Engineering For A Better World: The Meaning Of Utopian Thinking For Engineering Education

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1. Introduction

In recent years we have seen that conferences of the eight richest countries in the world in Seattle, Genoa and Florence invoked large demonstrations by anti-globalists who condemn the economic policy of the rich countries aimed at a global free market. One might reject the violent methods of these demonstrators, or a small group of them, but there is one thing no one can deny: they have a utopian consciousness, they believe that a better world is possible and desirable. A Dutch paper reporting on the battle in Genoa described the background as follows: "the utopian longing for a better world".

A lack of utopian consciousness is a general problem in present-day society. Since the fall of the Iron Curtain, a common belief seems to have emerged that there are no political and economic ideals to challenge the supremacy of Western capitalism and democracy. Optimistic belief in our ability to shape society has decreased with the same being true for the related belief in progress. Yet a culture may face the onset of decay when it has no utopian forces working in its core, no idealistic drives[1].

Engineers in particular should think utopian, because they possess the faculties to substantiate ideals. Until now, however, engineers have not seemed to be very bothered about this, they are not aware of any problems. Why should they be? Our universities of technology deliver engineers who possess great technical skills. Over the past years the awareness has been growing that a fully competent engineer, needs to be proficient in non-technical disciplines relating to science, technology and society. Most schools of engineering nowadays provide their students ample opportunities to learn communication skills[2]. Still there is something missing: engineers have no underpinned social ideals; they have no strong and cultivated belief that a better world is possible and worthwhile to strive for. Their utopian consciousness, in other words, is underdeveloped. Utopian consciousness and the importance of it for future engineers are the subjects of this paper.

2. Utopian thinking in historical perspective

Utopian consciousness, an awareness of a better world and an accompanying desire to strive for this world, is based on the concept of 'utopia', a term coined by the British philosopher Thomas More to denote both 'good place' and 'no place' [3;4]. A utopia is a vision of the future that embraces a society that is completely different from the existing one and which is definitely better; it is the design of an ideal society, a better world vision. A 'dystopia', conversely, denotes a society that is a nightmare. Western history contains a long list of utopias and the Renaissance - which started in Italy and reached its highpoint there around 1500, but lasted until the early seventeenth century in western Europe - has produced some of the more interesting and inspiring visions, especially Thomas More's 'Utopia' (1516) and Francis Bacon's 'New Atlantis' (1627) (see Van Dooren 1983). Other examples of ideal society designs are: Rabelais' 'Thélème' (1534), Doni's 'sensible world' (1552), Campanella's 'solar state' (1602).

Before going into these ideal society designs, we shall pay some attention to the mother of all better world visions: Plato's 'Republic' (around 400 B.C.). This exemplary piece of classic Greek philosophy deals with the question: What is a just state? Plato's ideal state is composed of three classes: the artisans and merchants class for economic needs, the military class for security, and the 'watchmen' (which may include the 'philosopher-king') for political leadership. An educational process that begins at birth and proceeds until people have reached their maximum level of education forms the basis of this class structure. The watchmen are the ones able to complete the entire educational process. They are the ones with a thorough knowledge of philosophy (Plato's ideas) and, consequently, they are the ones who are supposed to be able to make the wisest decisions. The classes have certain virtues: temperance characterizes the workers, courage characterizes the warriors and wisdom is the virtue of the aristocrats. Justice, however, characterizes society as a whole.

Plato's watchmen acted like a communist avant-garde avant la lettre; enabling the other classes to live their lives as usual. More, however, projected a society sharing all material resources in conformity with the modern communist model, though ruled from a democratic base. A lack of private property is essential in his ideal society is (see table 1.).

Table 1.: Characteristics of life in More's Utopia
- all citizens work for a period of the day agriculturally, helping produce the stores that feed them all
- social organization is patriarchal, in family units, with slaves for menial tasks
- all property is held in common
- citizens are indifferent to money, gold, silver and precious stones
- all the activities are carefully supervised, including travel, marriage, the care of the sick, and the elimination of the old and infirm
- war is hated, but if it must be fought, they attempt to get it over as quickly as possible and will even resort to treachery and to the use of mercenaries
- citizens are not afraid to do what is morally reprehensible if it will bring about a greater good
- they keep all faith, so that laws and lawyers are not needed
- what few laws exist are simple and easily memorized and understood
- they love wisdom and knowledge
- they pursue happiness in 'good and decent' pleasure

- they worship a single god
- they believe in the immortality of the soul and the happiness of life after death, and
- while they believe fully in their religion and are convinced of its truth, they would abandon it for one that could be proved better

(source: http://athena.english.vt.edu/~jmooney/renmats/more.htm)

Bacon was the first philosopher to suggest the improvement of society through the application of science and technology. In his New Atlantis the House of Solomon – a kind of observatory and laboratory - was designated to realize this ideal. The high goal of this institution was to keep order and harmony; to keep the people happy. This goal was to be achieved through extraordinary scientific advances that made it possible to satisfy all human needs. Researchers were expected, for example, to develop medicines and other means to keep people healthy and to lengthen their life span.

The root of utopian thinking is criticism of the existing situation resulting in a need to offer an alternative. How realistic are these better world visions? Plato got a chance to realize his Republic in Sicily but his efforts failed miserably. Yet for around a thousand years society resembled Plato's ideals in a number of respects[5]. In this time from the fifth until the 15th century – often referred to as the Middle Ages - the priests and popes of the Roman Catholic Church governed the workers and soldiers of Europe. As true Platonic watchmen, these princes of the Church represented the best-educated part of the population and lived simple lives, at least in principle. Communist ideals, as propagated by More and many others before and after him, ruled Eastern Europe until recently; other parts of the globe are still under communist regimes. Bacon's New Atlantis appears to have been realized in the western world, where people have high standards of living thanks to the blessings of science and technology[7].

Yet the Platonic Christian society collapsed without many people deploring its demise. Dictatorial communist Europe with all its lack of freedoms and distress came and went. And the advent of modern western science and technology has also produced disadvantages. People today live in a 'risk society' according to the well-known sociologist Ulrich Beck. The famous Dutch author, Harry Mulish, portrays Bacon in his monumental book 'The discovery of heaven'[8] as one who has made a deal with the devil and accuses him of being responsible for some of the most serious horrors of the Second World War. This state of affair has philosophical consequences: in his reflections on utopias as a phenomenon, the Dutch philosopher Hans Achterhuis[3;4] suggests that utopia's turn into dystopias such as Orwell's 1984 and Huxley's Brave New World. He sees utopias and dystopias as two sides of the same coin, as the same so-called better world seen from without or within. Though he is less negative about technical utopias, like Bacon's, than social utopias, like Plato's and More's, Achterhuis suggests utopian / dystopian thinking has had its best time. Are we indeed facing the end of utopia?

The present authors do not think that is the case. According to the famous sociologist Jürgen Habermas[9] utopian thinking developed in particular in the eighteenth century when the modern world began to settle its scores with the Christian Middle Ages. Modern man understands the present as a transition to the new, he knows times are changing and expects the future to be different from the present. Habermas recognizes that the 'utopia of the labor society', the social, communist utopia, has come to an end. However, he denies that the Utopian forces of our society are exhausted. He still believes in the ideals of modernity:

progress through science and technology and the ability to form society using rational means aimed at emancipation. Habermas also deplores the intrusion of the 'system', i.e. state bureaucracy and capitalist economy, into the 'life world' of people; he supports the value-driven citizen as well as the interest-oriented, calculating citizen. He also champions democracy; communication is essential for him. According to Habermas utopian ideals are important in the discussion of a better world; he believes historical processes result from the tension between such ideals and 'practice'. It should be noted that Habermas definitely rejects the suggestion that utopianism could be accompanied by dictatorship or terrorism.

3. Present day Utopian thinking

A modern alternative for utopian thinking is the process of world globalization. According to the protagonists globalization is good for the West and for the rest of the world, because it stimulates economic growth and the worldwide spread of all Western blessings. Above all, however, it is considered to be inevitable. Shell, for example, has factored this into its TINA formula: there is no alternative[2].

Does globalization lead us to a better world? Is it really inevitable? The anti-globalists, a colorful conglomerate of advocates of animal rights, proponents of biological agriculture, of people fighting world poverty problems, socialists, Catholic fundamentalists and other activists, doubt this. Naomi Klein[10], one of the leading philosophers of the movement, directs her arrows at multinational enterprise and its influence on the lives of people. Multinationals, in her view, no longer sell products, they now sell ideas. Nike is not selling sporting shoes, it is promoting a new way of life. Brand names or logos have become the new religion. In this way commercialization has reached a new phase. Concealing abuse, for example that related to using cheap labor or child labor to produce goods in third world countries, is part and parcel of this new marketing strategy.

On the other side, one of the most ardent critics on the anti-globalist movement, the Swede Johan Norberg, argues that this is not so bad as it may look at first sight. He points out that technology has in fact already improved the standard of living on a global scale enormously[11]. He strongly believes in the power of the free market supported by the liberal ideal of individual responsibility and democratic decision making.

This discussion between globalist and anti-globalist points of view plays within the framework of the western culture. As we all dramatically came to know at September 11 2001, western values are also being seriously criticized from outside the western world. However, the "ideals" of fundamentalist Islamic groups incorporate a level of restriction of personal freedom that cannot be reconciled with our western Utopian concepts. Habermas underpins the ant-globalists criticism of the global open market world order with his criticism of the two, ruled by power and money, subsystems of bureaucracy and economy. However, unlike the anti-globalists Habermas trusts the capacity of modern society to improve itself, through democratic discussions. In this respect, Beck has another view, he thinks social movements such as the anti-globalists will effect important changes.

The anti-globalists do not have a clear better world vision; they point to the route towards a better world rather than define what it should look like. There are some other promising starting-points for a better world vision which share this characteristic. One route that fits well with the process of globalization is the politics of the 'Third Way' defended by the famous sociologist Anthony Giddens and practiced by politicians like Tony Blair. The Dutch

'polder model', a structure based on consultation between employees, employers and the government that embodies an analogy of the way the Dutch people have dealt with their eternal water problems, should also be mentioned in this connection.

Beck has put forward another tool of change, which he calls 'reflexive modernization' or 'modernization of the modernization'. This entails the application of modern – more modern than modern – science and technology. Many engineers have been engaged in a modern technical utopia through the Appropriate Technology Movement. In his criticism of this movement[12] described the better world vision involved in terms of a decentralized village-based society, a small-scale, labor-intensive technology, a stable economy and production on the basis of identified human needs, creative work, and cooperation and participatory democracy. However, nominating this ideal society picture meant rejecting it and the whole of the Appropriate Technology Movement. Consequently, it has disappeared from the scene, although some writers have tried to offer a more refined and underpinned better world vision[13]. Moreover, the problems Appropriate Technology aimed to solve still exist.

Maybe now the time is ripe for a new kind of utopia. This would have to fit with the global character of modern society and it should also do justice to the fast tempo of changes in the present times. This latter aspect might call for ideal society designs that take their inspiration form the old utopian concepts, but are less detailed in their prescriptions.
An overview of initiatives towards modern versions of Utopia can be found on the web-site, Utopia & Utopian Philosophy (http://users.erols.com/jonwill/utopialist.htm).

The sites promotes an individualistic definition of utopia:
> *"Every person has thought, at least once in their life, that it would be nice if there were no disease, no crime, no poverty, and/or for some other improvement in the Human condition. Since everyone has dreamed of a better world, it is fair to say that Humanity has a common dream. ...*
> *We all ... hope for a happy, safe, and good life for ourselves and for our loved ones. Therefore, everyone has a common desire for the best life attainable. 'Utopia' is the word used to denote the best life attainable. Since each person has their own unique vision of Utopia, the only universally agreeable description of Utopia is, 'the ability for each person to live in their own vision of paradise.' Humanity should strive to obtain that ability".*

The proposed route to achieve this paradise is through science and technology.

> *"Since humans consist of both a tangible physical state (body) and an intangible mental state (mind), the way to achieve Utopia is to find technologies and methods that fully satisfy both states of human existence. With the right new knowledge Humanity can solve any problem and achieve any desired result. History has shown that anytime humanity wants to learn how to do something, such as land a man on the moon, the answers can be found if money and resources are devoted to the cause. Therefore, we should be devoting more resources toward finding the knowledge that will allow each person to live as they desire.*
> *Human DNA has been fully mapped and now it is just a matter of determining what each gene does so that we can manipulate the same to stop illness, increase intelligence, etc. Princeton University scientists have already genetically enhanced the intelligence of mice. Aged brains have been restored to youthful vigour in a gene therapy experiment with monkeys. Scientists have recently created a new life form in*

the laboratory by creating a new genetic pattern of a simple organism. Cloning capabilities are increasing. Computing capabilities are going ballistic, and artificial intelligence seems to be on the horizon. With robots, machines, computers, and other technologies beyond our current knowledge such as nano-technology, we can have unlimited production capabilities. With genetic engineering, chemical manipulation, and future technologies we can enhance the mental state of existence. In sum, with the right new knowledge, humanity can have infinite provision for all tangible and intangible needs and wants for existence, and thereby have Utopia. If humanity recognized this reality, and devoted more resources toward knowledge, we could accelerate the pace at which we reach a better world".

This modern version of the new Atlantis also contains an element that makes one think of More's Utopia:

"Everyone makes a vote as to the type of world we have with their lifetime efforts, and the total of all human actions determines whether the world is like a heaven on earth or a living hell. Therefore, the pursuit of Utopia can be implemented through the consensus method. The consensus method simply involves putting a dream into words and spreading those words until a large enough consensus is created to cause positive action by society. Individually and collectively we must shine the light of knowledge on the darkness of ignorance, until we find our best. If we take such a path, at some point in the future, Humanity will have a heaven on earth, where everyone lives as they desire".

4. The impact of Utopian thinking on Engineering Education

In an age in which (technical) scientists have the ability to design tools that are capable of destroying the whole world, or at least much of the life on our planet, the introduction of technical innovations without a clear social conscience constitutes a major threat. It is the responsibility of those providing an engineering education to take up this challenge and go beyond the simple teaching of technical knowledge and skills.
The importance of utopian consciousness is underpinned in a recent paper on Bacon's new Atlantis and the western world under the inspiring title "Be utopian!"[7]. The author maintains it is a paradox that at the very moment science and technology have fulfilled their promise, people have lost faith in them. Lintsen believes that many improvements are still possible, especially from the viewpoint of the quality of things. In arguing in favor of reinventing the New Atlantis, he heartens engineers.

Consequently, the intellectual content of utopian thinking should be represented in an engineering curriculum. Leaving open the question remains how this can be achieved. Being utopian is an attitude rather than a skill or knowledge. A bare minimum of what should be asked is to give our future engineers knowledge of the utopian tradition in modern society. Considering the global character of present-day society, students should also have the opportunity to learn about non-western utopias. But more fundamental, they should get the opportunity to develop 'utopian sensitivity'.

A naturally suitable place for stimulating utopian thinking during an engineering education seems to be in the projects in which technical-scientific subjects and humanities are integrated. Such projects, which could focus on real technical problem, could enable students to familiarize themselves with all the relevant facets of a specific technology and, at the same

time, to reflect on the desirability of certain technical solutions. Better world visions could be specified as criteria students could choose when selecting a level of excellence (see: De Graaff & Cowdroy, 2002).

Another approach to stimulate the development of a utopian consciousness is possible within the traditional framework of several non-technical electives, e.g. history, philosophy, ethics, psychology, sociology, sustainability, safety, and communication skills. However, the teaching of these subjects within an engineering curriculum, usually focuses on rational choices on the basis of extensive consideration and weighing of arguments. To serve our purpose if it needs to be broadened to include social considerations related to better world visions. And most of all it would be necessary to provide resources to elaborate the reflective dimension in the projects, both in terms of teacher support as well as with respect to enforcing of these elements in the assessment[14].

5. Concluding remarks

Depending on your point of view Utopias are beacons or milestones in human history. Nowadays the old utopias seem to have lost (most) of their attraction and new utopian ideals are being forged, possibly to produce a vision of a detailed new utopia but not necessarily so. Engineers, being the constructors of our material world, should preferably have, or share with others, social ideals or better world visions, they could certainly use utopian inspiration in their professional activities. A revival of utopian thinking in engineering education is needed to help engineers to move towards responsibility in a global society or at least to help engineers to view the word from more than one perspective.

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