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HOW AN INVENTOR SHOWS CARE TO SOCIETY

MEDEXO ROBOTICS -
YIN FAN DENIS HUEN

On the day of the interview, Denis's team was taking part in the "Golden Age Exhibition and Summit 2018" at the Hong Kong Convention and Exhibition Centre in Wan Chai. He looked pale and was obviously not feeling well — he had just returned from Israel and had not slept enough.

"Israel has a population similar to that of Hong Kong, but it is surrounded by enemies and suffers in war. However, it still attracts much capital internationally, and its technological development and technology ventures are thriving. This trip allowed me to learn from others' experience."

Despite feeling exhausted, Denis lit up when it came to these topics, his diligence shining through.

Before long, visitors stopped by to see the products Denis had developed. Denis approached them to introduce the products, and I took the opportunity to find out about the progress of his projects. Apparently, besides the robotic stabilising gloves, Denis had recently developed a set of devices to solve the walking problems of Parkinson's patients,

including a cue light and vibrating shoe insoles. Parkinson's patients have poor balance and tend to walk with a broken stride. The cue light is attached to the patient's waist, directing a constant green laser beam in front of the feet, prompting the patient to step over the light to return to a normal stride; along with the rhythmic vibration of the shoe insoles, the patient can walk at a normal pace.

When the media reports about Denis's inventions, it is often mentioned that he saw his friends and relatives with Parkinson's disease suffering from hand tremors, which inspired him to research the topic during his master's degree in the UK, leading to his achievements. While this was certainly one of the factors, Denis also emphasised that everything added up, including his interest in robots and his care for people with disabilities — it did not happen overnight.



“The American physicist Edward Teller once said, “The science of today is the technology of tomorrow.” Denis Huen, the founder of MedEXO Robotics, already understood this idea as a secondary school student. Today, he has developed a wearable robotic glove to help Parkinson’s patients mitigate their hand tremors. This multiple-award-winning technological product was indeed built upon the scientific knowledge that Denis had accumulated over countless yesterdays.

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A PASSION IN INVENTION INSPIRED BY HIS MOTHER AND TEACHER

Denis, now 31, has had a curiosity about things around him since he was a child. “Whenever an appliance broke in the house, such as a fan, my mother would disassemble it and try to fix it. I would help out by her side and gradually developed an interest in the area.” He imitated his mother, taking apart fans, TVs, and CD players.

“That gave me good experience. I took them apart and got to know their structure. It made me curious about the principles behind other things too.”

As a child, Denis had innovative ideas from time to time. For example, in secondary school, despite his mediocre grades and dyslexia, he won the book report award every year. It was all because he knew how to write creatively. “For example, if I read a book called *Exotic Israel*, I would write the book report in the format of a script for a travel show, with dialogues between two hosts to introduce the content.”

When Denis was in Form Four, his physics teacher held a mini competition that gave him the opportunity to combine his

scientific brain with creative ideas. The teacher asked the students to design a material that could withstand the impact of an airsoft pellet, and the lightest design would win. Denis came up with the idea of folding paper into strips, weaving them together and overlapping them to disperse the impact of the airsoft pellets. He ended up in the top three and was awarded a free film ticket.

This small classroom activity further sparked Denis’s interest in inventing and motivated him to participate in the Hong Kong Youth Science and Technology Innovation Competition in Form Five. Initially, he only thought of inventing something that did not exist, such as the Flaptor flying machine in *Laputa: Castle in the Sky*, but he soon realised that it was beyond reach in terms of technology; and if the device was to float instead of fly, it would have been too far from his original idea, so he decided to think of something else.



INNOVATION DOES NOT HAVE TO BE “FROM SCRATCH”

He tried to think of a real-world problem to be solved; from the news, he noticed that Africa was still lacking food and got the idea to develop “artificial chlorophyll”. He then went to the University of Science and Technology every day to read books on the subject. Based on his knowledge at the time, he could only put together the components of chlorophyll like a jigsaw puzzle, using equations to make a written report for the competition. “At the interview, the judges asked me if I had ever thought that I didn’t have to go through all that trouble. They told me that all I had to do was to collect some leaf samples and extract the chlorophyll from them.” Denis was shocked with realisation, and instead of defending his research, he asked himself why he had not thought of this. Obviously, he did not win the competition.

“This experience taught me that innovation or creativity does not always mean ‘building from scratch’. Some things already exist, or the focus could be on making effective use of natural resources, and making additions and subtractions — that is already innovation,”

Denis said. Spurred on by his first defeat, he

made another attempt. That year, he was already in Form Six; despite facing difficult A-level exams, he mostly focused on the competition, thinking about what invention he could make with his interests and abilities.

“At that time, I continued to watch the news for inspiration and discovered that countless World War II landmines were left in Cambodia and they were difficult to clear. Because of the high value of the mines, the locals would take the risk of digging them up, which would often explode and wound them or even make them lose legs.” Denis, who has loved robots since he was a child, wanted to design a mechanical leg to help Cambodians who had lost their legs from mines. It took him one month to conceive the idea and four months to design it, using wires and switches to build a control system. In the end, not only did he win the Hong Kong Youth Science and Technology Innovation Competition, but also the third prize in the Intel International Science and Engineering Fair and the first prize in the 5th Little Scientists of Tomorrow Competition in China. This experience was an important turning point in his life, proving his ability in science and innovation, and paving the way for his future career in medical technology.



THE PYRAMID OF SCIENCE-BASED SOCIAL IMPACT

After his A-levels, Denis enrolled in the Physics Department of the Chinese University of Hong Kong. He chose physics instead of the technology-related subject of engineering, because in talks by renowned scientists which he attended from time to time in Form Seven, he realised that all technologies are ultimately based on basic science, that is, physics.

“This formed a pyramid, with science at the bottom. Applied science — or technology — is on top of that. Then, on top of applied science is technological products, while at the tip is influence, or social influence.”

The closer you get to the bottom, the bigger the pyramid you can draw. With this in mind, Denis became eager to

pursue the fundamental knowledge that would allow him to make a greater impact in the future.

With this attitude, he completed a Master’s Degree in Physics at CUHK and a Master’s Degree in Medical Robotics and Image-Guided Intervention at Imperial College London, and is currently pursuing a PhD in Biomedical Engineering at the University of Oxford. In the next six months, he aims to launch the cue light and continue to improve the mechanical stabilising glove to bring convenience and comfort to the lives of Parkinson’s patients.

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