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The Moral Obligation of Engineers to Fight Global Poverty

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ABSTRACT

Ethicists have made the case that people living in rich countries have a moral duty to give to the poor. How does this claim apply to engineers in particular, who are uniquely positioned to apply their technical skills toward tackling global poverty? If engineers do have a moral obligation to use their occupation to help the impoverished, how does this duty interact with the rights to freedom of choice and pursuit of happiness for the engineer? This paper asks if greater ability implies greater obligation.

3,000 words

INTRODUCTION

In 1957, President Truman declared that for the first time in history mankind possessed the knowledge and tools available to eradicate global poverty[1]. Seventy years and quantum leaps in technology later, the world is still no closer to achieving this goal. To what extent is the scientific community responsible for taking action to address absolute poverty? On the one hand, engineers should have the freedom to direct their own careers and interests, for probably many of the world's most significant scientific discoveries were made this way. On the other hand, we must ask ourselves if too many of the technically trained have spent their time optimizing relatively inconsequential widgets while the poor languished.

The following paper asks: *to what extent are engineers morally obligated to apply their skills toward poverty alleviation?* The goal of this exploration is to contradict the fundamental notion that engineering is and should be agnostic, by asking the reader to consider some common assumptions about this profession. In the following section, an explanation of terms used in this discussion is provided. The body of the report then presents three main considerations and some opposing viewpoints. Finally, a conclusion is presented with a call to action for the scientific community.

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[1] Harry S. Truman: "Annual Message to the Congress on the State of the Union," January 4, 1950. Online by Gerhard Peters and John T. Woolley, *The American Presidency Project*. http://www.presidency.ucsb.edu/ws/?pid=13567.

TERMINOLOGY

Engineers are uniquely positioned to contribute to the fight against global poverty. When speaking about "global poverty", this paper is not targeted towards concerns of *relative poverty* (i.e. how much an individual earns compared to others in his country) but is primarily concerned with *absolute poverty* (i.e. those who cannot meet their basic survival needs and face acute hunger, unsafe water, lack of shelter, and premature death). In the following paper, I argue that the domain of engineering ethics has so far failed to outline the actions that engineers are morally obliged to take. By *obligation* I mean the condition of being morally bound to take action, a term which I use interchangeably with duty, in the deontological sense. Under such duty-based reasoning, the obligation to act according to a set of principles regardless of outcome means that the person is morally responsible for some (in)action.

This paper is not concerned with *retrospective responsibility*, which is used to look at the past and determine who is liable for something (e.g. if a motor fails, we want to know who was at fault). Instead, this paper concerns *prospective responsibility*, which deals with what we are duty-bound to undertake because of our social situation (e.g. developed countries should do more to counteract climate change). While retrospective responsibility is often used to for attributing blame; the notion of prospective responsibility is used to describe an additional normative requirement that ought to be fulfilled. In the following, I make the case that engineers have a hereto unrecognized social contract[2]; and that they are (as a collective) failing to meet the moral obligations they are responsible for.

GRADUATING WITH A DEGREE, A JOB – AND A SOCIAL CONTRACT?

The choice to enter into a certain profession comes with a social contract between the professional and society to use their powers in a way that improves society. Within this line of contractualist thinking, a person does not have the right to exercise power[3] over another human unless mutual consent is provided. Each member of society has the capacity to reason, which makes them deserving of value and respect. One principle that has derived from contractualist reasoning is the "rescue principle" [4]:

> "If we can prevent something very bad from happening to someone by making a slight or even moderate sacrifice, it would be wrong not to do so (Scanlon, 1998)."

Thus, by accepting the inherent value of human life, we are left to struggle with determining the position that engineers are in when faced with those who lack human dignity because of absolute poverty. One of the first objections that may arise when discussing the obligations to alleviate absolute poverty is: why should *engineers* be singled out from the rest of society?

There are some universal rules that we can apply to everyone equally with little controversy, such as "do no harm." However, attributing different responsibilities to different societal roles is actually not that radical either. For instance, we may say that doctors under the Hippocratic oath take on an additional normative level of responsibility that other citizens do not have. If a

[2] When referencing social contract theory, I mean the idea that individuals participating in societal institutions and norms implicitly agree to give up minor freedoms to uphold those norms.

[3] For the engineer, power is acquired through the acquisition of skills and knowledge.

[4] Scanlon, Thomas (1998). *What We Owe to Each Other*. Belknap Press of Harvard University Press.

passenger on an airplane was having a heart attack for example, we would expect that anyone with a medical background should step up and try to assist. They are not legally or otherwise required to do so, yet we would look down on them if they did not attempt it. Meanwhile, we place no blame on the other passengers for staying seated, since they do not possess the appropriate education to intervene and may only get in the way of airline personnel. Similarly, lawyers are attributed the prospective social responsibility of arguing on behalf of their clients without regard to their personal beliefs or preferences. If a certain lawyer acted less zealously in defending a client that had a different religion than him,[5] we would say that he is neglecting the moral obligations demanded of him by his profession.

However, it appears that society does not yet attribute prospective responsibilities to engineers in the same way as other professions, such as doctors or lawyers. In short, engineering obligations are viewed in normative terms that are neutral or negative[6]. For the most part, engineers see themselves as being responsible for something that at least does not make the world worse, but no further. This discrepancy in responsibilities are manifested clearly in their professional oaths:

> "Engineers shall perform services only in areas of their competence. Engineers shall act with zero-tolerance for bribery, fraud, and corruption. Engineers shall provide opportunities for the professional development of those engineers under their supervision."
>
> - American Society of Civil Engineers

> "I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm. I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick."
>
> - Hippocratic Oath

Though both professions require commitment to an ethical standard, the stark difference in language used highlights the lack of prospective responsibility that engineers place in their relationship with society. At first glance, it seems that one reason for the discrepancy in social contracts might be because doctors are directly involved in saving patients' lives. However, this argument begins to fall apart when you consider that the number one life-saving invention in history – more than penicillin or the smallpox vaccine – was the *toilet*. Separation of the pathogens in human waste from contaminating water supplies prevents the acquisition of deadly diseases such as cholera and typhoid. There are countless other examples of technological innovations that have fundamentally and permanently altered the course of societal behaviour, which I will not go into here. I will only ask the reader to consider why engineers are held to a different standard than doctors if both professions are potentially life-

[5] Masculine pronouns are used throughout this article for brevity and clarity, no gender bias is intended.

[6] In other words, engineering ethics have to date been primarily concerned with retrospective, rather than prospective, notions of responsibility.

saving or life-altering. I argue that the role of the engineer gained by his education and training places an additional layer of social responsibility upon him which has to date been unacknowledged by the scientific community.

COMPARING RIGHTS TO OBLIGATIONS.

On the surface, the case for helping the impoverished may seem obvious. Many philosophers have made the claim that we are *all* obligated to help the poor. However, suggesting that engineers *must* switch the focus of their work towards something more altruistic conflicts with the human right to freedom of choice. Engineers may prefer to focus on developing technologies that they: find interesting, can profit from, or improve their communities (i.e. without the explicit intention of alleviating global poverty). As a consequentialist or practical matter, advocating engineers to apply their skills to poverty may cause them to overlook inventions that would have been highly beneficial. This central objection concerning the autonomy of the engineer to his social contract is taken seriously here. Which is stronger – the engineer's obligation to do good or his right to autonomy? In response to this query, I submit two statements:

1. The role of the professional is not purely individualistic – that is, solely for himself. We don't tell architects how to lay out windows or biologists how to use a microscope, yet society does weigh in these endeavours by determining if more resources should be spent on improving the city skyline or on microbiological research. If an architect wanted to build skyscrapers all over the city of Delft for instance, there would likely be push back from civilians. This constraint implies that the professional's work is not possessed by him alone. In at least some capacity, the professional's work functions to serve society.
2. We often make choices that constrain our freedom, such as halting at a stop sign even if the street is deserted. By choosing this profession, engineers voluntarily enter into a social contract to create technologies to benefit societal welfare. So just as a forensic scientist or psychiatrist should not simply pick and choose cases based on curiosity or level of payment, neither should an engineer be completely free in selecting projects.

As an example of the tension between free will in professionalism, consider the Marvel movie *Doctor Strange*. In the movie, the self-important Doctor Strange decides not to take the difficult case of a man who is almost certainly doomed to die because he does not want the man's death to reflect negatively on his surgical success record. This action makes the audience initially view the protagonist unfavourably and is a decision the doctor later comes to repent. However, would we assign the same level of moral blame to an engineer who rejected to take an important design project because it was messy or even doomed to fail?

For instance, consider an engineer who designs a wastewater treatment plant in a developed country versus one in a developing country. In a developed country, the engineer may face troubles such as lead pipes and permitting requirements but can be reasonably assured that the project will at least treat wastewater to an acceptable degree. The need for such a project in a developing country is much higher and could actually save the lives of many who would have been doomed to die from dysentery without it. However, past infrastructure projects in developing countries show high rates of failure, where the equipment breaks down over time and is never repaired. Though both projects are worthwhile, the latter project may bring higher

benefits during the life of the project in terms of lives improved or saved - so is the engineer morally blameworthy for choosing to work on the 'easier' one?

Under deontology, the notion of acting freely is the same thing as acting morally[7]. Our ability as humans to reason means that the maxim of the action should be universal, in that we should only act in ways that we would want to apply *always*, for *anyone*. Acting in order to feel good, appear intelligent, or fulfill and urge, are all actions according to the laws of nature but not according to rational thought. Our ability to rationalize morality is part of what makes us unique as humans. Every human has this capacity for reasoning and therefore deserves to be treated "not as a means to an end, but as an end in themselves[8]." We should recall this maxim for the regard for human dignity when considering our obligations to assist a stranger by asking if the stranger will be able to live a life of dignity without our assistance[9].

One objection to the claim that engineers ought to work on projects related to global poverty is that they already contribute to human welfare generally. What reason do we have to think that the status quo is morally insufficient, such that engineers should not have autonomy over their own careers? Furthermore, opponents may claim that it isn't fair to make engineers work on projects they aren't inclined to. In debating fairness, Thomas Nagel's "constitutive moral luck" is appropriate to consider here[10]. Simply put, some people are lucky enough to be born into a wealthy country with strong schools and institutions. These individuals are more likely to become successful, enterprising engineers. Others are born into unlucky situations, into war zones with few educational facilities and resources. Following the theory of distributive justice to its conclusion, one may claim that it is only fair that the lucky should transfer some of their gains to the unlucky. Not doing so is to show contempt for the human dignity of the unlucky.

WHAT RIGHT DO WE HAVE TO BE HAPPY WHILE OTHERS ARE SUFFERING?

Let us side-step the question of whether an engineer has the right to freely choose whatever project he pleases and assume for a moment that he does. Now we ask: how does acting in favor of the human dignity of strangers *constrain* our individual pursuits of the good life? Certainly, if one individual tried to help every person in the world it would completely ruin his own quality of life. But, with modern technologies of remote communication, digital information exchange and online donations to charities– it is reasonable to claim that each of us could sacrifice a portion of our inessential comforts to help some of those who would otherwise face an early death. If we take the maxim of human dignity seriously, then are we not duty-bound to take action – even at the expense of what we would *rather* do? Or do we value such personal preferences so essential to our conception of "living well" that they cannot be sacrificed?

An alternative view on the concept of living well is carried by thinkers such as Nietzsche and

[7] Kant's claim is that no rational being would choose to act against a universal maxim (something which always holds true). The opposite of this thinking is utilitarianism, which claims that fulfilling the greatest good is to act in a way that maximizes your happiness.

[8] Johnson, R., & Cureton, A. (2016, July 07). *Kant's Moral Philosophy.* The Stanford Encyclopedia of Philosophy. Retrieved from: https://plato.stanford.edu/entries/kant-moral/

[9] Dworkin, R. (2011). *Justice for hedgehogs*. Harvard University Press.

[10] Constitutive moral luck deals with the luck affecting what kind of person you are (e.g. genetics, abilities, temperament).

Frankl who claim that man is much more fulfilled if he strives for a life of meaning and purpose, rather than happiness. According to these thinkers, even if one has the right to pursue happiness while others are suffering; true happiness will never be realized without finding *meaning.* For Frankl's part, his statements derived from his experience as an Auschwitz prisoner. While in the concentration camp, Frankl realized that the few prisoners who survived did not do so out of happiness, but because they had discovered a sense of purpose. Following this line of reasoning, an engineer who pursues his duty to improve society may not necessarily be happier than he would have otherwise, but his life will be better lived. Take the case of Sir Isaac Newton – he reportedly maintained celibacy and was incredibly lonely throughout his life, working 18 hours seven days a week and seldom engaging in recreational activities, yet he pioneered some of the most important work in scientific history.

CALL TO ACTION

Current standards of engineering ethics do not go far enough in addressing the responsibility of engineers to use their technical training in the best way they can for those in mortal danger. Previous literature has limited itself by simply claiming that values and ethics should be considered in the design phase, without going further. This step is important, but I argue that it misses a key opportunity to hold engineers to a higher standard. Beyond just determining if a single project has or has not been performed ethically, meta-level questioning needs to be carried out to understand if engineers have a normative responsibility to save lives, rather than just "do no harm." The scientific community, which values openness and impartiality, must acknowledge that it is irresponsible for us to focus on relatively inconsequential projects while such serious global problems exist.

Finally, the responsibility to act on global poverty is only growing as technology advances. Consider the case of an engineer trying to prevent a disease outbreak. Decades ago, the engineer may have had to move to a developing country and design a massive water treatment plant from scratch. But over time, perhaps all the engineer needed to do was order the right pump from a catalogue. Or to drop a single chlorine pill into the well. In the future, perhaps all he will need to do is push a button on his mobile phone. Therefore, as one's relative professional capabilities increase, so does the moral obligation to do the greatest good with those skills. And as modern technology makes poverty alleviation more immediate and achievable, our collective responsibilities as a scientific community also grow. To conclude – *those who can, should*.

CONCLUSION

As argued by the Commission on Science and Technology for Development in 1997, with the scientific capacity to overcome extreme poverty comes the responsibility to do something about it[11]. This paper outlined the normative obligation of engineers to use their technical training for poverty alleviation. Engineers are just as capable - and therefore as *responsible* - for preventing loss of life as medical professionals are. This ability and consequent obligation

[11] United Nations, Economic and Social Council. (1997). *Commission on Science and Technology for Development Report on the third session (12-16 May 1997)* (E/1997/31). New York: Official Records.

to save lives should be reviewed for incorporation into their ethical standard. So far, the conversation has centred on three points:

- A social contract exists between engineers and non-engineers, which obliges engineers to use their work in a manner that benefits society.
- When considering which projects to undertake, engineers should consider the theory of distributive justice and our position towards the morally unlucky.
- The obligation to save a life must be greater than the right to professional autonomy. Otherwise, one is showing disregard for the human dignity of that life.

To conclude, my discussion has not definitively resolved the topic of moral obligation in engineering once and for all, and much more can be said on the subject. This argument is meant to convince the scientific community of the need for a wider debate on the standards to which engineers should hold themselves.