On 26 October, Professor Emeritus Walter Lewin (MIT) delivered one of his legendary lectures about rainbows and blue skies to a packed lecture hall at TU Delft. He himself studied here 45 years ago. How does he view the difference in quality between TU Delft and MIT?

Jos Wassink

Interview

‘MIT pays nothing towards my research’

“You do not allow the creation of centres of excellence that’s a dirty word in the Netherlands’

This morning you began by inspecting your lecture room. What condition was it in?

“When I entered I thought: ‘Oh my God, this is going to go horribly wrong’. For the rainbow demonstration I need a sun, as I use a carbon light to achieve the enormous luminosity, but the carbon light didn’t work properly and I couldn’t adjust it. The slide projector didn’t work either – they had had four months to get that organised. The second projector also didn’t work, but eventually the third one did. Then I have an experiment with smoke which, as I’d explained, cannot possibly be done against a shiny background. So what was the background today? Shiny. So that had to be changed. I spent the first half hour thinking: ‘Oh God, this is not going to work’. After about an hour I regained a little confidence. And after two hours I felt there was a reasonable chance that the two experiments would indeed work.”

Why do you attach such importance to demonstrations during lectures?

“I don’t particularly. If you teach physics, then step by step you gradually derive formulas, but formulas are just lifeless figures on a blackboard. It’s important to be able to say: this is what we’ve derived, now let’s see what the consequences of the formula are. You said that I attach importance to demonstrations, but that’s not the way it is. The demonstrations are necessary to show the students what the formula means.”

But you take it to the extreme.

“That’s why 2 million people watch my lectures every year. I don’t know if you want to call that extreme. I think that, in the long run, I’ll influence the way many physics lecturers work. I notice that now already, with around 20 to 30 fan emails a day. By which I mean physics lecturers who write to say: ‘you made us realise that we have never taught physics as it should be taught’. So I influence the way physics will be taught in the classrooms.”

Only now, after 50 years of teaching?

“I’ve only been doing these online lectures since 2003 - seven years. Initially there were 300,000 viewers a year, now there are 2 million. So it’s expanding and increasing more and more.”

The disadvantage is that a good demonstration takes so much time to prepare. Are lecturers prepared to make that effort?

“No, most of them are not. In interviews they often ask me: what’s the secret of your success? There is no one thing, no magic pill. It starts with your lecture structure: where you start, how you start, which examples you choose and where you want your lecture to gradually lead to. That may mean weeks of preparation. I think about it on the beach. I call it the architecture of my lectures. You then have to conceive demonstrations to support your lecture. After that, you work out some kind of script which you try out in an empty lecture room. That lasts, say 65 minutes, and you only have 55. So some things have to be cut. That often takes me another week. I then do the whole lecture again, and this time it’s a lot nearer to 55 minutes. At 5 a.m. on the day of the lecture, I go back to that empty classroom and do my third dry run. By now my timing will be perfect, and a few hours later I will deliver the lecture as a kind of performance.”

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Who is Walter Lewin

Scruffy hair, bright yellow jacket and large plastic rings on his little fingers. Walter Lewin (The Hague, 1936) is not exactly your average professor. After a frightening childhood as a Jewish lad in The Hague during the Second World War, Lewin studied Physics at Delft Technical High School, while working as a physics teacher at a grammar school in Rotterdam, and obtained his PhD in 1965. He went on to join Bruno Rossi’s research group at Massachusetts Institute of Technology. The freedom and lack of bureaucracy there were like a breath of fresh air to him – he’s still there today. From the outset, Professor Lewin has been involved in the development of X-ray astronomy, publishing some 450 scientific articles in 43 years. He also made a name for himself with his theatrical lectures that students will not readily forget. His lectures have been available online as OpenCourseWare since 2003, which enabled him to reach a whole new audience: two million viewers per year. His theatrical lectures that students will not readily forget. His lectures have been available online as OpenCourseWare since 2003, which enabled him to reach a whole new audience: two million viewers per year. His work has been published in Quest, Incir, and Het Parool newspaper and elsewhere. In 2009 he was awarded a Teleg, the annual prize for journalism. Last year saw the publication of his debut novel, Spaghetti Spontini (Spaghetti Spontini).

“Let me tell you, I usually have two post-docs and two or three PhD students. I meet with them every week. Then, when I do those lectures in the autumn, they know Walter will be working 80 hours a week and that they won’t see much of him. By then the group is so well-oiled that all runs smoothly. But I cannot do that again in the spring, as I have to write research proposals. That’s hard business in America. I can send a proposal to NASA, but if someone else writes a better proposal, they get the money and I don’t. The university pays me absolutely nothing for my research. Nothing! In other words: even if you telephone calls has to come to external funding. I need roughly half a million dollars a year. I use that to pay my postdocs, the MIT overhead, my PhD students, my travels and conferences – I have to keep the money coming in. We professors – and that’s the principal difference with the Dutch system – we keep the university going. The university couldn’t exist without our overhead, so consequently, it’s vitally important to them that we write good proposals. This is why we have such tremendous freedom. They are very aware that we can bring in half a million a year – and some of my colleagues bring in ten million a year – that MIT will get 65 percent of that, which generates enormous income. In return they offer us an incredible amount of freedom.”

Is that the US system? “That’s the situation at top universities. There are around 10,000 colleges that offer Bachelor’s degree programmes, ranging from stolid to stupendous. The stumpy universities do not do any research and they receive no income at all from their professors. Conversely, such a professor may receive 10,000 dollars a year, but can’t do anything with it, of course. In other words: in the Netherlands, the standard of the universities is fairly consistent. There’s little difference between Groningen, Utrecht and Amsterdam, for example. In the US the difference is so enormous that comparing a university in the hinterland with say MIT, Caltech, Columbia or Princeton, would be like comparing apples with coconuts.”

And at the top universities, the professors have other freedom to set up their ‘own rag’? “Yes, because the people they recruit must be among the very best in the world. At some point you’ll offer a professorship for a period of five years, after which the university will decide whether you should be allowed to stay, whether to give you what we call tenure, which is for life. They will write to the top 15 people in the world in your field, and if two of those 15 say, Walter has done good work, but so has Piet, then Walter will not get tenure. You’re out. You will not be allowed to stay.”

You speak of the tremendous freedom, but doesn’t that also place tremendous pressure on you? “You bet it does, because if I don’t win enough proposals every year, I’ll have to dismiss postdocs, dismiss PhD students, because I have to provide for them. Naturally, I have sleepless nights about this. Absolutely. You bet your life. It places tremendous pressure on us.”

TU Delft likes to emulate MIT. If the Executive Board were to ask for your advice on how TU Delft could become more like MIT, what would you say? “It’s impossible. Your politics determines that. You cannot allow the creation of ‘centres of excellence.’ That’s a dirty word in the Netherlands. You don’t have a university that you could turn into an Oxford, Cambridge or MIT because you can only achieve that if you resign yourself to the fact that other universities would then become second- or third-rate. That is an entirely different approach. Asking what TU Delft could do to become more like that is asking the impossible.”

The Netherlands is more of an equality model? “If you grow too tall you get cut down, and if you’re too short they pump money into you to help you grow. I can’t stand that. We do things differently at MIT. A whole new world opened up for me in America.” As he reaches the door, the professor pauses, turns around and adds one final comment: his grandfather could neither read nor write. The Netherlands made it possible to develop from illiteracy to a professor at MIT within two generations. Professor Lewin considers that a great credit to Dutch education. But he is nevertheless glad he left at the right time.

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Toni Muddé (1978) studied aerospace engineering and is a science journalist and writer. His work has been published in Quest, Incir, and Het Parool newspaper and elsewhere. In 2009 he was awarded a Teleg, the annual prize for journalism. Last year saw the publication of his debut novel, Spaghetti Spontini (Spaghetti Spontini).

‘Ir’. Title

“Where can I find out whether anyone rightly uses the title ‘Ir’? This question was asked on the LinkedIn forum for TU Delft alumni last year, but for some reason it keeps crossing my mind.

I once lived in the same student house as P., an eccentric character who had fooled everyone into believing that he had just graduated and was looking for a house of his own. That shouldn’t have been a problem, as he was newly employed by TNO and earning a good salary working on wind tunnel research. He left for work every morning, in a smart suit and carrying his laptop-bag. Nobody suspected a thing until a bailiff appeared. P. was found the same day, crying in his car in a remote car park. In his bailiff appeared. P. was found the same day, crying in his car in a remote car park. In his