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Speaker 1: OK.

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Speaker 2: So my first question is, what does it mean, higher order thinking skills mean to you in the context of your teaching?

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Speaker 1: I'm not sure, to be honest with you, I haven't really thought a lot about it. The ability to reason, I guess I don't know if it's higher order thinking skills. I don't have a good answer. I'm I mean, I basically can delineate the people that I can interact with that have the capacity to think critically and auto and self evaluate and them with without emotional attachment. And I can identify the ones that don't, but I don't know that I have a good definition for this.

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Speaker 2: So basically, think critically self evaluate and seperate oneself from bias.

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Speaker 1: Yeah, I think at least at the very least, recognize that bias exists and try to find ways to take that into consideration. Yeah, probably about it.

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Speaker 2: And so may I know what courses do you teach?

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Speaker 1: So the only teaching I do in terms of didactic teaching will probably be what you did when you were a student, which is the M2 I don't know what it's called now, AIV or its course that we did at the CRI. So you can find the correct terminology for the promotion correct nomenclature. This, I do. That's what I have done. No, that's not true that I teach a course on a lecture, at pasteur where I work, on mitochondrial biology. And then next year, I will start teaching a course or lecture again on mitochondrial biology, remembering dynamics at the ENS - Ecole Normale Superieure. So those are principally related to my to my field of research.

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Speaker 2: Nice. So in the courses that you have taught, for example, at CRI have been teaching the course on literature analysis and the mitochondrial course, apart from the content knowledge you've already listed, let's say critical thinking self-evaluation and yeah, the basic reasoning skills. If this is what you also expect from students to attain as a sort of a thinking skill in that course.

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Speaker 1: Yeah, I think you can also put in I mean, we do teaching in the lab in the sense that we get graduate students in the lab, whether they're all three on one or two or Ph.D. students and two or three postdocs. We have to guide them and train them to think critically and to evaluate data and hypotheses and recalibrate if necessary, which is often the case. So those same kind of principles also, you know how to present and discuss data, whether it's written or oral or no, you know, through Zoom or Microsoft Teams, those are skill sets that I think are really important that come more or less naturally to some individuals, and it's got very little to do. I would argue with knowledge or content knowledge of content, but it's

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more about the dissemination of that information, which I think is critical. And so that's a lot of where that's what I would say that that's where I focus a lot of my teaching to try and communicate this. And we do this over CRI in a presentation is very clear, well-balanced. It's really nice and you get a lot out of it and how to communicate the necessary amount of information not to overwhelm, but not to underwhelm and to not to simplify too much the point.

00:03:42
Speaker 2: So from what you say, can I bluntly put that as a kind of a communication ability or communication skill in science?

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Speaker 1: Sure. And I mean, I don't know if this is in the context of your work, but I think this is the one thing that we screwed up on in terms of what is good at many things in terms of the pandemic and COVID. But certainly a communication was not forte of scientists and it got twisted. So that certainly, I think, something that is important for the general public beyond this discussion.

00:04:09
Speaker 2: Indeed, indeed. I totally agree. Um, so so you have a certain kind of an expectation as to kind of a skills or thinking skills. You don't probably have a definition, but you do have a sort of an idea of when a student exhibits a certain kind of reasoning or higher order ability, but there are certain students who don't as well. What do you think are the challenges in developing such a level of reasoning skills are thinking skills as a teacher, you find students struggling with?

00:04:44
Speaker 1: Right. So one recognizes these students in the context of whatever they're teaching, one has to as a responsibility as a mentor. Two possibilities either do nothing and get better that students and recognize that they don't have the skill set and will be able to develop it, which is, of course, a challenge or try and help them along and see if they can acquire it. So it kind of depends on what stage you get them, and it kind of depends on how much you're willing to how much effort you're willing or able to put in. If we examine the possibility in which we have effort that we're willing to put in and we see potential which sometimes happens, I think a lot of it has to do with kind of sometimes not a lot of it. Sometimes some of it comes with mimicry and basically one on one meetings, so you can try and simply provide simple problems in which forexamples in the literature of what we did in the course of this, this dramatic or this problem and try to dissect the paper and see where they where their challenges lie and because they skim the surface of the paper, they don't have a fundamental understanding of. You lost me. Yes. Last. Can you hear me?

00:06:00
Speaker 2: Yes, I can hear you.

00:06:02
Speaker 1: OK, I'm back. So do they skim the surface and they simply read the abstract of the documents, the paper, and they don't really have a fundamental understanding of part of it has to do with really have the basics to try to understand? I had students in my lab where they didn't have the basics. They didn't know, you know, for example, DNA makes RNA,

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makes protein. If you don't know that, then it's really complicated to try and understand genetic manipulations and molecular biology. So you got to figure out where the problems lie. I know their problem is not in terms of understanding the fundamentals, but how to interpret the data. Then you've got to give them real world problems, maybe ones that they face in the lab or ones that have already been tackled in a scientific article in which case there is a solution. There is a we've seen the story evolve in the paper. So those would be the ways I think new one would go around it. But I mean, these are concrete examples that you kind of assess case by case in the lab or in the classroom. But I would say that one needs to understand where the where the challenges the student faces are, and that is most of the job of the mentor to figure out A lot of the students try to figure out where their challenges lie. I don't know if that's clear

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Speaker 2: and that's very clear. That's very clear. I think the overarching point is that to understand the student's level for the teacher

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Speaker 1: to be the I mean, you can also think in terms of the ability you can think of on the X and Y axis, your ability and motivation, right? So if somebody is highly motivated but has low ability or low knowledge that you can work on the knowledge, but if the person has little interest in trying to understand, it doesn't matter how much energy and time you throw it at or not for it. And in those cases, you get rid of the student really ever in person because it's not going to work out. You have to find a better fit for that for that person. Indeed.

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Speaker 2: So let us assume that a person has the ability and the motivation. or an individual in your class? What kind of methods do you use basically to develop the kind of skills

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Speaker 1: that you expect? You aim higher than they're able to basically set the bar higher than you think that they're able to achieve? And you see, it's kind of, I wouldn't say, drop them in the deep end of the pool if they could swim but kind of in that direction. So I have one such student in the lab who's doing a joint master's in virology, in mitochondrial biology, and she's going to start her PhD and she's clearly above the mean, and she's very good. And so I gave her more responsibilities, more challenges and more critical, you know, considering the literature review, can she come up with solutions to problems that nobody else has come up with? And oftentimes they will fail, but they'll learn something in the process. So I think you you have to keep challenging. That's also true for anybody else that you're training. You want to make sure that the challenges that you put in front of somebody are. Somewhat attainable, you can't put the bar too high. Otherwise, people get discouraged or too low and then they get discouraged as well. So I think it's kind of trying to find that right balance or where do you set that threshold and how far do you push because they want to be challenged, they want to not be bored.

00:09:10
Speaker 2: Indeed. But I kind of agree, but in terms of when you interact with students. Yes. Do you I mean, subconsciously or if you can reflect now or consciously, as we're use to

certain techniques that you know that it is going to and kind of trigger the students to move on or help them?

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Speaker 1: Yes, I understand your question. I don't know if I would say I have a technique, but I certainly do less talking and then do more talking. So early on, if it's more of a didactic or if you need to give some of the knowledge base, you know, DNA makes RNA makes protein. If the mentoring needs to do a fair amount of talking because they just don't have the information, but the more advanced the student or the individual in front of you, the less talking you do and the more you listen to their input and they actually can come up and surprise you with really interesting suggestions, observations, hypotheses and proposals that you can then tackle together. So probably just stop and listen and ask a lot of questions that's probably set in terms of nomenclature technique, but that's probably something I do in the lab and to a certain degree, maybe in the in the in the classroom. I think that we also see this when we interview candidates who want to be, you know, professors hiring interviews. Basically, there's the more advanced you get. I think in science or at least I have found the impression is that you tend to ask more simple questions so early on your career, you're really like, OK, well, how do you know this experiment is well controlled and how to use this concentration of salt in this light? But in the end, you just ask, you can ask more questions of why is this important? Why are we doing this at all? Why do you have to use this smaller level? And it may sound kind of reductionistic like a reductionist approach or very simple minded. But it turns out to be the place where you can see whether the student has thought about all the different possibilities. And so that's something that we typically do. For example, when we interviewed Ph.D. students to see if they're going to get a PhD scholarship for the graduate school. I typically ask very basic questions and challenge their their fundamental beliefs of the system of their work to see how they react. And it's fun to see how they react to it.

00:11:12
Speaker 2: Yes. I mean, I was also one of the yeah, when I did my AIV M2 interview, I think had the interview panel, you were there. Actually, there were simple questions, but it gave me a lot of space for me to think and reflect and elaborate, actually. So yeah, I enjoy talking,

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Speaker 1: but I look for is and this can, depending upon your language capacities. Sometimes people talk for a long time without saying much. And so that's of course a challenge because they could be using a bunch of key words and phrases. But honestly, like, I don't give a shit about that. I'm not here to listen to a TED talk. I want to get to the core of the material to what they understand. And so sometimes that's superficial. Glaze coating of a bunch of key words and phrases can kind of hide a fundamental lack of knowledge or or lack of understanding, frankly. So those are the types of things I try to get at just to really ask basic questions.

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Speaker 2: Basic questions. Yeah, as simple questions rather than basic questions that are targeted to break the the surface and see what they've understood or not. And if they're not, if I can probably talk. My understanding is that you try to make them realize that they

don't have that understanding yet, and they'll probably develop if you make them realize through your questioning.

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Speaker 1: Yeah, I think it's also true to say that lots of things are they don't know or it is not known, and both are fine, but it's just important to understand the difference between the two and a lot of things aren't known. In fact, that's what you realize as you move on. In science, more things are unknown that are known, and it's good to know that you don't know everything, so it's not a goal to try and foster a sense of humility. But it is to try and understand what they don't know if they don't know something, but they have a basis of understanding of all these different parts. What would they hypothesize and why would they set things something? So that's kind of the next step is if you can say, well, you know, A B and C and D, and nobody knows the answer to E, but based on what you know, what could you predict and why? And this is where you can try to see that those who were switched on versus the ones that have an idea that makes sense.

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Speaker 2: Yes, indeed. I'm just wondering because whether that would come under critical thinking or self-evaluation, because what you mentioned is all about also a kind of an higher level ability in your reasoning, how would you kind of phrase that one's ability to identify and predict based on their knowledge?

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Speaker 1: I think it's the integration of existing knowledge. I mean, that's what we do at Typekit. We take existing knowledge, we integrate. We have a hunch based hypothesis, something that's probably, hopefully pretty solidly built and then we test it. So it's the ability to integrate. All the knowledge that exists, yeah, we stand on the shoulders and then say, OK, this is where I'm going next, great.

00:14:03
Speaker 2: So my next question is regarding challenges for teachers, which you already answered partially when I posed my question on challenges for students, basically, you're trying to understand the challenges are level, and then they assert that the teacher is willing to put in a model that is very near that a specific challenge as a teacher that you experience in helping students develop these skills and if anything, can help. Is there any ideas that you think could help?

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Speaker 1: So I don't know. If we're developing skills. I think it's important to understand who's interested to get better and who's actually interested in the subject versus the ones that aren't. And so part of this is triaging and making sure the students that are in a particular, you know, are doing a master's program. Not because because they want to do master's program, because they were actually interested in the subject or the idea, rather than because they couldn't do something else. So if you're trying to make sure that the student fits the program, that's probably the first step. Other challenges we face, probably language can be one language abilities and. Enthusiasm. I probably would say, hmm, I think that if you are, if the students are. Well-fed, have good mental health, have a good support structure, and they're doing well and they're going to be in a better position to succeed. But

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I mean, that's true of everybody, every human in society, so it's not anything specific to see it. So yeah, that would be. I don't know. Actually, more than this, probably, probably part of it comes from we hear this at CRI a lot is to try and clearly communicate what our expectations are as teachers and what are we trying to get over? And so this I think I do a little bit more of my life and say, Listen, I'm looking for a person that can do this, this and this, and I expect this, this and that. And so then it's clearly laid out and either they meet the expectations that surpass them or they don't. I think part of it has to do with that. So I think it's interesting that you're studying this because I don't think that when I say I would like a student that can do critical thinking, which is actually mean kind of the same question I asked you what is interdisciplinary research? But maybe the better way to define it is what is not interdisciplinary research, what is not critical thinking. And then by process of elimination, then we are left with the rest. But I don't really have a good answer to the question.

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Speaker 2: Yeah. Thank you very much, actually for that the elimination process. I'll see if I can actually approach that way as well. So my next question you already touched upon interdisciplinary research. So how do you define what is your definition, your perception basically?

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Speaker 1: Well, it depends which grant I'm writing and who I'm trying to sell my research to. But honestly, no, I think in my science, everything is interdisciplinary to different degrees. So. I don't know. Life sciences is by very, very nature, interdisciplinary, so that would be a good example. I'm not, I'm not. Well, we're set up in the other types of sciences to know whether they're interdisciplinary or not, but everything. So I think it's just a buzzword, frankly. I don't actually believe it is in today's science, something that we. We like it because it makes us cross disciplines and attracts funding. I don't know what the logic behind it is, but it's just a buzz word for me.

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Speaker 2: OK, so let me ask you another different question. In principle, one of the Phd project for your writing a. And that is obviously a life science project which involves, let's say, chemistry and physics as well in the dynamics of it, but only a pure chemistry student applies for the PhD. But do you know that the student has the potential that you'll do it? And she has a lot of knowledge in everything, but she definitely lacks understanding of biology, which you think you can provide the understanding all of it? Is it that only the subject training that you would give knowledge content that you would give in terms of making her able to do that research project? Or is there any other thing that is added because it is now not only chemistry, but also involves biology and physics?

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Speaker 1: Sure. So in practice, I'm just looking for somebody that's motivated. I think if you are motivated, you can learn anything in my team. I have people that come from other types of science, let's say life science, and that can approach a project and learn the skill sets. So part of it is, you know, frankly, in the lab, part of us is cooking. It's learning a new recipe knowing how to use your hand. So you've got to have the ability to use your hands to. My chemist doesn't have put in example if my chemist can't walk, if they're confined to a

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wheelchair or don't have hands, that's a problem because there's a physical aspect to our work that requires us to get up and down, move animals. And there's a physical aspect. So clearly that's going to be a big deal. But beyond that, if you've got physical capabilities of manipulating things like animals, whatever the case may be, I don't really care. We've seen this where we've had. So we do. We do life science stuff and we work with people that do deep learning in a lab that only is based on deep learning in terms of image analysis. And so they hired a postdoc that has a background in deep learning, but physics and mathematics and doesn't really understand physiology, maybe understanding the concept of a gene. And so it's been challenging to try and bridge those languages language differences. But I mean, the PI is an astrophysicist by training, but now runs this lab that I think you can. You can learn these languages, and it's just a question of desire and willing to to get into it. So honestly, I don't really care. But if somebody comes to me and says, Listen, I've been looking at, you know, the philosophy of science or I've been looking at, you know, sociology or something to do sociology, you don't have any understanding of how to the scientific method or how to control and experiment or these things control positive control that makes it more challenging. But honestly, those people that. So honestly, I look for people that are motivated and for the most part, most of the people that have done well. My team have come from other disciplines than the one that we study or my field. So there's just hunger and drive. That's the that's the key because anything can be learned.

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Speaker 2: I agree I as an educator, I believe that as well and the research and education I have, same principle. I just have a little need a bit of clarification when you mean language. So when the person don't know the language, is it just purely a knowledge and vocabulary that you're talking about? Or is there anything more to it?

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Speaker 1: Sure. So my my lab functions in English if you speak French, but if you speak, neither language and people can understand the words that are coming at your mouth or in the other direction they can be, the person can't understand the words that you're using. Then that's a roadblock that's really challenging to you. Of course, you can do things in writing, but it's not feasible to only communicate in writing. So one needs to have a lot and be understood. So it's not technical terms, it's really a basic ability to communicate.

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Speaker 2: So then the technical terms would not be of a problem.

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Speaker 1: So, OK, so I have I have a good example. So I'm taking a master's student next in January. So she is this woman is in Italy and she is going to do the genetics So she got accepted to this program to do in paris, and she's going to come to our lab for internship. But honestly, I had no idea we'd really a difficult time communicating English. I don't speak Italian. And so I had no idea her capacity or really if we understood each other. So I ended up going through one of my postdocs as Italian, as a translator to try and figure out if she understood. And so ultimately, I could see she was interested, but we didn't have just in English. The capacity to understand each other so was helpful to this person. I'm going to take her on and we'll see how much of a barrier that language is. So it's six months. It works out great if you work out here, but that'll be interesting to see. At what point can you say,

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yeah, this person's motivated clearly does science well in Italian, but communicate in English? And that's a problem. That being said, you know, not everyone is fortunate enough to have trained in an English language environment because science is done English. Now today or these life sciences. So at some point, you don't learn. So I think you just have to see how willing and motivated will they be to learn to put the time in and learn how to speak English or at least communicate fundamental English? Yes.

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Speaker 2: OK, great. Yeah. Very clear. Thank you. My yeah, I have more two more questions, and then I go for it. The next question is on in your own discipline that you do as a researcher, do you perceive any differences in the way knowledge is produced in comparison to other disciplines or the processes? Same. It is only the technical knowledge that changes.

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Speaker 1: It's a good question. It's difficult to understand and in with all humility because I'm not in those other disciplines. I think knowledge is being, let's call it data for the time being, and then we can talk about what knowledge is so data in my lifetime as a scientist and I've done my Ph.D. and my postdoc in our lab, basically studying mitochondria. So while different aspects of mitochondria, you can make the argument that I've stayed pretty much well-defined in life sciences, started in genetics, embryology and development biology or to biochemistry and physiology cell biology by doing all sorts of things. So. If I look at my lifetime and I started doing research as an undergrad in the early 2000s. The way data is being produced, the speed and the nature has changed in my field, so I can only imagine it's changed in other fields as well. So whether you're looking in terms of across time, in that dimension or just laterally and you know, at the same time, but in different disciplines, for sure, it's changed now as knowledge changed. There's just more of it. And you've got to filter through the bullshit, unfortunately, at some point. So yes, I guess the answer, it's changed and how it's more difficult to answer. One of the first rate hike. Now, do other disciplines do it? I'm not the right person that you've got to ask somebody who started their Ph.D. in physics and moved to chemistry and biology. But then again, I would argue that you face the same problem that because they're looking in time, of course, time has an impact on what you're trying to quantify and describe. Of course it is. Does that make sense?

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Speaker 2: Yes, indeed. Indeed. Definitely gives a lot of insight. So the final question is I'm are you familiar with the the vocabulary called metacognition? No, thanks. I've been. My question would be with the pretext. Metacognition is the ability to reflect on one's own thinking process, how I think, how I do, why I do what I do, basically asking and how I basically did some calculations, what went into my head, etc. So it's one the ability to think and then regulate based on the knowledge, OK, I'm not doing well. Probably if I change it, I will probably able to do well. So kind of ability to reflect and self-regulate is what metacognition is all about. What do you think the significance of such ability in an environment like yours, in an academic, interdisciplinary scientific environment?

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Speaker 1: I think we already I don't know if I would use the term metacognition. But I think they already do that. So I took a very simple example. I read a PCR reaction I put five

ingredients into the mix, and it doesn't work, it doesn't produce a band that I would have expected to see. Why not? Well, I go and reflect on what I've done. Why use each of those ingredients and the amount of added disorder? And then they're trying to figure out whether there were something to change or whether it worked well? I mean, you could also reflect and say, Hey, you know what? The PCR did work great. It could be because of this, this and that. So whether it does or doesn't work, you have this kind of reflection on the process. So now you're asking me, do we do this in the way we think about science? And I would argue what we're already doing it on kind of a micro-level. Are we doing that on a macro level, I guess to some degree. I think that where I've thought about this is come when I've had these types of reflections, when I'm taking management training courses for running a lab where we're asked to do these specific exercises that are supposed to reveal something about the way that we manage the way intuitively, we think of things and manage people and interact with individuals and interpersonal level. So to some degree, I think that that is provided for. Force me to kind of self-reflect a little bit more than I have, but, you know, I kind of when one runs a lab and I guess to a certain degree from what it's teaching, you kind of do this anyways. So you think, OK, I'm going to mentor this type of student this way and in other words, great. And you're like, OK, well, I like that. I'll try to redo it in the future or work terribly and then you stop doing that. But that's also true with the type of courses and lectures of you. So if I give the same talk about paperwork, we're preparing ten times, it's going to evolve because I'm going through that process. So you can call it metacognition if you want. But I just call it like learning so or learning from oneself. I don't. I mean. It's just trial and error, and that's of course, what we do in science, right, and we evolve literally and figuratively. So but I don't know that. Not necessarily thinking about in the way the terms you used necessarily provide us with more insights because the challenge, of course, is that if I apply to the example I gave you, something works well. It could work well with that one, but maybe in the next one, it won't work well. Or maybe it works well with the next five students. But as PhD students expectations and understanding change over time, just like I have described in terms of the longitudinal change in terms of data generation, knowledge acquisition, so too can these. Lessons we learned through, let's say, metacognition as you're describing change and their applicability kind of wait. So I don't really know. I think you just kind of try and then you go and and hope for the best, necessarily the best pedagogy, but probably that's what we do in the lab.

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Speaker 2: Yeah. So I totally agree with the the naming. It's called learning or, let's say, problem solving when metacognition. When I talk about metacognition, for example, you said about your teach to students over the course of, you know, 10 years, you mentored five or 10 PhD students each phd students. Have you encountered some problem? So at the end of your tenth year ure, you kind of have a set of aspects that you know that you have to reflect on in order to be able to do

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Speaker 1: or,

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Speaker 2: yeah, kind of reflect are to coach them properly, basically. So metacognition is all about gathering that kind of learning. The list of questions that you need to be able to reflect

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in order to function properly and do that kind of reflection actively as you do mentoring weekly.

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Speaker 1: So I think that that's probably you try and kind of name or clearly define what were the features are the parameters that you think are important to improve whatever process you're working on. Mm-Hmm. Yeah. So I think we probably do this subconsciously. And you know, an example of this would be, you know, when I'm hiring people now. I will say I go with my gut. And so you never 100 percent sure of the person you're going to take on any kind of level. But if you have a doubt, you don't take them on. So where does that come from? That has to have come from experience, either as running, running a lab or experiences I've had. Can we put a name to it? We haven't. I haven't answered so far, but it must have come from somewhere. It's just that it was done on a subconscious level. So now the challenge is, can we do this on a conscious level? And the question, of course, I would have, is that going to be more beneficial than doing it on a subconscious level? The fact that we can name it and we can gather those experiences of defining the protocol or document? Is that going to be? Helpful. For the individual, maybe for a friend in terms of pedagogy and teaching, maybe it is good for that individual, is that going to make you better? So, you know. What is it that Shakespeare says a rose by any the name smells as sweet? So the fact that you call it metacognition or do we define these things? Ultimately, it doesn't change the the feeling that one has. That's going to be the guiding principles of how I'm going to do in a lab or teach a course or whatever the case may be mentor PhD students, does that make sense?

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Speaker 2: Indeed, indeed, that makes perfect sense. The only reason why probably I investigate along these lines is because, for example, you are so good at filtering the right kind of candidate, and I know that you use certain cues subconsciously. And in fact,

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Speaker 1: you're not so sure that I'm so good at it, to be honest with you, when I look at the people in my lab. Not necessarily. No. No.

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Speaker 2: I'm just explaining for an example. And if anyone does it in a very extraordinary way, we may be able to identify and extract those features and try and teach others to be able to probably see if it works or not. It could be wrong. It could be right, but there is a possibility that we could try and teach this excellence or performing at a higher level by taking those features and making it more conscious for other individuals to reflect on.

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Speaker 1: So I think that in principle, it sounds very promising and exciting. But there are two caveats. The first is that those features are insensitive to culture and time and language and discipline, and can be an age in whatever gender and whatever other variables. And if so, then go for it. My feeling is having interacted and having worked in three different countries and three different cultures in three different languages with all sorts of people from around the world is that it's precisely that. That makes it difficult to run a lab and teach a course is that you have to adapt or to be successful. The mentor must adapt to the

mentee. And there's far too many variables that generate into personal or into individual and individual variation that. I mean, probably if you did some sort of deep learning algorithm that some features are not pretty good examples, some sort of algorithm that told you, you know, it's this, this and this that we have to define it. But still, you're putting words and names, presumably in English or in Dutch, to things that might have a completely different meaning in another language. And so I think that that's a huge challenge indeed. So it reminds me of what I had when I was an undergraduate student in Canada. I had Japanese, but a chemistry teacher spoke terrible English, but it was really funny. Very slowly, they told me a story which was There is the soldiers in the desert, in Africa and from different companies, and they get a message of war going on or something and they get a message and it's, you know, keep cool or stay cool. You know, that can be interpreted as don't fire if you're in distress or don't start a war or keep your body temperature low and drink or relax. So it kind of depends on the interpretation. So if now you're going to use cool or you're going to need some sort of terminology to define these characteristics, it's going to be challenging to translate that across cultures if that's your goal. Now, if the goal is to find a way to teach in Anglo-Saxon culture or an English language environment, you might have a better chance. But even then, when you look at places that speak English that teach higher education institutions, it's it's very uncommon for them to be kind of monoliths. And we have one type of individual, actually, I've never seen it. So you can have people from everywhere. So I think that's going to be a major means to me. That would be a major challenge. So on paper, ultimately, I agree with you in practice, I am highly, highly, highly skeptical.

00:34:22
Speaker 2: And know there is a lot of room to be skeptical. My research is all about scientific process. So on a universal level, I don't think scientific process changes in itself and much of the language obviously is in English at the moment. And my my my research is going to be as well completely in English based things, probably also translated in Duttch because I'm at university. But the fact that I'm relying on the universality of the scientific process and my research is all about bringing students at the higher level reflection to high level reflection on scientific process to be able to carry out interdisciplinary multidisciplinary practices, whatever that is, beyond mono disciplinary at ease.

00:35:04
Speaker 1: And what makes you think that the scientific process is universally and correct

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Speaker 2: and based on what I probably learned, but I'm not sure I can't say 100 percent that there is uniformity based on the Western influence on science and how it's actually being carried out. Here is what actually kind of. Yeah, but I try do follow so as you said, that it is not universal. And I didn't

00:35:26
Speaker 1: say it's not universal. I just wondered if you if it is universal or what makes you think it's universal. It's, you know, I have no particular. I don't I can't speak on the topic. I haven't thought about it.

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Speaker 2: And so this is basically after coming here, I had to learn a lot of philosophy of science. So I kind of read from how science evolved, from renaissance to modern scientific period and how each philosophers and created a paradigm across history and what the paradigm is all about at the moment in terms of creating a hypothesis, experimentally reviewing all of that. So basically, I followed the philosophers of philosophers of science that kind of shaped the paradigm that we follow as researchers are students and in academia. But then this philosophy is majorly influenced by Western European white men,

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Speaker 1: which is, of course, the beginning of our exit of our problems today and on Earth or in space now. Also this we should be going off into space. So these are all old white men that you studied.

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Speaker 2: Yes. From the Greek plato to Dutch philosoph Van Frassen that I actually these at with everybody. Most 90 percent. OK.

00:36:37
Speaker 1: OK.

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Speaker 2: So yeah, we'll see. Let's see. How is it going to go? I hope. Yeah, it's going to go well. But thank you very much, Tim. It was my

00:36:47
Speaker 1: pleasure. I think it's a super interesting project. I hope you get a good response from the rest of my, my colleagues, and I wish you luck with your research. When when will we when we learn about this or when? When can we defend your Ph.D.? What's the

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Speaker 2: might be? I will defend it on June 10, 2025.

00:37:08
Speaker 1: Oh, wow, OK.

00:37:09
Speaker 2: Yes, it's a five year project, and I'm employed part time as a teacher and also as a researcher. At 60 percent, I do my Ph.D. 40 percent teaching, so it is extended. Three years is extended into five years. So I have bit more times this. I'm using summer to a little bit progress because

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Speaker 1: not get

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Speaker 2: most of the time is occupied by teaching and research is really difficult to do. And that's why I'm just

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Speaker 1: welcome to academic science. I think there most of the places in the world do science this way and. I make do with this not as a pastime, because of course, they're heavily invested. But, you know, there's a heavy teaching on for many, many researchers. Of course,

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you being one of them. In any case, I wish you luck with it. Sounds very exciting. I'm going to I mean, we're on break now, but I'll see my my CRI, my three buddies in the fall and we'll probably talk about this. Have you heard back from the rest of them? Have you?

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Speaker 2: Yes, I'm contacting and even just answered that they actually replied, I contacted Stiff under the anime that I have to get response from,

00:38:07
Speaker 1: so I wish you could show I wish you all the luck in the world. It sounds like a fantastic project. Good luck teaching as well. Yes, and good luck to all the young people. Always say good luck with this pandemic, which has been a shit show, and so I think it's really taking a lot of courage and it's taking a toll on you guys. And I wish you luck in all of us.

00:38:23
Speaker 2: Thank you. Thank you very much, and thank you so much for all wishes and time and application.

00:38:28
Speaker 1: Take care. Bye bye. But I.