Traccia n.3

In this extract from Umberto Eco's *Combinatoria della creatività*, the author expresses his opinions about the way we define art and creativity, and then tries to understand the relationship between science and creativity

Are arts created or discovered?
In the first part of the extract, the author shows to the reader a new way to intend the work done by an artist: in fact, creating art, is commonly seen as the creation of something new, that never existed before and that is brought to life by the artist.
In the author's opinion, this is not correct, because what is created already existed in nature.
For instance, we can say that all the possible combinations of characters, already exist in nature, even though anybody has ever said or written them; therefore every book or poem, which are simple combinations of characters, existed in nature before they were written.
Moreover, his idea is valid for all kinds of arts, as all the possible combinations of sounds, letters, colors and lines, already exist in nature, so the artist does is not creating them, but just finding them.

What is creativity?
As written before, the task done by an artist is not the creation of something new, but the discovery of something already existing in nature, therefore creativity acquires a completely new meaning, different from the traditional one.
In fact creativity becomes discovery and the act of creating something becomes discovering something.
It may seem that this definition makes creativity completely lose its importance, but this is not true: the activity done by the artist is obviously the same incredible activity that requires great skills and hard work, what changes is the way we define the action of creating art, which is now seen as a discovery and not as a creation.

Can creativity be used in science?
These considerations about creativity, lead to the main question expressed by Umberto Eco in this extract: can we use creativity in science?
If creativity is defined in this new way, it becomes something that can also be applied to science, because this subject deals with the discovery of the laws that rule the universe, and creativity has the exact meaning of discovery.
Today scientists already give a lot of importance to creativity in what they do and a clear example of this is the creation of a mathematical proof: in the last century many proofs of new theorems were created by mathematicians that spent many decades of their lives trying to solve a problem.
The reason why finding the solution took them so much time is definitely not the lack of knowledge: in fact what they were looking for was a new idea that nobody had ever had before, and the research of this idea obviously implies creativity.
Considering creativity as a part of the work done by scientists leads to many interesting and important questions about the way we do science.

Can creativity, defined in the traditional way, be used in science?
The traditional definition of creativity, the act of creating something that never existed before makes science a task that does not need creativity: for instance, we can not say that a physicist created or invented a new formula, because this formula describes a law of the universe that already existed before the physicist understood it, therefore what he did was a discovery and not an invention.
This may seem to be correct because science is shown, at school and in the medias, as the application of rules in a straightforward way, but it is definitely false; all the scientists have a great knowledge of their subject but what makes the difference between a good and a great scientist is their creativity and lateral thinking.
Therefore it is clear that the new definition provided by the author is realistic, as it explains why creativity is so important in science.

Can an artificial intelligence be creative?
Supposing that, in a far future, we will have artificial intelligences with almost unlimited power, many questions arise after the considerations done before.
If we consider creativity as creating something new that never existed before, we would probably think that an artificial intelligence will never be creative, but if we are asked whether, in the future, an artificial intelligence will be able to discover already existing things that humans do not know, we would probably answer yes.

Some examples of artificial intelligences' ability of creation already exist today: the algorithm used in search engines like Google, that, given a certain word, gives the user links to the web pages that match with that word, was not created by a human, but by another algorithm.
In addition to that, algorithms are used to create parts for planes and spaceships and even to create paintings and music.
This gives even more credit to the new definition of creativity, because what these algorithms do is generating many possible answers for their tasks and then researching the best one, and this is made possible by the incredible calculation speed they can reach.
What we can understand from this is that, if we accept the new definition of creativity, it becomes something that can also be done by machines; if we do not believe that machines can create something, it means that the definition is wrong, because today machines can discover and, in the future, they will probably do it even better.

Should we change the way we do science?
Acknowledging the importance of creativity in science is really important, and today more and more people begin to understand it.
The way we do science today is definitely the right way, because scientists know how to use their creativity to solve problems; what we should change is the way science is seen by children and by people that are not scientists.
As I wrote before, science is shown at school as a boring activity, and many students do not find it interesting: this means that many students that may become great scientists will never even think about the possibility of such a career.
We should pay much more attention to the way this subject is taught, and make sure that students clearly understand the role of creativity in this job.

Should we consider scientists as artists?
The considerations done by Umberto Eco may lead us to think that artists and scientists do really similar jobs.
Obviously, as written before, they both need creativity and, in addition to that, in both these jobs the knowledge of theory is really important, as both these figures usually have spent years studying, before beginning their activity.
What seems to be the important difference between artists and scientists is the reason why they do their job: all the artists and scientists earn money for what they do, but for some of them this is not the main reason why they do it.
While thinking that some artists do not have earning money as their most important goal is simple, thinking this about scientists is harder, but there are some examples that prove the opposite, even though the number of scientists that do this is smaller than the number of artists.
For instance, in the year 2000, seven mathematical problems were chosen as the "Millennium problems", and the society that chose them decided to give a rich prize to the first person that could solve anyone of them.
Today only one of these problems has been solved, but the professor that managed to do it, with a two hundred pages long solution, refused the prize, proving that he did not decide to do it because he was interested in the prize.
The only difference that may be left is what these people want to achieve with their creations: even though it may seem incredible, both artists and mathematicians want to create something beautiful, but sadly many people can not see beauty in a mathematical proof.
This means that the scientists that do their researches without any goal should be considered as artists; in fact these figures are really similar, not just because they use their creativity, but also in all the other aspects of their jobs.