# Lehren – Lernen – Lauschen #25: Carlo Alberto Boano

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[Intro, Jazzmusik im Hintergrund]

Lehren – Lernen – Lauschen

Der Lehre eine Stimme geben

Persönliche Gespräche mit Vertreterinnen und Vertretern der TU Graz, die uns in die Welt der Lehre einladen, über ihre Motivation, aber auch Herausforderungen berichten.

KS: Carlo Boano is our guest today and he's from the Institute of Technical Informatics. He is also one of our teachers who was awarded for the Prize for Excellence in Teaching. And it was for the lecture “Embedded Internet”. So today we want to talk about your life here in Austria, how you came to Austria, and of course, about your experience in teaching and research and learning. Welcome.

CB: Thank you very much for the invitation, first of all. So, as you said, my name is Carlo Boano. I'm actually here at TU Graz since 2013. So it's already almost 12 years.

KS: Already some time, yeah?

CB: Yeah, it's quite some time. I'm originally from Italy. Then I actually did there my bachelor. So I'm a computer engineer. I completed my bachelor's. And then I started my master. Then I decided to make a double degree. So I went to Sweden to Stockholm in KTH. There I finished my double degree, also in computer engineering with specialization in networking and embedded systems, which is still today my main research field. And there I actually was initially thinking about going to industry. So I actually did a master thesis in cooperation with the company. And I thought, OK, that's perfect way to start with my industrial career. But then I actually decided that somehow I felt I wanted to stay in an academic environment, mostly because of the research part, but also for the teaching. I like to be surrounded by international people, students. And that was the way I decided then to make a PhD. So then I moved to Germany, to Lübeck in the north of Germany, where I started my PhD, also in the broad area of network embedded systems. Then at some point, my supervisor got a call from TU Graz. And then I moved along. So actually, my choice of coming to Graz was not really planned, so to say. So in the middle of my PhD, I had the choice to well, either stay in Germany or move along and you know, going closer home to Italy was actually appealing and learning about yet another country and getting to know another culture was appealing to me. So I moved to Graz. And well, I didn't move away. So it means that I like it.

KS: So here, you have been here 20 years now.

CB: 12.

KS: 12. 12, 2013, is it?

CB: Yeah, 12 years. And so here in Graz, I finished my PhD. I then remained as a postdoc. I started my research. I started building my research group. And I did a main habilitation. And now I'm ultimately a tenured associate professor since 2021.

KS: OK. And when did you start teaching? In which country?

CB: I started teaching, actually, in Germany. So when I started my PhD there, I started building courses on ubiquitous computing embedded systems, the basics of computer engineering. That's my research, my area, so to say. There, we were still playing with smartphones and bigger systems. Now I'm getting tinier and tinier, so to say.

KS: For example, what is tinier and tinier?

CB: So well, my main research area is the Inter of things. So IoT technologies and tinier embedded systems. So I work with battery-free systems, something which you can power with solar or even just movement or temperature differences. So there's a really millimeter level devices, which you can hide everywhere in your home. And they tell you, well, how warm it is if the thermal starts to turn on and so on. And this is automatic. So the IoT is basically everywhere nowadays. It's an invisible technology. So for those who don't know what embedded systems are, they are actually called the invisible computer. And yeah, that's my area. So I'm trying to make sure that we can exploit them to connect them to the internet, these devices, because we can build smart homes, smart cities, wearable devices which can monitor your health 24/7. We can also build a lot of societally relevant applications, like smart agriculture to increase the crop yield, so basically increasing the amount of food being produced, to monitor disasters and do some sort of critical monitoring of the environmental structures. We use them to build better cities, because there are tons of relevant societal problems like urbanization and aging populations. And actually, the IoT actually has an answer for all those. And that's basically where I'm sitting with my research and teaching.

KS:Okay, and all those things are also part of your teaching.

CB:Yes, absolutely.

KS:And on which level, bachelor's or master's?

CB:From bachelor all the way to the PhD level. So I have frontal lectures, I have exercises, I have laboratory exercises, and I also have seminars. So pretty much the whole spectrum. Some of them are on a bachelor level. Some of them are more for PhD. For example, on a bachelor level, I teach how the internet works. So I've just actually this year, I have created a new course called Communication Networks. And this is basically teaching how does the internet work, which is very funny because also in my first lecture, I mean, everybody knows, I mean, I know what is the internet, right? We use it every day and--

KS:Yeah, but I don't know how it works.

CB:Yeah, that's exactly what--

KS:That's the thing.

CB:What the lecture is about.

KS:Can you say that in one sentence, maybe, for someone who is not an engineering background?

CB:Yeah, I mean, essentially, the internet is a network of networks. So whenever we have, we think about, okay, I'm now connecting with my phone, using Wi-Fi to the internet. That's just a very tiny part of the whole thing because essentially we are connecting our small device to a network with billions of devices. And there is a lot behind to understand and actually to enable this. And this is the classical internet, if you wanna say. Because that's just the basic infrastructure for our society, so to say. And then beyond that, then in my other lecture, which is the embedded internet that you mentioned before, then I teach how not people connect to the internet, but how these small devices are connected to the internet and talk to each other. And so basically in this bachelor lecture, I teach just the fundamental on the internet of communication networks. Then I have a lecture on a master level where I teach embedded systems, how to build the hardware, how the software works, how to network them. And then I have a specific lecture, which is embedded internet on the IoT, which is how we can really build applications with them. Then there is a lab course where we actually build. For example, we have some fun assignments where we build a smart plant, where you have sensors to monitor the moisture of the soil. And you get updates on your phone or on your email to see: “Oh, you forgot to water me and my moisture level is going too low.” I mean, these kinds of things just that students can also see in practice how to build applications.

KS:Okay, so this is a very broad field of research and with lots of possibilities. I have the feeling that you kind of also focus on sustainability, is this right?

CB:That's correct.

KS:How did the interest into sustainability change during the years also within the student population? Can you explain it somehow, how that changed or how you…?

CB:So there has definitely been across the years, an increasing interest in sustainability, mostly because there are some urgent challenges on a societal level. And actually the Internet of Things allows to tackle many of these challenges. I mean, I mentioned a few before, for example, building devices to which can make sure that your field where you are basically growing different type of food is not essentially…the crop is not getting wasted. We have a lot of works where we actually try to build greener cities. So just one aspect which we all know is the sustainable transportation where we optimize the traffic flow to minimize, again fuel consumption with, for example, give a live picture of where parking is available and you can see live… and therefore, actually the bigger amount of fuel consumption is actually in the city…it's actually to look for parking. I didn't know that, and I was very surprised.

KS: Going round and round

CB:Exactly, going round and round looking for a parking.

KS:Stop and go.

CB:Exactly, nowadays with these tiny embedded systems, you can basically embed them in the tarmac in the asphalt and you see live, because they talk to the internet, you see live if they are available or not. And so you can just directly go to the street or to the area where there are most places…these are very stupid example.

KS:No they are interesting

CB: But if you sum all of them, you have so many different applications, I mean, another example, which is actually very relevant is… each of us is throwing the garbage away every day, right? And once a week, the truck comes to collect it, but for example, sometimes our bin is empty, maybe we are on vacation or we are not producing any waste. And so actually we can optimize the route of the truck based on the sensors which are in the bins and tell the truck: “Look, there is no point in going in the street because there is nothing to collect.” Maybe instead of doing it once a week, you do it on demand and that of course also optimize traffic and emissions and everything. These are just tiny examples. Of course, there are way more relevant ones like optimizing the energy consumption in buildings for cooling down or warming the rooms only when needed and whatnot.

KS:And so on and so forth.

CB:Exactly, and so on and so forth.

KS:And so do you think, or do you know that the people before they start studying know that these things are possible? Are they aware of that? Do pupils learn things like that?

CB: I think most people nowadays they are aware. I mean, maybe 10 years ago they didn't…they were not. So actually when we started with the lecture, we were one of the first… actually we were the first course at TU Graz. And I think people were not aware yet. Nowadays, I think it's a buzz word, everybody knows. But how these things work, it's still not very known. And so there is still some way to go. Actually something which is very interesting for sustainability is that actually the IoT itself is a problem for sustainability. And this is very funny because I mean, according to different predictions, we are gonna have hundreds of billions of these tiny devices everywhere. And most of them actually are powered by batteries. And batteries are by definition not sustainable because they have chemicals, they have to be disposed of and there are landfills and whatnot, which is to be avoided. And so if you're gonna have hundreds of billions of batteries maybe replaced every second year, this is terrible, right? And so actually a research direction which we are also tackling in our group is battery-free computing, which essentially consists of leveraging supercapacitors instead of batteries to basically harvest energy from movement, temperature differences, the sun or other sources to essentially still operate without the need of replacing a battery or actually having a battery at all. And this is very, very nice because it actually gives birth to new computing paradigms. For example, what people don't know is that these kinds of devices, they are not active most of the time, simply because they don't have power. And so most of the time they are just inactive. And then they basically, as soon as they have enough power because they harvest it from somewhere, then they get restarted, they have to restore the context and predict how long they can last, do the operation, then save the context again because they are gonna be “dead” again, so to say. And this is actually, it's called intermittent computing, which is a very important concept nowadays.

KS:Yeah, and it's also a reaction to the batteries and for sustainability, maybe also on the SDGs. And it might be cheaper if you don't have to produce a lot of batteries.

CB:It's especially, besides the manufacturing of batteries, what is actually cheaper is the replacement because very often the replacement is expensive and unwanted. And sometimes you have these sensors, even in the mountains, to prevent rockfalls or in rivers to monitors, like flash floods. And you don't want to go there every second year to change batteries every time. And so even the avoidance of the replacement, it's very relevant.

KS:Okay, and one question that just came to my mind because you also said that motion and so on is charging those devices. Is this also part of medicine?

CB:Absolutely, these can also have much relevance in the health and the health management. So…it's a fact we have an aging population, and the health system cannot cope with such a huge amount of patients. And we especially have an increasing amount of chronic diseases. And they can be monitored 24/7 at home. So you can basically wear your smart watch or you can wear some custom made device and they can monitor your condition. And if something becomes relevant, then you get alerted, or your doctor gets alerted and you can go for a checkup. And this of course avoids all these routine checks which would be essentially extremely costly and demanding for the health system. So actually it is also very relevant…how to make sure that we can improve the monitoring of the health of patients.

KS:Okay, thank you for the very interesting insight into your research. Now we talked about what you teach and I think we could switch to how you teach. That's why we are also here. But it's good to know what you teach and how you teach. What is the most exciting part of teaching for you?

CB:Well, I think teaching itself for me is very exciting. So…I mean, I'm a researcher and I think being a researcher alone would not be appealing to me. I think teaching is a very important part of my job. What I like the most is essentially being in the class, interact with students. I think this is the best part. It might sound silly, but just interacting with them, hearing their questions, which are very often very meaningful and very insightful. Also answering them, seeing the blink in their eyes, like, "Ah, now I get it." I think this is fantastic. And for me, the most rewarding thing is actually the end of the lecture. So if I know that, okay, this was a good lecture, I managed to convey everything. The students were participating a lot. They were very active. There was a very good interaction. At the end, when I basically pack up my things and go back to my office, the sensation is really, really good. I mean, really, it feels really great.

KS:Was it always like that when you started teaching in Germany?

CB:Of course, it's a learning process. Teaching actually is learning. And of course, I mean, I made many mistakes and very often you have to adjust your teaching style, your teaching material to the students' level, to the requirement of the students and to the wishes of the students. But it's always a matter of active asking and getting feedback. So essentially, in general, in my lectures, I always try to proactively involve students, asking questions, getting feedback, even adjusting the contents to their wishes, because that's very important, obviously, to motivate and engage the students. Of course, sometimes it may happen that a lecture doesn't go well. I mean, it's normal, right? But then actually what I do is, as soon as I go back to the office, I actually, I immediately change it. So because I have a fresh memory, I know what went wrong. I then reflect what can be changed for next year because next year I probably won't remember anymore. And so basically, I adjust the slides if something I saw didn't work or wasn't conveyed well. I've actually, this is actually one of the most important parts. So thinking back, okay, how can I even improve it? If everything was fine, great. If not, how can I adjust my things so that I basically can, you know, offer a better experience in the next iteration?

KS:And how do you get feedback that do you ask directly for the feedback? I mean, if you're in a bachelor lecture, there might be, how many students are in your bachelor lectures?

CB:It depends. They've arrived between 30, 40 to 270 students.

KS:I thought about something like that. Are you asking them with any app you have, Feedbacker, Mentimeter, whatever?

CB:Yes, I mean, I've been using all these apps, Mentimeter…now I use Feedbacker. So actually, I start every lecture with a Feedbacker round about the previous unit, just to make sure that we are all in the same page. And that's actually very much well received because, well, it's also a self-assessment for the students to keep track if they are on the right pace. And then even during the lecture, sometimes I put questions either with or without Feedbacker, just direct questions, or I pose a problem, I don't give the answer, I expect the answer. So these are…normally do it very in a very interactive way. But also at the end of the lecture, I always tend to ask: “Okay, was this stuff all known? Did you learn something? Should I maybe skip something?” Because of course, we have a very heterogeneous group sometimes. Sometimes the lecture has a mixture of students from electrical engineering, computer science, digital engineering, information and computing engineering. So there is a very large crowd. And of course, even though they are very close in knowledge, there are some differences which may, of course, or which have to be accounted for. And so there it's still important to make sure that we are all on the same page.

KS:Okay, that's a question I had. If there are any challenges in bringing the students' knowledge in line.

CB:Yeah, so definitely making sure that nobody's left behind based on their previous background or their course of studies. This is definitely a challenge, but I think the answer is interaction, explicitly asking and getting feedback. And I mean, at least it works for me. So I think this is definitely something difficult. Another key challenge is perhaps the engagement of students. And I think there…what I do is always try to include the real-world examples. I mean, I am in a very lucky position because I have a very tangible research field where you can really see the benefit for our lives and our society. But even when explaining the boring and tedious technicalities, you can still explain like: “Look, if you don't have these, how can you have YouTube, for example, or how can you enable video streaming on your smartphone?” And these kind of things then get a bit more interesting for the students exactly to make sure they can follow and can say, okay, it's interesting because now I know how this really works. And I can see the relationship in practice.

KS:And what I might need it for.

CB:And what I might need it for. Exactly, actually, often the students, they see it later how they need it for. So it happened to me twice already that after many years, I meet some students on the street in Graz and they tell me: “Now I'm working for company X. And I'm really using what you taught me in the courses. And it's very useful. I mean, people there don't know how these things work, but I do.” And actually, this is very nice. I mean, you can really see that, okay, look, it was useful, this knowledge transfer.

KS:Okay. So before you just said that also teaching needs to be learned, what did you do to learn how to teach?

CB:Yeah, that's a difficult question. So there are different aspects of learning. I mean, there is of course the aspect of learning the technical part, which I mean, most of the times you already know it, but especially in a field like mine where technology goes at an extremely fast pace, there is a continuous need to get updated…to be updated. And in a sense, I learned together with the students because sometimes every year there is a new technology and then I learned it in detail before explaining it to students. So on the one part, there is a technical learning, which is really like how things evolve and how things…how technology evolves over time. And so it's a way for me to also stay up to date. And the other learning is actually about the methods. So as I mentioned before, very often after a lecture, especially in the first iterations, one goes back to the desk and tries to think: “Okay, how can I adjust things?” Maybe there were examples which I thought were obvious for the students, but they were not. And then you try to think: “Okay, maybe I should change the example, or I should just rework my slides.” And so that is also part of the learning process. Sometimes you also, well, learn that maybe a topic is maybe old fashioned or maybe has to be replaced with something newer. Again, things are very subjective. So this happens relatively rarely, but it may happen that you adjust the contents of the lecture because you learn that maybe this is not relevant or interesting for students and there are other topics which can engage them even more and then you just switch on demand. So this is also part of a learning process.

KS:Did you book any courses at the Teaching Academy or in Germany or anywhere else?

CB:So actually, I mean, I must say that the TU Graz has a very good offer in terms of Teaching Academy and also like Weiterbildung so like in-house training courses. I did a lot of them during my years here, especially as a postdoc and as a PhD student, something which was extremely useful for me besides the classical courses on didactics were these personalized coachings. I mean, there were courses, there were these courses where I got a person. This was Isabel Landsiedler where she really sat in my class as a student and she was noting down basically everything on my teaching style, on my material. And then we had personalized sessions where she was explaining how to do things better. I mean, this was absolutely fantastic. I mean, you can really get to see things that which you otherwise would normally not think about.

KS:Okay, have you been surprised by anything she...

CB:Some comments were...

KS:Some comments.

CB:Some comments I expected. I mean, for example, I think I recall that... I mean, I know that I speak very fast and that was of course one of the comments. But also things like posture…and I think one very funny comment was that I was always trying to fix my pullover. Yeah. And that was very interesting because then I realized once, oh, I'm really doing that.

KS:You're doing it again.

CB:Yeah, exactly. No, I mean, these are more funny stories, but now actually on the way I was conveying material and on the way these slides were built, I got very, very good feedback.

KS:We talked a lot about feedback from your students also. And is there any method you would like to explain to us, which is very important for you? Like, I don't know, teaching methods like puzzling or what is there… blended learning?

CB**:** So, I mean, it depends, of course, on the type of lecture. I mean, in a classical frontal lecture, it's a bit more based on... From at least my teaching style is based more on interactivity. But for example, in labs, in laboratory courses, one can have way more personalized teaching also for individual students. One can have custom projects. One can also play with gamification to try to encourage and stimulate students to perform better and even kind of have a contest with each other. I think in the past, for example, we had a course where we were teaching how to localize indoors. So you are wearing a small device and you are trying to know where exactly you are within a room or a hallway. And you are trying to do that on a possibly centimeter level. I mean, trying to really understand where you are. And there it's very nice because the task was: Try to be as precise as you can. And then the students that were really fighting, I mean, at some point they were staying…staying hours and hours and evenings in the lab. I was myself very pleased by that…just to try to beat each other. And of course, this also helps a lot. So, I mean, interactivity helps. Feedback sessions, explicit or online help a lot. We also always have a channel, an online channel with students where they can ask questions anytime. So not just in class because, you know, when you have 160 people, maybe…you may be shy and you don't want to just expose yourself. But then we have a dedicated discord group where they can ask questions anytime. This works also very well. In labs and like exercises, we have more…way more time for discussions. We also have smaller intensive sessions with smaller groups. And this works pretty well.

KS:Okay, so communication seems to be the key.

CB:Yeah, absolutely.

KS:Yeah, and motivating the students.

CB:And communication is also my research field. So it twice as important.

KS:It kind of connects, yes. You can say that. So, one question about…now…already not so new thing, artificial intelligence. How did that change your teaching? Did it change your teaching at all? Did it have an impact?

CB:I mean, it of course affects teaching. I mean, it affects the way you assess students. It affects the way you prepare your material as well. I mean, there are very different aspects of artificial intelligence. I mean, on the one hand, I actually have changed some of my classes to allow assignments at home where you can use whatever you want, even including artificial intelligence.

KS:Like open book assignments.

CB:Exactly. And then of course, I then have to then retest the knowledge of students once they are in class. This is, I think, necessary. It also changed the way I actually prepare the lectures. So sometimes I do ask, ChatGPT or whatnot, what or which answers they will give me to specific questions just to see also, because sometimes the answers are very plausible. And it may actually be the same mistakes that students would do when erroneously thinking about something. So for example, sometimes, even with Feedbacker, I have multiple choice questions and some of the plausible answers are actually generated by AI. And actually this is working pretty well, I must say. Also just to think really what exactly a concept means. And for example, to generate wrong answers, this actually…I use it a lot, I must admit. And it helps.

KS:Do you also communicate that to the students?

CB:Absolutely.

KS:Yeah. Did you discuss AI with your students?

CB:Well, there are some aspects of AI which are actually even embedded in some laboratory courses. So for example, we are playing with, again, these small devices which can, for example, record your voice and you can even authenticate the person. And there you need some artificial intelligence to basically…or some machine learning to essentially recognize who the speaker is and so on. So there are practical aspects which are learned about AI. And then there are, of course, aspects…for example, I have a seminar where I teach the scientific research to students, to PhD students, more advanced students. And there I actually show examples of how not to use AI. So, there are examples of scientific papers. I basically let the AI make a summary of what the paper says. And I basically then show exactly all the errors which have been made. And I really make a very concrete example. It sounds very correct, even for me, if I'm not very careful, it looks pretty much correct. But then if you really dig deeper, it's fundamentally wrong.

KS:Fundamentally?

CB:Yeah, sometimes very fundamentally wrong.

KS:Okay.

CB:And so these aspects, sometimes I look over in the seminars, for example.

KS:So, chat GPT and so on, they are not the answer for everything. And I think…so do you have the feeling that you need to teach students that you can't trust them 100%?

CB:I teach them that they are extremely valuable tools.

KS:Yeah.

CB: And one should use them. But one should be extremely careful the way they are using them. Because in fact, they are not…I mean…they are language models and they are making a fantastic job for specific tasks, but not for others. And one has to be very conscious about what they say. I mean, if one just blindly takes their output and applies it, it doesn't end up very well most often.

KS:And people need to know that.

CB: Exactly.

KS: So that knowledge still is important.

CB: Mm-hmm, absolutely.

KS: Is there any part of your teaching or your research you would like to talk about? We didn't talk about until now.

CB:Actually, one aspect that I might bring up and I would definitely like to praise for TU Graz is actually the Projektfonds for the teaching.

KS:Projektfonds für die Lehre, yeah?

CB:Because actually we obtained some funding.

KS:I know, yes.

CB:And this was a very great opportunity because our activities are very much hands-on. So we actually build systems…we actually like, we are sitting at an intersection between hardware, software and networking. And so students build systems really with their hands. And so also because of the extremely fast pace at which technology evolves, it's very important to offer students the latest platform or some…yeah…kind of very up-to-date technology. And so in that regard, we have been restructuring with these funds, our laboratories. So what we actually can do now, thanks to these funds, is we are giving each student a platform. They can bring home, they can use it throughout the course and they can build their application. So there are some specific assignments and tasks which are very much linked to the concept we teach. But then they can also build their own project or their own application. Just… they can spend as much time as they wish because they can bring it home. They get feedback online…or using Discord or we also dedicated the lab sessions. And this is very well received. And especially the ability to bring it home actually allows the student to devote as much time as they wish. So if somebody is extremely motivated and extremely interested, they can play 24 hours, so to say, 24/7. And sometimes they do and you can see some fantastic results. As I mentioned before, there were these competition where people could localize themselves in a lab. And I remember one of the final days of the evaluation, I was just drawing some random marks on the ground and say, okay, this is the ground truth now. Tell me where you are and I compare how far you are. And I was amazed by some solutions. They were stunningly working well.

KS: I have a question because if students bring home…everything to build their devices, it might not sound very sustainable, but are they reusable?

CB:Yep, so actually, these were actually also something we were scared about. I say, okay, now we are gonna lend our hardware and they're gonna be returned all broken or, let's say they were a bit careless when handling them, but to our surprise, they are, most of them… may have…of course, sometimes something breaks, but it's not very often, I must say. So they are actually taking good care of them. They are returning them perfectly functional and we can reuse them in the following lab. So actually this works.

KS:That's great. So thank you for that information. And it's great to hear that the Projektfonds is good for you. It benefits.

CB:It's a great opportunity.

KS:Yeah. Now I am switching a little bit, I'm getting some content and I'm getting back to something you said at the very beginning. So you studied at KTH.

CB: Yes.

KS:Yeah. KTH now also is a partner of TU Graz within Unite. Did you benefit somehow from that earlier connection that you studied there and that we are now within a strategic partnership with them?

CB:So actually, I mean, I haven't, I do not have a specific connection to KTH, but I do have, for example, a connection to Damstadt. We also have been using a lot of opportunities and this cross financing with research groups there. We also already actually have some plans of doing potentially some teaching courses together. So actually Unite is a great opportunity. There are actually…you know, what we teach is also taught in other universities very often. So very often there are also exchanges on how to best structure your course or your lab and maybe even some exchanges of material between courses. And I think Unite is a great opportunity in this regard. Something actually…I would have as a wish is the opportunity to do some teaching sabbatical at one of the universities. Because very often, I mean, people know how much effort it takes to design a new course, restructure a new course, update a course, and especially for professors which have to devote basically their time to research and teaching is extremely hard to find the time to just, you know, it's always about time, right? And so actually I know from other universities, from other colleagues that they actually have the possibility to do sabbaticals just for three, four months for restructuring their teaching. They just go abroad and they get some knowledge from other colleagues, they restructure it together. I think this will actually be something which if possible, this would actually make Unite even more attractive to achieve better teaching and better quality.

KS:I will give it forward…that idea as it is, of course, not my decision to make something like that. So this within Unite…for students and also without Unite, there always is the possibility to make intercultural awareness sessions, information and so on. Do you think this is needed in the whole Europe when we work, for example, together with Germans who speak the same language as we? Nodding, he’s nodding…nodding for everybody who can’t see him.

CB:Nodding because my background is actually of someone which has been wandering across Europe. So, you know, Italy, Sweden, Germany also. So I'm biased on that, right? So I did an Erasmus double degree program and I actually enjoy very much learning different cultures. And even though two countries may speak the same language, it doesn't mean that there is not a lot of differences culturally and also in the university system itself. A lot of differences in the way…the expectation of the students but also in the way the things are conveyed and support from the university itself. So there is a lot to exchange, a lot to learn from each other. And actually I warmly welcome such activities and such discussion and intercultural training as well. So I myself also have benefited in the sense that I've also been doing as part of my habilitation as abroad stay where I was going, I mean, I first went to Sweden, I went to Italy as well. I went also to Singapore and I also really had the chance to see different systems and also learn…I also had a very short visit in China. There it's very different how things are and it's absolutely important. Also for developing myself and getting to know better how to maybe even change some things I do in relation to others.

KS: Is there a special example?

CB: Yeah, maybe I can give a fun example. So once, you know, the question you should never ask a PhD student is: “Okay, how long are you a PhD student and how long have you been, you know, how is your research?” Right? But normally at least in Europe, the typical duration of a PhD is four or five, maybe really six years if too long, right, between three and six. And when I went to Singapore, for example, it was very funny because I was asking a student: “Okay, so, you know, where are you in your PhD?” “I’m in my fourth year.” I was:” Okay, so cool. So you are about to finish.” And then the supervisor watched me like: “What? He just started.”

He just started. Yeah, exactly. And then I was like: “But what do you mean?” “I mean, here it takes seven, eight years.” And I was like, oh, okay, that was the wrong question.

KS: Yeah, that was the wrong question. But how you know that?

CB: Yeah, exactly. How can you know something like that?

KS: Thank you for that. So you also were awarded for the prize for excellence in teaching. What significance does this price have for you if it has any?

CB: Actually, I think, I mean, it's extremely nice and rewarding to see the TU Graz cares about this. And it's not just about, you know, seeing that my efforts have been recognized, that, you know, the massive amount of time I've been investing was awarded. It's really just to see that there is visibility for this, that people do care about teachers which put effort and they get recognized. I think it's a very good message for the entire TU Graz. And I can really see that in the 12 years I've been here, things have been changing a lot, for the better. So there is way more awareness about the importance of good teaching. There is a lot of..more activities, like supporting and courses. And I mean, opportunities like the like the Lehrefonds, for example. And I can really see an improvement for the better. So actually, I want to do share that.

KS: I think everybody will be glad to hear that. Is there anything you would say we could do better from the administrative part or side of teaching and learning? Any wish you would have?

CB: I think the support is really great. I mean, also from a tool's perspective, there are so many opportunities. The TeachCenter has been improved greatly in the last years. There are all the possibilities to record…slides and lectures. I think from that perspective, I think I'm pretty satisfied with the offer. Yeah, I mean, the sabbatical is maybe one wish. I could bring forward to basically devote the time for the teaching, which otherwise would have to be mixed with research and whatnot. Otherwise, I'm pretty happy.

KS: OK, thank you. So then I'm finally going to ask you the question. Everybody gets at the end. I would like to ask you to finish the following sentence from your perspective. Teaching means to me.

CB: Teaching means to me to light a spark in the students and to learn together with them.

KS: Great. Thank you. Thank you for being here with us and for that interesting interview.

CB: Thank you for inviting me.

[Lehren. Lernen. Lauschen]