State Department issued an order to take design files down, on the grounds that Defense Distributed violated laws regarding selling weapons overseas. (Carrberry, Catie) Defense Distributed complied with the ban but sued the State Department. The suit resulted in a settlement with the State Department that permitted Defense Distributed to put its files online again. This ruling was contested by the District of Columbia which ruled the exception made for Defense Distributed to have been unlawful. Five days after the ban was lifted it was set again, and has been ever since. (<https://defdist.org/>)

Never the less, the idea of a weapon is becoming ubiquitous with the possession of a weapon. Defense Distributed’s plight appeals to both the first and second amendments of the constitution. Defense Distributed may even demonstrate that the first, second, and possibly fourth amendment are converging, and revealing themselves to be different forms of the same fundamental right. Regardless of what happens to Defense Disributed, CAD files for 3d printed weapons are in the air. They have shared across the internet, and as such they can be reshared. If people have a right to possess and share ideas- including papers, mathematical formulas, and even designs, and should not be required to resign their files in an unwarranted “seizure of papers”, then even without a second amendment, they have the right to at least arm themselves with the idea of a weapon- an idea stored in a CAD file that could be used to fabricate a very “real” weapon at the press of a button.

For better or for worse rise of the internet has made information more accessible than ever. Thus, the maker movement raises an important question in the ethics of communication. Is it more favorable to allow the free communication of ideas- even if some dangerous ideas will be transmitted or to restrict speech, stifling innovation in the interest of safety?

IV Socrates’s Nightmare

We live in one of Socrates's nightmares. In *Phaedrus,* a dialogue by Plato, Socrates is depicted having a conversation with Phaedrus. Nearing the end of their discussion, Socrates and Phaedrus consider the merits of writing. Socrates recounts an Egyptian myth in which the king Thamus critiques the invention of writing to the god Thoth,

"And in this instance, you who are the father of letters, from a paternal love of your own children have been led to attribute to them a quality which they cannot have; for this discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves. The specific which you have discovered is an aid not to memory, but to reminiscence, and you give your disciples not truth, but only the semblance of truth; they will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality."

(Plato quoting Socrates quoting Thamus, *Phaedrus)*

The myth Socrates cites illustrates the difference between true learning and merely stowing away ideas in an external cache. If a person stores information in a physical medium, rather than their own minds, then they fail to fully enrich themselves with the knowledge they store in that book.

The myth Socrates brings up is similar to the modern concern that the modern person's reliance on the internet could become a detriment to their development as humans. The internet is becoming like a massive encyclopedia which is used for constant reference rather than training. Today we carry devices in our pockets, and smart house devices that can relay our questions straight through a digital composite of human knowledge. Terabytes of data can be encoded into the space occupied by a book. As a result, the need for route memorization diminishes as humanity becomes increasingly reliant on its man-made brains of solder and silicon.

Socrates's criticism of writing is similar to Plato's idea of forms. Later in the same discussion, Socrates inquiries about a word “of which the written word” is a mere image of.

“Soc. Is there not another kind of word or speech far better than this, and having far greater power-a son of the same family, but lawfully begotten?

“Phaedr. Whom do you mean, and what is his origin?

Soc. I mean an intelligent word graven in the soul of the learner, which can defend itself, and knows when to speak and when to be silent.

Phaedr. You mean the living word of knowledge which has a soul, and of which written word is properly no more than an image?

Soc. Yes, of course that is what I mean."

*(Phaedrus From <*[*http://classics.mit.edu/Plato/phaedrus.html*](http://classics.mit.edu/Plato/phaedrus.html)*>*

Naturally Socrates moves on from this one beat of a very long dialogue, decided for himself that verbal discussion is a superior means of transferring information between, as discussion ensures ideas are transmitted with minimal confusion about the speaker’s meaning, and that the listener is more likely to remember.

Socrates was also known for his objections to the Sophists of his time. (The West in the World, page 68). Sophist was a name given frequently to individuals who were paid to teach philosophy. The Sophists were teachers of Rhetoric who taught pupils that “Man is the measure of all things”, and as such that virtue is shown by success with rhetoric and that moral behavior merely entails following their own desires.

Socrates objected to how sophist teachers trained students in rhetoric. While the sophists simply taught their students how to be persuasive, Socrates believed the student should be taught not only how to speak persuasively but how the powers of persuasion should morally be used.

In book I of Plato’s republic, while disputing over the nature of justice, Socrates tests a definition of justice proposed by Cephalus, that justice is being truthful and repaying debts, by presenting this scenario:

“I mean, for example, as everyone I presume would admit, if one took over weapons from a friend who was in his right mind and then the lender should go mad and demand them back, that we ought not to return them in that case and that he who did so return them would not be acting justly—nor yet would he who chose to speak nothing but the truth [331d] to one who was in that state.”

Socrates’s argument raises a concern about 3d printed guns- even assuming a right to bear arms, there are clear exceptions to what people should have access to weapons.

The modern maker movement invokes these two objections of one of the forefathers of western philosophy combined: information is mainly transferred and stored in an external server; and information is given without instruction in how to use it virtuously.

If asked, I could not tell you the exact ratio of mass of sugar to that of stump remover should go into the King of Random’s rocket fuel. I have a digital notebook where I keep that information instead.

Socrates would perhaps commend modern makers on this point: unlike the Sophists who frequently charged money for philosophizing, rather than for the love of wisdom, the Maker Movement often shares how they created their projects for free. This is not to say that Makers are necessarily opposed to capitalism. Makers can and do monetize their efforts. As mentioned in the Maker Manifesto, some entrepreneurs have had success with making as it has allowed them to create prototypes without much initial capital.

IV Power to the Individual!

Automation has been destroying jobs since the stone age. Historians suggest that before the agricultural revolution, humanity fed itself by foraging and hunting. A nomadic tribe could move from place to place, feeding on what plants and animals were available. But hunting and gathering was tedious. The hunter-gatherer spent a lot of time and energy in pursuit of food. The energy gained by eating the flesh of an animal only came after the expense of all the energy needed to stalk, attack, and kill the prey.

The discovery of agriculture ushered in a new method to produce food- a method which could be expanded. Technology combined with what would today be considered animal science and botany made a new means of accomplishing the same thing, while burning less calories in the doing. The universal occupation of foraging was replaced with the farm.

Farming can be considered to be a kind of automation. The same process that once required a mass movement of people could now be replicated in tilled soil. Why send out gatherers to collect fruits and vegetables when you can grow them yourself at home? Why risk life and limb chasing a wild animal for meat when you can raise a fatter, more docile version of that animal for the slaughter?

The fruits and vegetables that were once harvested by foragers could now be planted, tended, and harvested in the farmer's own backyard. Animals could be raised within the safety of the village.

The same foods harvested by the foragers could be replanted, and regrown with relative ease. Automation creatively destroyed the jobs of many hunters and gatherers- and it made many new kinds of work available. The developments of farming brought new power to the individual, as such fewer individuals were needed to produce a sustenance. The ratio of calories earned to calories spent was decreased. A surplus of food meant allowed new occupations to be explored. The rise of agriculture also meant the rise of specialized labor.

In the case of farming, new technology and knowledge empowered the individual to reduce the labor required to produce food. Many old jobs were lost. New jobs were created. The ability of the average individual was significantly greater.

But automation did not stop destroying (and creating) jobs with the end of foraging. Throughout the history of technology come examples of innovations that removed the need for an occupation. In pre-industrial societies farming was the predominant occupation. With the status quo changed to farming, most people were farmers. But with each new invention the powers of the average individual increased. Archimedes would declare that he could move the whole earth given a long enough lever. The technology increased the power of the individual- so fewer individuals were needed to complete the task.

The printing press was a kind of automation. With the invention of movable type, fewer engravers were needed to encode information onto parchment. The development drastically decreased the labor needed to produce a book. The price of books dropped harkening in an increase in literacy. Thus, the new technology empowered the average individual.

The mass production of Gutenburg's Bible is considered to be a cause of the Protestant reformation, as it enabled more individuals to read scripture for themselves without depending on a clergyman. The industrial revolution brought about ways of automating labor-intensive processes. Now that each individual could do more work for the same amount of effort, fewer individuals were needed for a single production. Many jobs were creatively destroyed, supplanted by automation.

Why send a letter over land and sea, when the same message can be sent quickly by telegraph? Why send the telegraph over a wire when you can do it over the air? Why send a telegraph at all, when you talk directly to the person on the other side? Why bother calling them, when you can encode the information you want them to have into a shared electronic system for them to consume at their own convenience? Why hire a telephone operator when you can build a series of electronic switches to connect one machine to another. Why hire somebody to play records in your radio station when a machine can do the same thing for no pay?

Pioneers of computing such as Charles Babbage, Ada Lovelace, and Alan Turing saw the possibility of a general-purpose machine: a machine that could be programmed for the needed task. The automation of information destroyed plenty of jobs.

Now ideological movements can spread like wildfire via social media platforms with haste revolutionaries the likes of Julius Caesar, Joan of Arc, Samuel Adams, Maximillian Robespierre, and Napoleon Bonaparte could have only dreamt of.

The progress of technology has been upheaving the status quo- and empowering the individual since the stone age. As such, it is important to consider the progress of information technology when considering the future of communications ethics.

I believe that the trend of technology to empower the individual is leading to a decision humanity might have to make between extreme totalitarianism and anarchy. This seems to be in part what Cody Wilson describes as the “transcendence of the state toward the empowerment of the individual” against the alternative of a “trans political permanent state of emergency”. Unlike Wilson, I believe neither outcome is good.

Based on this trend of empowering the individual I suspect that the world is facing a terrible question of ethics: whether to strip mankind of his right to share and receive information in favor of preventing dangerous information from coming into the hands of someone willing to wreak havoc. Technology in the totalitarian alternative might resemble something like the Great Firewall of China.

The government of China has addressed issues of security by blocking many foreign websites and keeping close surveillance over its populace. China may be a fair example of the totalitarian side of this ethics question, by restricting its citizens to use a state-monitored version of the world wide web, the so-called "great firewall ". But the great firewall has a few cracks on its side. A site called GitHub is used by programmers worldwide to collaborate while working on a project. Git hub uses git, a software developed to streamline the process of collaborating on code.

When the Chinese government restricted certain foreign websites from being accessed in several Chinese cities, a Chinese organization called "Great Fire" responded, using GitHub as a means to post duplicates of censured websites. As a result, GitHub was blocked in many regions in china. The block was met with criticism and backlash, as many Chinese programmers and businesses depend upon GitHub for development of products. The ban was lifted for the majority of China.

An important quote from Benjamin Franklin comes to mind, “Those who would sacrifice freedom for security deserver neither”. The persistence of organizations like Great Fire and Defense Distributed may be a testament to Cody Wilson’s prediction. If Wilson is correct and the progress of technology will lend itself to a libertarian or anarchist outcome, then the saying might be better put, “Those who would sacrifice freedom for security can have neither”.

Who has the Right to Regulate the Internet?

The internet exists mostly in a state of anarchy. A people has the right to regulate affairs within the borders of their own state. As argued by John Locke, a state is granted authority by the consent of the people. But who can claim ownership of the internet? The internet does not completely reside within any one state's borders. Some of the infrastructure that makes the internet possible does not even exist on the planet. Communications satellites in orbit are often used to transmit data. The satellite

A state could arguably claim sovereignty over the space a satellite occupies if that satellite is in a geostationary orbit- an orbit set at an altitude such that the satellite revolves around the earth "over" the same point on the earth as the earth spins. But what government can rightly dare to claim sovereignty over the space travelled by a satellite that orbits over its own borders and around the whole globe?

The original infrastructure that evolved into the internet, ARPANET, was owned by the United States defense department. Based on this fact, can the US claim the internet as American soil? The world wide web was created through efforts led Sir Tim Berners Lee, a British physicist. Does the United Kingdom have a stake in the internet? Lee began creating what became the world wide web while working as a researcher at Cern, Switzerland. As such, his creative efforts could have technically been considered the property of Cern University. Fortunately, at Lee's request Cern later signed an agreement not to claim proprietary over the world wide web. (Weaving the web)

In the US, officials have resorted to interpretations of old laws to new kinds of crime. If an American commits a cybercrime, then that American can be prosecuted in the US. But the waters quickly get murky as the internet allows cybercriminals to collaborate and attack across borders.

The internet is not merely a virtual space- it is a conglomerate of connected servers. These servers are owned by private individuals, government offices and organizations, businesses, and every last person who is currently using their computer to access the web. The physical internet is owned by people all over the world.

IV What a Fake Summer Camp Can Teach Us About the Importance of Innovation

The Robers Cave Experiment was a psychological experiment performed in the 1950s to study the dynamics of human conflict. (Psychology HQ) To avoid any conflict from arising as a result of bias or prejudice, all the boys selected were from families of the same social class, race, and religious affiliation.

Researchers posing as the staff of the Robbers cave summer camp divided the boys into two cabins. For one week the counselors in charge of either cabin worked with their campers to develop a strong bond of community within the cabin. Each group performed activities as a team without much knowledge of the other cabin. Each cabin developed a name and a corresponding flag to identify itself with- one group became "the Eagles" and the other, "the Rattlers".

On the second week, the counselors subtly caused the two groups to meet. The counselors arranged for either group to participate in competitions with each other. When the boys were asked to describe their cabin mates, they did so with favorable descriptions, praising their fellow eagle or rattler's strengths and positive attributes. When asked to describe a boy from the rival cabin, the campers emphasized the rival's negative attributes. Both cabins described the other as offensive and immature.

The researchers' goal had been to first create group identities within either cabin, and then test the effect of group identities. The counselors were surprised by how volatile the conflict between the Eagles and the Rattlers became. In the aftermath of a baseball game, a fistfight broke out and the eagles set fire to the Rattler's flag. In retaliation, the Eagles ransacked the Rattlers’s cabin.

The researchers moved their attention to conflict management, and resolution. The new goal was to find a way for the warring eagles and rattlers to reconcile. The counselors engaged the campers in activities that required mutual cooperation, created a technical challenge that required both eagles and rattlers to solve.

The two groups managed to put aside their differences in the interest of pursuing mutually beneficial goals. By the time the camp was dismissed several boys from either cabin chose to ride home alongside a boy from the opposite cabin.

The researchers concluded that conflict between two adversaries may be best managed when the parties are engaged in an effort of collaborative problem solving.

While information distributed amongst makers can be dangerous- and easily misused, it is important that information makers have chosen to share not be restricted. In the interest of collaborative problem solving in fields such as science, technology, and engineering, dangerous information- freely given with the proper warnings of any danger cannot and should not be restricted.

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