

Professor Mehdi Fardmanesh: Don't be afraid to doubt!

We should seek help from philosophers and sociologists, says Mehdi Fardmanesh, professor at Sharif University of Technology in Iran, discussing the rapid development of technology. An expert in the field of electronics and bioelectronics, the founder of a number of scientific laboratories, the creator of many courses in various fields, Professor Fardmanesh calls science an art, believes that doubts contribute to the evolution of knowledge and that online education will never replace classroom studies. This is not the first year Mehdi Fardmanesh has come to Polytechnic University where he lectures students of the Institute of Electronics and Telecommunications. In an interview with the international Office of SPbPU, the Iranian professor spoke about breakthroughs in the world of electronics, presented a formula reflecting the essence of science and gave useful advice to students.



— **Professor Fardmanesh, you are a serious technology expert. How do you feel about online learning?**

— Everyone talks about the benefits of online learning, but I am more inclined towards the traditional format. For me, teaching in a classroom and live communication make a lot of sense. It's the only way to sense when the students'

focus is shifting and prevent the moment they lose the thread of conversation. While online classes make our lives easier, an important part of the learning process is lost with them.

— In your opinion, is the engagement of today's students in the classroom changing?

— Let me put it this way: as a professor, I think we don't always do a good job. Many of us become overly immersed in teaching the basics. Students become overloaded with theory and their ability to see, to predict the future diminishes. And that's key to learning.

— But it's kind of inevitable — there's more and more information every year...

— Yes, and I'm sure everyone has to work harder and harder as time goes on. There's already a lot more to learn now — compared to 50 years ago. Time will tell how we will cope with the increasing flow of information. Perhaps — this is so far out of the realm of science fiction — scientists will use chips to store data, which will be implanted in the human brain. Imagine being able to download all known material about physical phenomena, and use it as needed. But the questions immediately arise — is it ethical? Is it humane? And what happens if a virus gets on the chip? Talking about this opens up the very interesting world of bioelectronics, a field that combines biotechnology and electronics. I can assume that in the future, bioelectronics and biosensors will take their place in the market and have a serious chance to radically change the field of medicine. It will be a big breakthrough in many areas.

— What other breakthroughs in electronics do you consider the most significant?

— There have been quite a few. The discovery of electromagnetism, the creation of the first computers, the invention of the transistor, lithium-ion batteries, liquid crystal screens; the introduction of Wi-Fi — you could go on and on about the milestones in the history of electronics that have had a major impact on our lives. Quantum computers — today they no longer seem like something futuristic, and there was a time when we could only read about them in science fiction novels. Artificial Intelligence is also changing dramatically. I'm excited to see what the world will be like in a few decades — I'm sure there will be a lot of changes.

— You once compared science with art, why?

— On the board in my laboratory there is a formula: $(ART)^2K$, which can be defined as Advanced Applied Research Requires Through Time Knowledge. This is the key for knowledge. I believe that science really get into this. You gain a feeling of what you do. It's a kind of art. Sometimes the solutions that we have problems are very artistic and you have to use your intuition to find them. At the same time, you have to have the necessary knowledge — as complete as possible. If they are not correct, you will not get the result. Of course, it has nothing to do with

a mathematical formula, but in my opinion it is an accurate definition of science.



— **This brings to mind the catchphrase: «The more I know, the more I realize that I know nothing».**

— And it's true! Imagine that there is a big board, infinite in all directions. It is a board of knowledge. On it, what we know is surrounded by boundaries. We know what is inside the boundaries, but we have no idea where the boundaries of the board itself are. As you expand your knowledge, your own boundaries get bigger. And you see that the scope of what you don't know also increases. Unfortunately, our capacity, particularly our memory, is severely limited. Who knows, maybe someday we'll solve this problem too!

— **How dependent is man on technology today?**

— My brother, a professor at a university in Pennsylvania, USA, says that we scientists are ruining the world. He believes that technology has taken over our lives. And he has a point: go for a walk in the park one day and see how many people are walking around with their smartphones on. Our brains just don't have time to rest. We take the phone to the bathroom, we flip through the news feed before going to bed, we start the morning with the phone in our hand. It seems to me that man and high technology should be disconnected as soon as possible — or at least a balance should be found. Perhaps experts from other fields —

philosophers, psychologists, sociologists — can help us in this.

— **And of yourself, would you say that you are addicted to technology?**

— Oh, I have a different kind of addiction. I have an endless thirst for knowledge and periodically forget that time passes. When I work on an experiment, create a system, delve into the phenomenon of something, I enjoy these processes. It's a real art. I enjoy being able to pass on my knowledge, to teach someone. The true pleasure is to see the gleam in the eyes of students, the real emotions. It is impossible to feel them in online learning — so once again I will talk about the benefits and advantages of traditional classes.

Of course, I'm a workaholic, and I love it. I love teaching and seeing students learn. When they see with their own eyes how a project is launched. The magic that comes on from the results achieved probably happens to everyone. I once had a group that was behind on a lab work deadline. They started late at night, and, of course, they didn't make the deadline. Then they asked me to help, and we started working together. You should have seen it — when they realized that the project was working, and they could personally see the results of their work, they were so happy that they turned on the music and started jumping almost to the ceiling. Then someone looked at the clock — it was half past two in the morning. After a while, they gave me the night owl award. Very symbolic!



— Is the teaching process at SPbPU much different from other universities?

— I would say that the teaching style at Polytechnic University is a little different from what I'm used to. But students adapt very quickly. I think the fact that the lectures are in English is very useful for them. My lectures are very interactive, and the students interact well with me. Not everyone is fluent in English, but you can shake them up and say: wait, it's not your native language! It's not mine either, by the way. I also make mistakes, but I am a scientist-engineer, who first of all cares about the result.

— What three important qualities, in your opinion, should a student or a young scientist have in order to succeed?

— The first is to be a broad-minded person with no preconceptions. Have the ability to explore and observe. The second is to study scientific concepts carefully to avoid superficial knowledge. And third, never assume that you really know a subject. Facts you are completely sure of today may be false tomorrow. I would put it this way: always doubt what you know and what you believe. We don't know how much we don't know. And how can I be sure of what I don't know? Confidence stops us from growing. Why learn something when you already know everything? But when you doubt, your knowledge evolves and improves. So don't be afraid to doubt!

Prepared by SPbPU International Office

Дата публикации: 2023.01.27

>>Перейти к новости

>>Перейти ко всем новостям