

The Very First Letter of STEM is *Science*

By Maria Anna van Driel

“The earliest roots of science can be traced to Ancient Egypt and Mesopotamia in around 3000 to 1200 BCE. Their contributions to mathematics, astronomy, and medicine entered and shaped Greek natural philosophy of classical antiquity, whereby formal attempts were made to provide explanations of events in the physical world based on natural causes.” Source: Wikipedia

Nowadays, young people have an almost free access to an interactive world we have become to know as ‘The Internet’. Wikipedia in this, is a frequently visited site for them to upgrade their already possessing knowledge.

But how reliable is the written knowledge we can find on the internet? I mean, are we in the position of adding a form of creative and critical thinking to this avalanche of information? Are we allowed to take this information, discuss it, break the taboo and convert it all into a new evolution in science?

“My research field does not quite fall within the framework of the standard model of STEM subjects.” Too often I hear this and similar comments from people experiencing this feeling of dissatisfaction what is, in my opinion, not something that should be screaming in the background of anyone’s passion for researching the myriad possibilities all sciences has to offer in the modern era we have counted to be the twenty-first century. This is not the true meaning of science. Science, regardless which field is firing up your curiosity, should start with exploring the question asked! Even if this question falls slightly outside the frameworks of ‘accepted’ science.

So, are we allowed of breaking this problem, this taboo, and widen the boundaries that indicate the, in this line of thought, tunnel vision what seems to be taught so abundant since the removal of, for instance, Plato’s teachings?

It seems that here we are addressing that one particular *sore spot* in what the general public, as well as some scientists, think to understand about science. Unfortunately, this also leads to young people being taught that STEM subjects are those sciences which fall within the, by the majority, acceptable boundaries of what science is standing for.

Why is creativity necessary to science and art?

Personally, I am of the opinion that STEM (STEAM) should speak of young people gaining the opportunity to explore all corners of science without this fear of being ridiculed. Young people should have this freedom of expressing their creativity in what we have become to understand as the standard model for science. This creativity is necessary in all sciences because it involves imagination, and imagination equals visualization. In other words, creativity in itself has ‘created’ the world we live in today.

Think about it, would a mathematician really be able to solve the problem in the moment he or she is focusing on the flat numbers only? Visualizing the numbers, use them as coordinates and connect them and, convert it all into multidimensional objects floating in a Euclidean space, seems to be a much easier way to solve a math problem.

Did you know that mathematics can be discerned in arts such as music, dance, painting, architecture, sculpture, and textiles? And did you also know that these are considered to be the first 'technologies' used in cultures and societies? I wonder how a skyscraper would look like when this creative visualization (thinking outside the box) is not taught to, for instance, an engineer.

How it all connects

Even though Science is with humanity for centuries, it is still in its infant moment but that does not mean that as soon as you find yourself not agreeing with someone's research results you should sweep it under the carpet and label it as pseudo-science or, 'hypothetical nonsense'.

You know that, at one point in time, the pony express was thought of being the fastest way to transport messages but, in that same period the Romans already had the intelligence to think of VLC (visible light communication) what most likely was copied from their Egyptians neighbors who understood the effect in charging light even more by using 'mirrors'. Today we understand this as photon trapping which is something that is accepted by the majority.

Centuries later this term VLC, as well as its engineering, went beyond its own borders due to the curiosity of those who applied *critical thinking* to their scientific research. And if they did not had done so, none of us would have touch screens, internet, cell phones, electricity, a car... and physicists would not had the possibility to discover the Higgs Boson. Never forget, once upon a time there were scientific adventurist, visionaries, pioneers, who thought up an apparatus you know today as an accelerator.

So, for all who are convinced that their research field is a bit outside the remit of any STEM subject, this thought falls within the range of being incorrect and seems to be based on a behavior of the majority *accepting knowledge* in a democratic manner. I wonder, how would the world today look like if Leonardo DaVinci, Nicolai Tesla, Albert Einstein, Carl Gustav Jung, Erwin Schödinger, just to name few, had applied this way of thinking to their research? Would we had the opportunity to speak with each other through this medium we call "Internet" and read the psychology between the lines of an email?

Remember that the very first letter of STEM is *Science* which is from the Latin word *scientia*, meaning "*knowledge*" what can refer to a theoretical or practical understanding of a subject and can be acquired in many different ways and from many different sources, including but not limited to perception, reason, memory, testimony, scientific inquiry, education, and practice.

According to Wikipedia, “The philosopher Plato famously pointed out the need for a distinction between knowledge and true belief in the Theaetetus, leading many to attribute to him a definition of knowledge as "justified true belief". The difficulties with this definition raised by the Gettier problem have been the subject of extensive debate in epistemology (the philosophical study of knowledge) for more than half a century.”

On the latter, do I have to say more?