WHY DO WE CONTINUE DOING SCIENCE?

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ABSTRACT: In this paper I speak from both a scientific and religious perspective. From this dual perspective I question the motivations that drive us to continue in the effort of doing scientific work. I ask the why and the wherefore of scientific work. To answer this question: *What drives us to continue doing Science?* I raise a preliminary question: What do we mean when we say 'Science'? After briefly describing how the language of Modern Science has evolved in the last centuries, I distinguish between the knowledge that can be expressed by the formal languages of mathematics and the more personal and internal knowledge that can only be expressed by other languages that I call languages of symbol. Finally I propose positive and religious values that move us to continue doing science, while, together with more critical voices, also show the relativity of scientific work.

KEY WORDS: science, knowledge, epistemology, formal languages, mathematics, values, religion.

¿Por qué seguimos haciendo ciencia?

RESUMEN: En este artículo hablo desde los puntos de vista científico y religioso. Desde esta doble perspectiva cuestiono los motivos que nos impulsan a continuar en el esfuerzo de llevar a cabo trabajo científico. Me pregunto por el porqué y el para qué del trabajo científico. Para responder a la pregunta: ¿Qué nos impulsa para seguir haciendo Ciencia?, planteo una cuestión previa: *¿Qué queremos decir cuando decimos 'Ciencia'?* Después de describir brevemente cómo el lenguaje de la Ciencia Moderna ha evolucionado en los últimos siglos, distingo entre el conocimiento que puede ser expresado por los lenguajes formales de las matemáticas del conocimiento más personal e interno que sólo puede ser expresado por otros lenguajes que yo llamo lenguajes símbolo. Finalmente propongo valores positivos y religiosos que nos mueven a continuar haciendo ciencia; mientras que, junto a las voces más críticas, muestro también la relatividad del trabajo científico.

PALABRAS CLAVE: ciencia, conocimiento, epistemología, lenguajes formales, matemática, valores, religión.

1. Science and Religion

Non-overlapping Magisteria

The North American anthropologist Stephen Jay Gould, in his book *Rocks of Ages* (1999) [1], avoids the conflict between Science and Religion by presenting Science and Religion as what he calls Non-overlapping Magisteria, which he designates by the acronym NOMA. According to Gould, both magisteria of Science and Religion maintain their authority without interfering one with the other: The Magisterium of Science is about empirical facts while Religion deals with issues about the ultimate meaning of reality and moral questions. Gould,

[1] Gould, S. J., *Rocks of Ages: Science and Religion in the Fullness of Life,* Ballantine Books, Reprint february 2002.

who has personally declared himself agnostic, defends the separation between the magisteria of Science and Religion.

In this paper I want to show the interaction between both magisteria.

In my book *Mathematics and Religion*[2], I defend the interaction between the magisterium of Religion and the magisterium of Science. Each of these magisteria acts upon the other, although each one in a different way, because each one has a different view of reality. Science looks at reality from its own methodological autonomy. Religion looks at it from a more global and inclusive approach.

Science and Religion, two views of the same reality

Indeed, as discussed below in more detail, since the seventeenth century modern Science has developed methodologies that have a value in themselves. These are methods and methodologies that, although in some ways have only a relative value, they need to be respected and taken into account.

In dealing with Religion I will focus, as Gould does, in the inclusive value and meaning provided by Religion, but I will insist, unlike Gould, in the proposal of linking the method of Science with the values inherent to Religion.

Everything that is human is of importance to any Religion. But everything that is human is especially important to Christianity, because of the presence of God in the world through the Incarnation of Jesus Christ, and by the presence among us of the Spirit of the Son, sent by the Father. If all things human are important to Christians, Science, as privileged human knowledge, is particularly important.

The scientific view of reality can dispense with the religious view, because of its autonomy, and indeed there are good scientists that dispense with the religious view of reality. But the religious view cannot forget the scientific view. This is not a detriment to Religion, as it is a consequence of the global manner in which Religions, and particularly Christianity, are related to reality. Science is a very important part of the global reality which Religion addresses.

NOSYMA (Non Symetrical Magisteria)

In response to Gould's NOMA, I propose in my book, *Mathematics and Religion,* a relationship between Science and Religion I call NOSYMA (Non-Symetrical Magisteria). By using this name, I admit with Gould that Science and Religion correspond to two different magisteria about reality. But I do not claim, contrary to what Gould does, that these two disciplines are two separate views of reality that do not interfere with one another. I insist rather on the mutual interaction between them. When I say that they are not symmetrical I want to point out that each of them represents a different view of reality, while stressing the interaction between those views.

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[2] LEACH, J., *Mathematics and Religion. Our Languages of Sign and Symbol,* Templeton Press, 2010.

2. What do we mean when we say 'Science'?

Current Science has its historical origins in past cultures that have left various types of documents which testify to the presence of some elements in current scientific culture. These documents have been found through archaeological research in ancient Egypt, in the clay tablets of Babylon, in the sacred books of India, the Chinese abacus, etc.

Later in the Greece of Pythagoras, Aristotle and Euclid, Science took a historic step to incorporate deductive methods of formal logic and mathematical proofs. In Greece, Science ceased to be merely intuitive and inductive and began to be structured in deductive theories.

Modern Science

We have to place the birth of what we now call 'Modern Science' in seventeenth century Europe. From the seventeenth century onwards there was a new scientific methodology, supported by two pillars of knowledge: empirical observation and the formulation of empirical observations in a mathematical language. This new methodology has been based since then on two basic human cognitive abilities: the ability to observe methodically empirical phenomena and the ability to express those observations in a public and precise language, which achieves its maximum degree of accuracy and objectivity in mathematics.

Empirical observation and mathematical language formulation

Using methodical observation and the formal languages of mathematics, and ultimately the formal languages of computer Science, has led to a new kind of knowledge which is both objective and public (when I say that knowledge is public I mean that it is expressed in a language that has the same meaning for everyone). This has had a very specific and important cultural impact. Scientific knowledge enabled first the industrial development of the nineteenth and twentieth centuries and is currently facilitating the development of computer technology that reaches all areas of our present culture. The new contexts of computational Science, the development of software, and the multiplicity of telecommunication computer devices are transforming the way we learn and communicate. These achievements are only the spearhead of technological developments we are currently experiencing under modern Science.

In a first approach, Science is a way of knowing the world based on a methodology. But Science is more than that. It is a way of seeing reality, and it is a way of seeing the causes of things. An important consequence of the methodology of modern Science has been the new treatment of causation that it has introduced. As Stephen Hawking says in his latest book T*he Grand Design* [3], Science answers the question *why things are*.

[3] Hawking, S., *The Grand Design,* Bantam, Reprint, 2012.

Science has always studied the causes of events. Modern Science seeks to explain why empirical facts occur. Science wonders why the presence of a fact causes another fact to occur. Because of the importance of causality in Science, it is worth that we devote a section of this paper to reflect on how Science understands causality. The study of causality in Science shows both the internal wealth of scientific knowledge as well as the intrinsic limitation of such knowledge.

Scientific causality

In Medieval Europe, before the appearance of modern Science, the view of causality of Greek philosophy largely based on Aristotle‘s four causes: material, formal, efficient, and final, was still dominant.

The last of these four cases, the final cause, is what has given more problems in its reinterpretation from the perspective of modern Science. The formulation of empirical observations by mathematical laws in modern Science has led to the reinterpretation of Aristotelian plurality of causes, but mostly has meant that Science has avoided talking about final causality. Let's see why this has been so.

When Science studies the causal relationship between two events 'A' and 'B', it seeks to demonstrate that for each occurrence of 'A' 'B' also occurs. Modern Science states that an action causes another action by relating the two events using a mathematical formula. For example, if I push a car I know that I set it in motion, and I know that there are mathematical formulas that relate the force of my thrust with the amount of movement that I impart to the car.

We can reinterpret, from the perspective of modern Science, what Aristotle meant about the three first causes, 'material', 'formal' and 'efficient', but there is a great difficulty to reinterpret the meaning of the 'final' cause. The reason for this difficulty is the reference to the subject that appears in the final cause. The final cause contains subjective elements because there is in it a reference to the agent which seeks an end, by the presence there of a search by the agent, of a purpose, a 'telos'.

The final causality

Science speaks of factual events. Science speaks of facts but does not speak directly of purposes. Science speaks only indirectly about goals. Science reformulates teleological observations (in which there is searching for a purpose, a telos).

For example, Science tries to explain the observations of evolutionary biology, in which there appears a purpose, describing objective causal relationships between the observed facts, and tries to express these relations by mathematical laws. In the phenomena of evolutionary biology we observe different forms of intentionality, desire and intentionality that in an evolutionary way appear in living beings, in various forms and degrees. The difficulty in finding a mathematical language to express these phenomena is that by applying a mathematical language we isolate living processes making them objects. Thus, purpose becomes an objective characteristic of living beings, and we eliminate the subjective origin of this purpose. In the case of human beings purpose is a very important factor that assigns responsibility to us as men and women. How can we express purpose? Would we simply use the language of mathematics? What language should we use?

Formal and symbolic languages

The presence of purpose represents a jump from the causality of material objects to causality of living beings, which cannot be (fully) explained mathematically. What language do we use then to explain this jump? Is it enough for us to use the language of mathematics? Is it enough for us to use the formal languages of computers and artificial intelligence? In my opinion it is not sufficient to only use these formal languages, which I call the languages of sign. In addition to these languages, I maintain that we need to use symbolic languages or languages of symbol. But before describing the languages of sign proper to Science and languages of symbol that go beyond Science, let us look at how the mathematical language of Modern Science has evolved in recent centuries. In the last two centuries Science has undergone significant changes that will help us understand scientific causality.

3. Evolution of Modern Science

Modern Science has not always been the same. The two basic features of Modern Science —the observation of facts and the formulation of the observed facts in a public and objective language— remain and continue to be the pillars of current Science. On the permanence of these two foundations, current Science remains also Modern Science. But Modern Science has evolved considerably in recent centuries and Modern Science as we know it today is the result of this evolution.

Perhaps most important, or most remarkable, in this evolution has been the knowledge that modern Science has acquired about itself.

In the last two centuries the evolution of modern Science has led us not only to better understand the nature of the world, but also to learn more about the same scientific knowledge. We not only know more about the world, we also know more about our scientific knowledge of the world.

When I say that we know better our scientific knowledge I mean we know better both the capabilities and the limitations of our scientific knowledge. And that means that we know more about the characteristics of our ability to observe objectively factual events and of our ability to use formal languages to express with certainty scientific statements.

From mechanical decision to risk management

In recent centuries, we have learned much about the characteristics of mathematical language. The language of mathematics, and with it scientific knowledge, has followed a path that leads from the automatic and the mechanical to the risky and the probabilistic.

In early Modern Science there was an abundant empirical and rational optimism and there was an almost absolute confidence that the scientific methods could give us a fixed and certain knowledge about reality. Now we know much more about the different types of risks that involve many of our scientific claims. I will focus primarily on the use of formal languages of mathematics and computing. I will start with two anecdotal reports, one of Gottfried Leibniz, a German philosopher and mathematician of the seventeenth century; the other is of the English twentieth century mathematician Alan Turing. Turing is one of the fathers of theoretical computer Science. One year ago we celebrated the centenary of his birth. Turing was born on June 13, 1912.

Leibniz's anecdote reminds us of seventeenth century empirical and rational optimism. Turing's quote explains the risk awareness that today necessarily accompanies mechanical decisions.

From Leibniz to Turing

Let us recall a famous quote from the philosophical writings of Leibniz:

> «... quando orientur controversiae, non magis disputatione opus erit inter duos philosophos, quam inter duos Computistas. Sufficiet enim calamos in manus sumere sedereque ad abacos, et sibi mutuo dicere: calculemus» [4].
>
> «... When disputes arise, the debate will no longer be between two philosophers but between two calculators. It shall be sufficient to take a pen (pencil) in hand and take a seat next to the abacus, and say by mutual agreement: calculemus».

Scientific optimism led Leibniz to equate philosophical thought with mathematics Leibniz believed that there was always sufficient reason to explain everything and dreamed of creating a universal calculating machine. Leibniz created a calculating machine which improved existing calculators in his time, one of them designed by Blaise Pascal.

Turing's machine and Church's lambda-calculus

Turing's machine, together with a mathematical calculation, called *lambda-calculus*, created by the American mathematician Alonzo Church, offered for the first time a formal definition of what an algorithmic process is. Turing first

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[4] LEIBNIZ, G. W., *Sämtliche Scriften und Briefe*, p. 1049. Herausgegeben von der Berlin Brandenburgischen Akademie der Wissenschaften und der Akademie der Wissenschaften in Göttingen, Akademie Verlag, 1999. http://www.uni-muenster.de/Leibniz/DatenVI4/vi4pur.pdf

explained with universal mathematical precision, by using a mathematical procedure, the operation of a computer. This explanation is now called 'Turing machine'.

Today we are used to the fact that computers make decisions for us. For example, when a traffic light turns green I move forward and when it turns red I stop. In this case, a computer has made that decision for me, and I am confident about the operation of that computer. But an important question we should ask is: Can we trust all our decisions to a computer? Can a computer replace all aspects of the human mind and will?

In a famous lecture that Turing gave on February 20, 1947, at the London Mathematical Society, he addressed the issue of whether a computer can simulate human thinking. He reformulated the problem and wondered if a computer could be programmed to learn from its mistakes, thus imitating the characteristic of human thought of learning from mistakes.

Turing noted that there are several important theorems that show the limitations of formal languages to make decisions (recall the Gödel incompleteness theorem, which states that we cannot get a program to make all our basic arithmetic decisions). But at the same time Turing claimed that there is no a theorem which tells us specifically where are the boundaries of formal languages and the boundaries of the interaction between the human brain and the computer machine.

We can say that the world constructed by formal languages cannot be controlled axiomatically (Gödel's theorem)[5], but we must say at the same time that the world of formal languages and computers is indefinitely open. The world of mathematics is like a bottomless pit, likely to continue growing without limits, but on the other hand we know that we cannot fully control its growth with mathematical methods.

This situation led Turing to say that if we want a machine to *think,* we have to give it room to make mistakes. That is, we cannot have a formal procedure that allows us to control, in each case, the decisions made by a machine. In other words, we cannot program a machine so that it makes all of our decisions.

In response to this situation Turing proposed to study experimentally the interaction between a human agent and a computer (between a human brain and a machine). Turing invented the *Turing Test*[6]. The *Turing Test* confronts the formal language of a computer with human language, and the outcome to that test is still open.

The Turing Test

The *Turing test* consists of placing in three different, isolated rooms, a human judge, a computer and a human agent. Communication is established by means of computer systems (keyboard, printer, microphone, speaker, etc.) between the

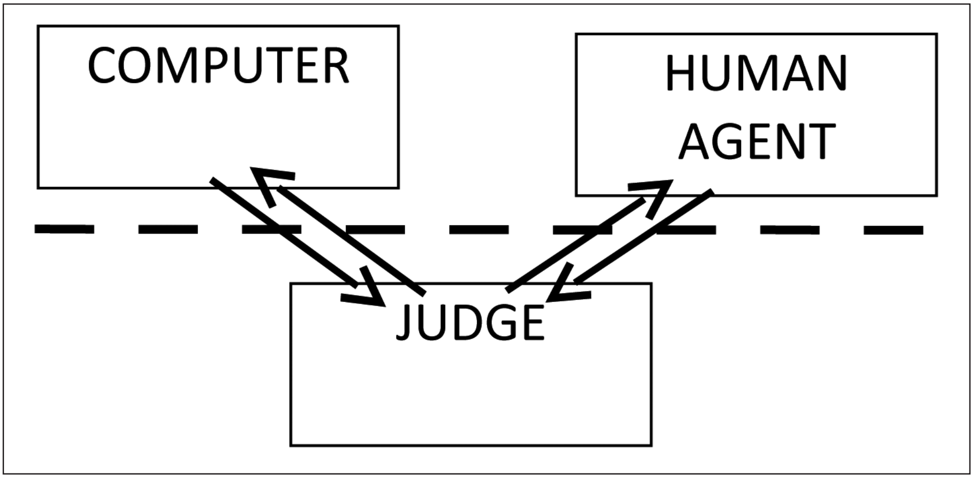
[5] Gödel, K., *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme*, Monatshefte für Mathematik und Physik *38* (1931), pp. 173-198.

[6] Turing, A. M., *Computer Machinery and Intelligence*, Mind, 1950.

judge and the computer, on the one hand, and between the judge and the human agent, on the other.

If the judge is unable to distinguish between the human agent and the computer, the computer has passed the test. On the contrary, if the judge is able to distinguish which of the two is the human agent, then the computer does not pass the test. It is important to note that in the *Turing test* the communication between the human agent and the computer occurs by means of computer systems. That is, the communication is in a formal language.

TURING TEST



The key question in the *Turing test* is: Can we translate absolutely every aspect or dimension of human language to a formal language that can be used by the computer? If we really can do this, then, if we have a computer powerful enough, we will not be able to distinguish any human agent from the computer.

The *Turing test* is still an open-ended problem on the relationship between computers and the human mind.

But, in my opinion, the point of the *Turing test* is that it ignores the distinction between symbolic language and formal language. The *Turing Test* raises the problem by using the formal language I call *sign* language, but ignoring the language I call *symbol* language. Because communication with the human judge always takes place through formal sign language, the judge may only make a decision based on the mechanical laws to which the formal language of the sign is subject and the judge will only rely on the formal meaning of the symbols used.

One of my purposes in this paper is to show that there are two levels of language, and that a full translation of the symbolic language to the formal language of sign is not possible. The knowledge that we can communicate with the formal language of sign I will call scientific knowledge and the knowledge that we can only communicate with the language of symbol I will call personal knowledge.

4. Scientific and personal knowledge

To study the relationship between formal and symbolic knowledge I compare a human person with a highly evolved robot. Is human consciousness only the product of certain circuits and interconnections present in our body? Are we more than just a robot?

Robots are an advanced product of Science and technology. They incorporate in their hardware the latest advances in electronics and store sophisticated software. Perhaps there are still in the human body circuits that are not in robots but they will be someday.

Hal, Kismet and other robots

Let us now consider an example with robots. Many of us, especially the not so young, have seen the film directed by Stanley Kubrick and released in 1968 entitled '2001: A Space Odyssey'.

One of the protagonists of the film is the robot HAL. An important moment in the film is the scene that shows the struggle for control of the spacecraft between HAL and the ship's human crew. After going through great difficulties the crew beats the computer and disconnects HAL.

During the struggle HAL understands everything, or almost everything. For example, when the crew locks itself in a cabin to prevent HAL from listening to them, HAL is able to read their lips through the window and in this way she learns what they say. HAL has a cold and calculating intelligence. HAL corresponds to the idea we had 50 years ago of robots.

In 2000, a year before Kubrick's projected space odyssey, Cynthia Breazeal [7] built at MIT (Massachusetts Institute of Technology) a robot named Kismet, which was in fact a humanoid robot prototype. Humanoid robots came after HAL. They are characterized by perceiving and showing feelings of empathy to humans. Cynthia's aim was to build a machine that could learn by social interaction and empathy, just as we humans do.

Kismet communicates emotionally, like many current humanoid robots do. Kismet as a child learns to communicate, reads emotions in the faces of its interlocutors and reacts emotionally. Computer programs responsible for Kismet's education teach her by 'trial and error'. Kismet tests a reaction, and if it is socially satisfactory, learns it; if it is not socially satisfactory, then she will not repeat it again in the future. All of us also learn social behavior, like Kismet, by 'trial and error'. When testing a new behavior for the first time, Kismet does not do it very

[7] Breazeal, C., *Designing Sociable Robots*, The MIT Press, 2002.

well. But she remembers her mistakes and improves her social and emotional responses subsequently. So, Kismet is able to complete her social learning skills through different circumstances.

There is a major leap between HAL and humanoid robots. HAL communicates with her environment only by using a menacing red light – those who have seen the film will remember that it was by looking at this red light that the crew knew that she was still 'alive'. There was no empathy between HAL and the crew. HAL was pure brain. On the contrary, Kismet learns as a child to communicate with emotional intelligence. Kismet is a step forward in the process of bringing tcomputers closer to the human mind. With Kismet, the struggle for the control of the spacecraft would have been much more complex. Desire for power, jealousy, and acomplexity of the feelings and emotions would have come into play in the struggle to control the ship. And these feelings would have complicated everything.

Kismet perceives and communicates emotions but she has no human consciousness

Recently, I presided as a priest at a wedding. In the homily I told the story of Kismet and then I asked the couplewhether they would be willing to marry Kismet? This question allowed me to discuss the option they had made when they decided to marry one another, as well as the personal freedom and the religious dimension of their choice, beyond the legitimate manipulation of feelings and emotions that we can achieve by scientific and technical procedures.

Much of the strength of Science and technology lies in its ability to study objectively intentionality as a fact, thereby achieving technological manipulation of intentionality. Thus, scientific methods can stimulate by technical means the intention and purpose of our human actions. However, the limitation of Science and technology is that they can never fully control human consciousness and freedom. The strength lies in the capacity of manipulating intentionality and purpose. The limit resides in the choices that we, as human beings, can make freely.

Science shows us the causes of things, why things happen. Technology allows us to manipulate the occurrence of things, and so the narrative of the story. But neither Science nor technology can act on our purposes and on the freedom that lies in our personal consciousness.

Let us consider another experiment known as the *Chinese Room* to explain this situation. The *Chinese Room* can help us describe the dimension of consciousness and freedom that cannot be reached by Science and technology.

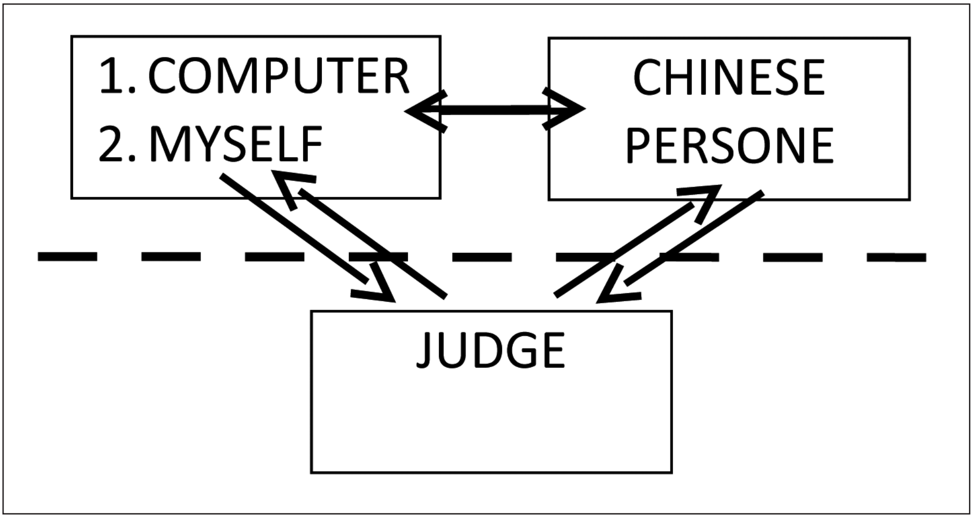
The Chinese Room

John Searle in his book *Minds, Brains and Science* [8], aims to show with the *Chinese Room* experiment, that a computer can understand formal language

[8] SEARLE, J., *Minds, Brains and Science,* Harvard University Press, 1986.

without being aware of the fact that she really understands it. Searle's experiment seems relevant because it refers to the inability of formal languages to express the inner state of human consciousness.

THE CHINESE ROOM



The *Chinese Room* experiment works as follows: We put in two different, isolated rooms a computer and a person who speaks Chinese. The Chinese speaking person and the computer have a conversation in Chinese language, communicating with each other via computer (keyboard, printer, microphone, speakers ...). Imagine now that an external judge cannot tell the difference between the two and cannot decide which one is the computer and which one is the person who speaks Chinese. Now, aware that I do not speak Chinese, I enter into the room in which the computer is, and I use the software and the media of the computer to communicate with the Chinese person. It may be that the external judge is not able to tell the difference between me and the Chinese speaker, when in fact I know that I do not speak Chinese. The question is: Is the computer aware of knowing Chinese? What is the difference between the computer and me, when I am aware that I do not know Chinese?

The interesting point of this experiment is that there is not a formal algorithm that allows us to check whether the computer is aware of knowing Chinese. All we know is that the computer behaves as if she knew Chinese.

Searle's *Chinese Room* experiment shows the existence of two different types of meaning in language: (1) the formal meaning which is the meaning which our brains share with the computer, and (2) the personal symbolic meaning with which humans communicate to other humans the internal perception of our personal consciousness. The formal algorithmic languages of sign have only a formal meaning and languages of symbol have also a personal meaning. Programming languages and programs have a formal meaning, but do not have a personal meaning and they cannot communicate the inner perception that we have of our personal consciousness.

Technically we say that the meaning of the programs is described by their formal models. Since the programs only have a formal meaning, the human agent, who is conscious of not knowing Chinese, has not persuasive communication skills to communicate the internal perception of his consciousness, using only the language of the machine.

The knowledge by which I know that I do not know Chinese belongs to my personal consciousness. The judge cannot find out that I am *cheating*, based solely on the formal analysis of what I communicate using a formal language. Therefore, the knowledge of the fact that I do not know Chinese is a knowledge that I can hide in a context in which I only use formal languages such as the computer's and the judge in the test of the.

Chinese Room

The metaphysical question, i.e. the question beyond physics and Modern Science, is how and why human beings are able to communicate their goals and the perceptions of their consciousness.

I formulate this question in the language I call the language of symbol. Any element of the languages of symbol can be interpreted by the computer through a formal sign, but we use symbols to refer to realities that cannot be expressed in the formal language of the computer.

5. Why do we continue doing Science

At this point, after reflecting on the limitations and capacities of the public and objective language of Science we can ask the question that motivated this paper: why do we continue doing Science?

Never in history has there been so much Science and technology as today. It is said that researchers in mathematics and formal Sciences currently at work outnumber those who have existed throughout history. Science and technology have changed our image of the world and that change is in many respects irreversible. We can criticize Science and technology, but we cannot give up the development of Science and technology if we are to act responsibly for the future of humanity.

The challenge of a sustainable development

One of the most important challenges of today's society is to achieve a sustainable development. There cannot be a sustainable development if it is not accompanied by scientific and technological development. Science and technology are a necessary part, even if they are not the unique part, of our construction of a sustainable future.

Science and technology both are in some respects blind tools that know nothing about ends and intentions. But it is also true that Science and technology are indispensable instruments to build a more humane future.

Without Science and technology we cannot talk about sustainable development. On the other hand development is not enough to justify Science. Currently we cannot speak about development without using the adjective sustainable. Sustainable development needs to be driven by motivations, purposes and intentions such as justice and ecological balance, which are external to Science.

«*We cannot change the cards we are dealt, only how we play our hand*»

This quote is from Randy Pausch, professor of computer Science, human interaction with computers and technology design at Carnegie. Randy died while he was still active. Before dying Randy wrote a book entitled *The Last Lecture*[9]. In his lecture Randy talks about his hopes and dreams knowing that his life is coming to an end. Randy encourages us to play our hand with hope, knowing that our life has a meaning.

When Randy says that we cannot change our cards —why not?— he is talking about Science such as we have received it. He refers to the use we make of our life and our work in Science. We need to continue doing Science, but also we need to ask why and for what reasons we continue doing Science.

Non-symmetrical relationship

I want to end this paper with a reference to the non-symmetrical relationship between Science and Religion (NOSYMA) I mentioned at the beginning. I think that now we can understand a little better why I propose a non-symmetrical relation between Science and Religion. Science provides objective knowledge and explains the objective causes of events. Knowledge of the objective causes allows us to manipulate the facts through technology. The facts are the cards of the game which we play. But Science does not allow us to talk about the purpose. Science is blind to human consciousness and the purpose of our actions. Science does not give us clues about how to play our hand.

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[9] PAUSCH, R., *The Last Lecture,* Hyperion, 2008.