

In the pursuit of inspiration

My passion for astronomy began as a child. Large parts of my years in elementary school were spent stargazing, reading up on the solar system and the universe, as well as renting the video of the first Moon landing and watching it over and over again. I remember telling my parents I was going to be the first human to walk on the surface of Mars (and while this is now a real option, my spirit sank a bit at the prospect of a one-way ticket). Over the years, my passion extended into other fields of physics, such as particle physics, and to this day, reading up on everything from astronomy and particle physics to quantum mechanics and nuclear fusion is a hobby of mine.

Despite the interest in physics that I had in my spare time, my motivation for studying the subject was a different matter – I did pass my exams in the subject most times, but quite often only just above the minimum required. All of this changed when I was introduced to doing real research, for which I quickly developed a passion that remains to this day. I would love to liken myself to Albert Einstein in this matter (I guess every scientist likes to compare themselves to the great man in some way), who also struggled at school. He deeply disliked the teaching methods employed by his teachers, and later said that he felt the spirit of learning and creative thought was lost in strict rote learning.

Now, I do think that the comparison with Einstein completely stops here – my name has never been synonymous with genius, my papers have never turned the world of physics upside-down and, as of today, I've never received *that* phone call from Sweden (or any call from Sweden, to be fair). Luckily, my hair isn't quite as grey yet either. However, it has made me think about what could have been different to make me a more driven student? Clearly, I wasn't inspired enough – but was this my own fault or could a more motivational teacher have made a difference? I always had a passion for science, so why could this not emerge at an earlier stage in my education?

Thinking back to the moments when I was really interested in what I was learning, the one thing that they all had in common was when a topic had a clear application in view – this helped me to see a clear reason for why I was doing it in the first place. Some of my teachers could give vivid examples or demonstrations that helped to explain how the topic that we were studying could be applied. Knowing why you had to calculate a sum or memorize a formula helped a lot. Calculating a triple integral from zero to infinity, simply because my teacher told me to, never seemed like a good enough reason.

Teaching methods matter. I always enjoy reading about Richard Feynman, who was known to be an excellent teacher. He always seemed to show great enthusiasm when explaining science and could even engage students when it came to notoriously difficult topics such as quantum mechanics. Feynman did this by not just getting his class to work on a calculation, but by letting them think about the deeper implications of quantum mechanics, as compared with a classical way of thinking. This level of dedication to teaching is what I think is sometimes lacking in current teaching



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methods. Students do need to know how to calculate and memorize information, but this does not mean that they have truly understood the concept. For example, I remember learning thermodynamics and memorizing the laws, equations, principles and what they can be applied to. However, the actual understanding came when I was working out the results from an experiment of my PhD. It took me a while to figure it out, but suddenly it all made sense in the light of my practical experiment. The complete subject of thermodynamics now made sense to me, and this understanding will stick with me to the end of my days.

So, is there a preferred method for successfully teaching science, especially to tricky students like myself? Should all teachers endeavour to be like Feynman? Should all students be doing practical research at an early age? Or should we just assume that a passion for science is enough, and it will come through eventually? I'm not sure. While it all seems to have worked out fine for me in the end, it wouldn't have hurt if I had become more adept at science from an early age. To students such as myself, don't worry – if your passion for science emerges while you are still studying, great! If it develops once you are an active researcher, that is fine too. If it never comes, you've picked the wrong subject. Stop what you're doing and go back to school.

For me, I'll keep doing what I've been doing. All that is left is to wait for the legendary call from Sweden... but I think I'll turn grey long before that happens.



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