

# Digital Ethics: An Analysis from the Science-Technology Relationship

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## To cite this article:

Mario Gonzalez Arencibia, Dagmaris Martinez Cardero, Jorge Luis Vazquez Gonzalez. Digital Ethics: An Analysis from the Science-Technology Relationship. *American Journal of Applied Scientific Research*. Vol. 8, No. 3, 2022, pp. 52-57.

doi: 10.11648/j.ajars.20220803.13

**Received:** July 23, 2022; **Accepted:** August 31, 2022; **Published:** September 14, 2022

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**Abstract:** Ethics is an instrument of the orientation of human beings, which allows selecting the bases that correspond to human dignity. However, it is constantly rethought according to the context in which it is considered. This phenomenon is particularly important in the science-technology relationship that is occurring in the digital context. In this environment, ethical dilemmas that threaten social development are occurring particularly rapidly. Consequently, this article aims to reflect on the dilemmas that arise in the science-technology relationship in the digital context. For the development of the article, the qualitative research paradigm was applied, which allowed, from the inductive and deductive, to identify the bases of the ethical dilemmas that arise in the digital environment in the science-technology relationship. The central idea of the research is that in the area of informatics and the digitalization to which it leads, a specific type of ethics is being born, which is not reduced to the simple delineation of the rules of conduct, but on the contrary, it supposes the inquiry about the real modifications that are taking place in the moral relations, referred to the decadence of old moral reasoning and the birth of new ones that define the objective behaviors that derive from the development of informatics.

**Keywords:** Ethics, Morality, Science, Technology, Digitalization, Ethical Dilemmas

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## 1. Introduction

A long time has passed since it was dichotomously thought that science and technology were neutral and that only politics, economics, or ethics had to do with value-related issues. We are assisting a stage of human thought, which has made severe criticism of science and technology and their naive pretensions of objectivity.

In this scenario, we are facing a world in which old realities are disappearing, and the modifications that are taking place are no longer mainly of the physical or material order. These have serious implications in the definition of the values that will participate in giving a dignified orientation to human conduct. The fact is that we are in a historical era in which the relationship between ethics, science, and technology is increasingly demanding due to the dangers of not paying attention to them. [25].

For the establishment of this relationship, ethics as a concept understood in its broadest sense as the discipline in charge of studying the moral evaluation of human acts, or the way to explain the conditions of a fair coexistence, is the central nucleus. According to this approach, ethics is an instrument of the orientation of human beings, which implies a responsibility, so that the knowledge of science and technology is also accompanied by the responsibility to use it well, such is the case of spaces where the dignity of human life plays a preponderant role at the moment of acting and executing daily actions [17]. From the concept presented, it can be deduced that morality is the axis around which ethics revolves. Its function is to preserve society so that human acts develop positively for it. Thus, it could be argued that morality is culture insofar as it influences the positive behavior of people.

In this context, it could be argued that morality is based on principles, norms, values, qualities, and ideals that guide man

on how to behave to develop an honest life. That is, morality is the progressive movement towards a certain model of behavior; its function is the improvement of the conduct of human beings [11].

From the aspects mentioned before, the objective of this presentation is to outline the bases on which the relationship between ethics, science, and technology is based, to reflect on the profound social implications that the inadequate use of information technology in contemporary digitalization processes could have.

The idea is that in the field of informatics and the digitalization to it leads, a specific type of ethics or technoeconomics, and digital ethics is being born [14] that is not reduced to the simple delineation of the rules of conduct, but on the contrary, it supposes the inquiry about the real modifications that are taking place in moral relations, referred to the decadence of old moral reasoning and the birth of new ones that define the objective behaviors that derive from the development of informatics [3, 2].

It is taken into account, as a premise, the need to propose a basis for the research and adoption of digital ethics, in an area in which the "technological civilization" in which we live demands behaviors consistent with this, in which the Information and Communication Technologies (ICT) play a vital and growing role, demanding a "new ethics" focused on the "principle of responsibility" and the values that accompany it, considering the digital scenario and the conflicts associated with its inadequate management.

## 2. Methodology

Assessments were applied from the qualitative paradigm, based on research on ethical dilemmas in the science-technology relationship in the digital environment. The historical hermeneutic approach of a documentary type of content analysis was used because the relevant information was contained in articles and research reports that required to be examined. For the content analysis, the inductive and deductive method was applied. This made it possible to identify the conceptual bases on which the present research is based, comparing the concerns and solutions of the most relevant authors, and from this, the fundamental propositions of the article were constructed, allowing a better understanding of the phenomenon under study.

## 3. Results and Discussion

What does the debate on the relationship between ethics, science, and technology raise?

The current debate about the relationship between ethics, science, and technology is based on the assumption that ethics is above, and must guide science and technology in their ability to serve human development [16]. It is recognized that science and technological development provide the means and knowledge to build large computer systems, but it is ethics that will judge whether or not it is legitimate to apply or dismantle them. The effect is that

science and technology are not neutral either in the uses to which they can be put or in the means they use to achieve their ends, which is knowledge. In this framework, it is important to reflect on the role of computer sciences, in the digital environment that is being built, which are based on building realities of social interaction according to its socio-classist character. However, in its possibility of acting, there is also present the possibility of presenting or constructing that reality deforming the senses according to the interests of the individual. Therefore, the risk of manipulating reality according to the evaluative nature of the interests of the human being is a fact that permanently awaits any area of knowledge and human exercise in the current digital scenario.

According to this, the following question could be asked [1]: Are the knowledge and scientific-technological advances linked to informatics and digitalization to which it leads, as such the source of this type of threat? Or is it their use by other men, by the means of political and economic power? [12].

Considering the current realities of the world, the answer may be obvious. A huge part of the world's population is not threatened by the scientific-technological advances of information technology, but precisely by their lack of access to them, proliferating a huge digital divide. The social tensions generated by this lack of equity imply such a danger to the social fabric that it is no longer possible to avoid it.

### 3.1. The Need to Clarify Ethical Dilemmas in the Digital Environment

The bases on which the use of information technology is advancing in today's world makes it all the more necessary to clarify the ethical dilemmas in the digital environment presented by human action in this context. According to analysts, the 21st century will be the century of ethics [24]. This is determined by multiple factors. The fundamental one, is the advance of information technology and its implications with the accelerated digitalization of the social processes involved [12], which leads to the need to conceptualize digital ethics.

Consequently, it is reasonable to think about several problematic questions before acting [19, 20, 6]: Is it worth asking what should be the appropriate limit for this intervention? Is it possible to identify only with the idea that the absolute value and above all the advancement of knowledge for its own sake, or is it necessary to revalue ethics during the challenges of science and technology? During the 19th century, certain ethical problems caused by the progress of science and technology remained in a practically "theoretical" framework.

At present, the social connotation of these issues is giving rise to strong concerns. In this framework, the ecological crisis that the world is experiencing stands out, as well as, the growing ethical dilemmas produced by the use of information technology and its digitalization processes, which makes us think of the need for digital ethics, which could be conceived as the set of moral decisions that are taken concerning the virtual and 'cyberspace' world [18].

Therefore, the concept of digital ethics is the social and moral code necessary to face the problems that the inappropriate use of the internet is causing. This implies facing problems of intellectual property law, cyber-attacks on security [10], limits to freedom of expression, regulation of large corporations, digital disconnection, malicious behavior in social networks, and privacy of personal data [8]. This new concept can be considered essential to strengthen aspects such as online reputation (as a public or private entity), retain customers, and behave 'ethically' in the digital world" [5, 23].

### **3.2. Re-evaluating Ethics in the Context of the Development of Digitization**

For the case of the object of study that this paper occupies related to ethical reflection in the face of the dilemmas of informatics and the digitalization it leads to, several things could be raised that could make one think about the importance of revaluing [7, 6].

First, information technology and its social impact with the digitalization that accompanies it have become the center and the basis of all important operations of the most developed societies. It is practically impossible to locate these societies without digital networks. Most industrial, commercial, and military operations, as well as services such as transportation, health, education, and research, would grind to a halt and cease to function without the support they receive from digital media.

Second, information technology and the digitalization it implies is certainly the most important technology to appear in the twentieth century, revolutionizing ways of thinking and being of societies and people [13]. What is known today as Information and Communication Technologies could eventually have a social impact equal to or even greater than that of the Industrial Revolution.

Third, digitalization imprints multiple potentialities, among them, the possibility of easily handling large amounts of information, practically instantaneous communication with any part of the world through fax or electronic mail (e-mail), interactive television, and primary and secondary education supported by computational artifacts. On the other hand, what is characteristic of the current era is the increasingly frequent implementation of intelligent systems to control various everyday automatisms. All these changes are shaping new ways of life and new problems, in which information technology is taking on a leading role.

Fourth, as society becomes more dependent on digitalization, it also becomes more vulnerable to failures that occur in this system, either by a malfunction of digital media, and social networks or by misuse by the people who must handle such knowledge.

The failures in the management of social networks in the digital environment have created a new repertoire of social problems, proliferating terms such as computer crime, software theft, hackers, and computer viruses. These are increasingly frequent realities that imply major problems that hinder social development.

### **3.3. Ethical Dilemmas Involved in the Inadequately Designed Digitization**

On the other hand, each of the problems raised above creates ethical dilemmas for professionals and users of digital networks [22]. In this framework, it would be wise to reflect on questions such as: Is it lawful to copy a software program, how far do I have to check a program to be sure that it does not have bugs, is it lawful to enter computer networks to which access is not permitted, etc.

The fact is that these problems are becoming frequent dilemmas that arise in the digital environment, and for which it is not easy to find a single answer [20]. These assessments are important for making decisions on how to deal with the ethical dilemmas arising from the inappropriate use of digitization.

### **3.4. Developing a Digital Ethics and Its Professionals Only**

One agrees with the idea of developing ethics applied to Informatics, as well as introducing professional codes of ethics, which could help to think about and solve many of these problems, thus allowing adequate management of digitalization in terms of social development [12].

But the problem is not only to develop morally good behavior for IT professionals, it involves the large social masses that are the protagonists in the development of digitization. Its magnitude is much greater. Irrational use of information technology can cause serious problems that may even involve the cost of human lives. What is the cause of inappropriate uses of digitization?

First, computer science, together with the social networks that go with it, is sometimes considered as a second-class science, which encourages anyone to claim the right or the ability to manipulate or make a program.

This implies that programmers or people with a little qualification are sometimes in charge of collaborating or developing important computer applications, whose efficiency and security are by no means guaranteed.

Secondly, the lack of clear ethical standards leads to inadequate handling of information technology and the digitalization that goes with it.

The solution to this problem is also twofold: on the one hand, to improve the social image of informatics by giving it the importance it deserves and explaining its social implications. This would oblige IT professionals and users to rethink their actions in this context on an ongoing basis. On the other hand, developing a code of ethics that establishes guidelines of correct conduct for professionals and users in this field becomes a social imperative.

### **3.5. Ethics in the Digital Environment Is Not Equivalent to Promoting Good Intentions: We Are Talking About Common Sense Ethics**

The challenge facing 21st-century society in the face of the dilemmas that occur in the digital sphere is to introduce correctives to negative social behaviors that go against human nature. Otherwise, we would again realize that a

society without ethics becomes blind and inhuman.

Only by becoming aware that it is the human subject who has to assign value to things and establish criteria for the development of science, technology, and informatics in correspondence with social development, is what will make human coexistence permissible. The fact is, the social problems that accompany digitalization in any region of the planet have implications for other countries. But none of these problems can be solved without an appeal to ethics.

Therefore, the following aspects should be recognized in any debate related to the question of how to face the ethical dilemmas of the inadequate use of information technology [12]:

a) Law is nothing more than the legalization of ethical values. But laws cannot be formulated without prior reflection by society, which seeks axiological convergences without discriminating against minorities of any kind; b) On the other hand, no legislation, code, or constitution is capable of exhausting all the ethical dilemmas that arise in social coexistence. Hence, moral formation at all levels of society is increasingly necessary. In any case, the dilemma of ethics in the context of science and technology, and particularly in the digital field, is not resolved through the establishment of standards and codes, but through a broader ethical understanding of the implications and future effects of the results in all contexts of human endeavor [12].

In this perspective, the ethical stance of each professional and user of digitization should combine a capacity to visualize and perceive the impact of new knowledge with a more responsible and respectful attitude consistent with the social values that correspond to social development.

The ethical and social challenges of Information and Communication Technologies derive from the same reasons why these technologies have spread, as in the case of the automobile, nuclear energy, etc [4]. The aim is also to create a balance that is favorable to the inevitable dualisms: light—dark; advantage—disadvantage; or even cost – benefit of technological development [18].

Ethical-social problems related to information technologies are strongly intertwined and increasing along with technical complexity and political complexity. In other words, ICTs, while providing increasingly effective solutions to master technical and political complexities, generate new challenges and ethical-social issues that are more serious and difficult to solve.

An interesting map of the main problems of digital ethics to be addressed points to the treatment of privacy [8], intellectual property, electronic democracy and offshoring, as well as Internet governance, cyberwar, cyberterrorism, and digital crimes.

The comprehension of ethics goes hand in hand with privacy, and it may seem simple at first, but when you start dealing with the topic based on real-life daily cases, you discover the need to find the balance. There will always be a "trade-off" between what will be 'cybersecurity' versus privacy, and it is there, where digital ethics will be a determining factor in decision making;

avoiding abuses in people's privacy and intimacy so that this represents an effort to safeguard the national security of an entire nation.

At the 2019 Davos Forum, [21] 40 business leaders signed a Digital Declaration establishing a series of principles on which to build digital ethics, a concept intended to offer solutions to the problems that are emerging from them. Among those principles stand out:

- 1) Participation: The development of digital skills is an integral part of the education of every citizen everywhere in the world.
- 2) Dynamic digital society: Digital products and services must continue to develop and bring benefits to society.
- 3) Data and privacy: Respect for citizens' privacy must be ensured through responsible, secure, and transparent data management.
- 4) Cybersecurity: Cooperation is needed to reduce cyber threats and strengthen people's security in the digital environment.
- 5) Cooperation and dialogue: Stakeholders everywhere and in every sector must dialogue and collaborate to achieve greater development of the digital future.

In synthesis, digital ethics has several actors, on the one hand, user ethics, and on the other hand, corporate ethics and ethics applied to technology. But it is also important to understand that ethics does not depend on the software, but on the people behind it; if whoever programs an algorithm already does so with some bias (for example, race or gender), the algorithm will be biased.

## 4. Conclusions

A vision of the history of information technology can greatly help to establish a unifying principle of digital ethics, both in terms of its creation and the needs to which it must respond.

In accordance with the above, one could arrive at the idea that the development of science and technology and their social implications in the digital sphere have led to a revaluation of ethics, in which it is important to recognize several things:

In practice, the computer ethic of capitalist society is "as much as you have, so much you are worth." Developments in science and technology and their derivative: information technology, are not ethically neutral.

We are facing a development of informatics accompanied by digitalization, which is giving rise to a different ethical perspective.

The qualitative and quantitative leap of science and technology in the scenario of digitization has extraordinarily aged the classical vision of ethics.

This can be seen in the following: A shift is occurring from ethics as a technological discipline toward more specific concerns that can be employed in the context of technological development in correspondence with the profile of the professional. Abandonment of the ethical concepts as autonomous. The effect is the development of

ethics applied to engineering and technological practice. Greater concern for the analysis of the consequences of the decisions taken concerning the introduction of technology. The idea is that there is more awareness that a society left to its wild forces ends up building or maintaining dreadful social differences, unworthy of humanity.

The professional preparation of computer scientists, quality, and professional excellence should not be assessed by referring exclusively to the level of qualification related to the mastery of computer skills.

Professional excellence is achieved when information technology becomes an instrument at the service of more human reality. In the Cuban case, it is based on the ethics of the principles of the socialist project.

The idea is that information technology only makes human sense when it preserves exquisite respect for each of the rights and freedoms in which human dignity is materialized.

For the purposes of what has been expressed, it is worthwhile to state here the idea with which the Code of Professional Ethics of Science Workers in Cuba is identified, which is part of the basis on which the development of informatics in Cuba is based:

"Science will be meaningless if it is not based on the principle of humanism since all scientific activity should be guided by the recognition of man as the supreme value. It is precisely man, his life, welfare, health, health, culture, freedom, and progress, who gives meaning to science" [9].

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