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Speaker 1: Now your turn, could you briefly introduce yourselves for the purpose of the interview?

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Speaker 2: Yeah. So my name is-----, and I'm a professor of inorganic and hybrid nanomaterials chemistry. So I'm a chemist, um, a material scientist. So I do research and I'm also a teacher. And I think the reason why you're sitting here is because part of my time, I'm also the program director of the Bachelor and Master Chemical Science and engineering .

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Speaker 1: Great, So that makes definitely an ideal candidate for my idea. Having done research in interdisciplinary context and being a director of a bachelor's program, definitely your input is going to be highly valuable. So to begin with, I'm just going to start with the higher order thinking skills section and going with interdisciplinary sections, two major sections and finally, one or two additional questions that that will be about 30 minutes max. So what is your understanding of perception of the thinking skills are is there any definition that you have?

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Speaker 2: I don't have an explicit definition? It's not so much. My let's say maybe not so much in my my line of work, but of course, we we. Higher order thinking skills are. Let's say my understanding of higher order thinking skills is a very implicit one, I would have to describe it in using in using examples and such. For me, it's it's clear, but but it's, let's say, difficult to give you an explicit definition of the never give it any specific thought. But for me, higher order thinking skills are. Skills that sort of emerged from the training of a lower, lower level skills, which are usually the sort of basic engineering skills like like math, like a design of of of of, let's say, reactors reactor science. Organic chemistry, so those are sort of the building blocks, and in my, for me, those are the kind of things that we teach. And eventually, in the course of time, we tried to come to a situation where people actually integrate and use the elements that they have from that sort of. From from those courses into, I'd say, into a sort of synthesis of of of approaches.

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Speaker 1: You said obviously your understanding is implicit, but if you could give anyone concrete examples in one of the courses that you've taught, or any courses that you teach that you.

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Speaker 2: For me a higher order thinking skills is what I do for instance, I teach, I teach a course in this chemistry of nanomaterials. It's a it's an elective course for master's students. So it's really sort of the most specialized course that I teach. It's a group of students or something like between 15 to 20. And what I what I teach there is. Let's say if you understand the. The topic there is how do the materials grow from the solutions, from them, from chemical solutions, from solutions of molecules into solid phases, and how can we understand that and how can we steer that so that you form very specific shapes from a homogeneous situation to something heterogeneous? So if you want to understand that you need to understand chemistry, you need to understand so thats molecular chemistry. You

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need to understand surface chemistry, you need to understand thermodynamics. You need to understand kinetics. And to have certain skills to to may be to do small calculations with that or make engineering estimates of of orders of magnitude should not so much very detailed models, but especially where people have to, No let me first say. And from all those particular subjects that people have thought, they have to use that knowledge, but also they have to understand and use actively the integration of those knowledge. You cannot understand the subject. You can't understand the growth of crystals unless you have knowledge of all those various fields of chemistry, mathematics, physics and you have some ability to use those elements and.

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Speaker 1: So if.. for my understanding, I just would like to

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Speaker 2: add to, and maybe it's sorry if I can add to that, because maybe that's just an integration of knowledge, but it's also and to have a feeling what you need in the kind of work that we do as chemical engineers, what your molecular engineer or materials in the new or process engineer is to have an understanding of orders of magnitude, how large our affects relative to one another, maybe not knowing exactly defective tubes, but it's something small relative to the other. How does that work out in reality? That kind of a skill to understand that really is for me, a higher order thinking skill, estimations is a higher order thinking skills because it really requires a lot of very elementary information, very elementary knowledge that you all needs in order to to be able to get to to make such an estimate in a in a in a reliable manner.

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Speaker 1: if I understand correctly so there's discipline, I hope

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Speaker 2: it makes some sense. Not only did I find this difficult question or I think about it.

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Speaker 1: It is indeed not that easy

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Speaker 2: because I'm using it so implicitly. For me, it's clear whether people need to know whether you ask me, OK, so others have until it's not so easy. Yes, that's why I need them examples.

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Speaker 1: I totally understand because I've had actually so far 20 plus interviews with them, such as in parentheses, and most of the majority of them do not have any articulate of definition for their understanding of higher order thinking skills. But they do have the experience and an implicit understanding. They know what they are kind of expecting. But it is impossible, almost impossible for them to accurately define it.

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Speaker 2: So OK.

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Speaker 1: Yes, indeed, that's true. So since it is a kind of a field of study in cognitive sciences

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as well, and they have certain vocabularies using it, and that helps them to articulate it better. And so if I understand correctly so there are knowledge of different topics and the ability to integrate that knowledge and use that knowledge in the context to estimate to apply is what you consider probably a higher to thinking skills if I understand correctly.

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Speaker 2: Yes. Yes, yes. And that's the very that is still a very technical definition because I don't include here that people work in a specific context, that there's usually also a social context, that there is a societal context that has to be taken care of. So all those things actually also come into play and play a role.

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Speaker 1: Great. So. You know, implicitly, do you teach them explicitly to your students? And do you also have a way to measure if they have actually acquired such skills? How do you see the progress basically in your students?

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Speaker 2: I talk to them individually. I interview them because for me, in fact, it's the only way to know if somebody this kind of this is specifically a force that I cannot teach them that I cannot. I could give him an assignment that that would be an option I chose to to have just. An interview with them. Let's say the classical written exams that we use a lot in engineering studies, it doesn't, doesn't work here. You don't find out if somebody. Unless you. Talk to the person individually, so I and that and that. Again, that's also very implicit. Yes. But in fact, it's the. Very precisely,

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Speaker 1: yes. I've actually heard a similar kind of responses that they can be very sure if the teacher themselves can interact and understand if they've actually reached the level, but how do you teach them your exercises or problems or the lectures that you've designed and kind of enables them practice their the skill? Or do you give them separate homework exercises that helps them practice apart from the content knowledge they're required? And so all these people

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Speaker 2: I usually give them? You know, they have to they have to read a lot of information with that. They get the knowledge, skills, what I what I what I give them, I will tell them, OK, think of a strategy to grow a crystal that is, I don't know, first growing as a role, then branches out. And so that you get a sort of tribal, how would you do that? What would what would be your. Its actually you can't really design such a thing. I mean, in the sense that you can you can think of a ball such and carry it out and it will work, but you can you can come up with rational strategies and that if you can explain that strategy and why it would work. That's actually it contains everything that's

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Speaker 1: true, that's that's very interesting.

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Speaker 2: Some of these, they have to design something.

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Speaker 1: Yeah, but the very interesting aspect of the approach is that you mentioned about asking them if you grow a crystal in a tripod manner or on a single vertical manner. But is it about how asking the right kind of questions to students to nudge them in? in using their knowledge in the right way?

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Speaker 2: To nudge them.

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Speaker 1: Yes. So if you haven't asked that question, for example, you gave an exercise, I want a crystal to be grown in multiple directions and different directions. But still, you see that there is some sort of a gap between from where you want the students to be and where students are in their understanding. So what would be your step in this case? What would you do? You have given an exercise that they would reach, but there is still a gap.

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Speaker 2: OK. Um. Well, usually. I think I would. Probably you try to figure out where exactly the gap is because it didn't take the kind of not, and they said it's a complex issue. They have to combine a lot of information, a lot of theories or ideas or concepts. And and. Typically, they understand 85 or 90 percent. So what? But it goes wrong because of the 10 percent, and I guess I would try to figure that out, which element didn't, you know, didn't isn't properly in your mind.

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Speaker 1: So you've identified and what would be the remedy step?

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Speaker 2: Um. Very often, if you've at some point in in a in a in a in a dialogue, you come to the point where. We sort of reached their poor understanding, usually the student would say you would pick up from there and say, Oh, OK, that's fair. That's the part. So it's hard to identify where the the source spot is. And let's say for a fifth year, students would typically. Then I thought probably don't have to. Probably it's a sort of they call in good German, and AHA....

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Speaker 1: the AHA moment.

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Speaker 2: Yeah, In Dutch we don't have a word, but we always use the German word I live in. Yes, but

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Speaker 1: that's so great. I mean, you try to sort of understand that they're kind of, uh, let's say, the shift spot where they can actually which.

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Speaker 2: Yeah, because my feeling is that it comes back to, you know, they have these individual skills and one of these one of these are two of these. There is something wrong or they they they misunderstand something conceptually, and it's about figuring out what. What I'm trying to do with it. And in an aggressive way. So at what? What do you not

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understand why? And so you try to get to where things go wrong? And I try to challenge something.

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Speaker 1: So it is more about having a personal interaction with the students when they lack knowledge that you can identify those things as. Without having interactions, can you do that?

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Speaker 2: Well, I guess you can do these things on paper, but is I really feel that in that sort of interaction, I feel that you somehow need to talk to a person. This is

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Speaker 1: indeed great.

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Speaker 2: And it's the same with with the exam, with the final exam, with a colloquium. I mean, there must be a moment where you can actually question the students through the presentation and the question. It's not enough that you must if you really want to know, does somebody understand that there must be a direct dialogue?

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Speaker 1: Indeed, the. Yeah, yeah, I totally understand I agree with that. So my next question is about challenges and difficulties for first for students and for teachers. And obviously in your class, 80 percent of them would probably reach what you want them to achieve and an expected level. Mm-Hmm. But there is 20 percent of students who are not able to reach and attain the expected outcomes. What are those? Why do you think they have those challenges? What makes it difficult, for example, especially in the context of higher order thinking, skills, the ability to think at high level.

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Speaker 2: Umm hmm. Yeah. That's a difficult question too you ask difficult questions. Yeah, know, maybe it's the way it is in the end, the personal talents or the personal talents and the personal talent. So. The personal talent has led to a certain. Level in these in these lower tasks, the knowledge, the level of chemistry and the really deep understanding of the chemistry is less than with with, uh, with, uh, maybe another student and especially in these higher order learning. You need to have a good basis, your basis needs to be good. So I think that very often people lack. It's a sort of a lack in their knowledge and their and mastering the skills of the. The individual courses. And that the reason for that they didn't. That maybe they didn't take enough. Knowledge skills from those courses is due to the fact that there is an intrinsic talent limitation or I'm not sure if I put in the word talent who is not the right word, but that just. The inherent capability of a person to what, what, what somebody can achieve. I mean, not everybody can achieve the same. We are not in the university or the same. We don't all reach the final at the same level, and I think its very often has to do with just what is intrinsically there in the students. And to some degree, maybe also. They're their personal ambitions and perseverance and hard work, and in previous stages of of of the of their studies. And, you know, let's realize if somebody passes organic chemistry with the six we pass, I mean, it's an official pass, but doesn't mean that the person. I mean for me is six means that. The understanding is quite shaky, but OK, we we you know, we have to. At

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some point we are we are. A school where you also have to maybe be satisfied with the student who doesn't really qualify at the highest level, I don't see. Let me put it this way. Maybe I'm I, I don't know. I do not necessarily think that all our students need to reach a certain level. They all need to to reach a minimum level. Mm-Hmm. But I also realize that sometimes we give people a diploma that are on the whole of sufficient quality, but that are not necessarily suitable for any job that you do with that kind of diploma.

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Speaker 1: So I think from what you're saying, my understanding is that. Students inherent capacity to reach a certain level is probably the common denominator that kind of accounts for the performance.

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Speaker 2: Yeah, of course. I mean, just the attitude of this person is equally important, but let's say or if that if that, let's say between two students is the same, then yes, some students are more talented than others, has a bigger ability to understand or to really to to grasp complex problems to to oversee things you have. There is there is something like like like intrinsic ability there that.

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Speaker 1: So what can? Teachers do to help students like this lets say with the lower capacity to perform at a thinking skills, do you believe that they can't perform. Do you believe that they can with support and help. in that case, what could teachers do, what could help teachers in being efficient? Obviously, time and personalized attention is one of the biggest challenges that the teachers have.

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Speaker 2: Yeah. What kind of teacher do a teacher can can? There is this, I think, what a teacher can do is keeping a finger on the pulse throughout the course and try to assess whether or not students have reached Specific goals in within the subgoals within the course, um. But typically, it is something that is being tested at the end of the road. And then you find out that the student understand or not. This is, I think, what what is what the teacher should should do, ideally in the ideal world is to have shorter feedback loops with the students a lot shorter than on the on the on the timescale of the entire course. But of course, we are not in a perfect world. Our teachers are have limited time and possibilities to do this. Um. So maybe doing the next best thing to do is to to, uh, to, uh, to develop tools for self that sort of students can self-assess, and to some extent, of course, such tools are available in courses in, let's say, the courses that are off offered, though there is enough. Materials with which students can. You know, let's see if they if they if they have reached certain sub goals within the course. But that's something that I could imagine could be improved, at least in the program that. Like the one that I'm responsible for., it's really a balance between what you want ideally want to do and what is just feasible in the real world. There is a compromise.

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Speaker 1: there, indeed. So as this question is more, as a program director for you, as a program director, do you think that in your program students are being evaluated at their knowledge in their subjects? Are there right? So what I want to ask is, let me be clear, so in

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every subject in the program that your students are undergoing, are they being evaluated if they're able to perform at a higher level using their knowledge or just they are being evaluated if they have acquired the knowledge?

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Speaker 2: I think it depends on the course. There are courses where acquired knowledge is being tested and there are other courses typically the part where where higher order skills are required, but they have to design something as a final and in projects very often, we test higher order thinking. But it really depends.

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Speaker 1: So, of course, of course, obviously depending on the requirement and yes, you believe that in your in your program, at least that not every course deserves or needs. For example, I wrote thinking abilities. Some courses need, you know, just acquisition of knowledge.

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Speaker 2: Yeah, I think I really believe that. And I mean, maybe we as engineers are a bit conservative there, but I really believe that a good engineer that the basis of a good engineers is a number of individual skills like you need to know mathematics. And it's not. It's not. It's not. Specifically, it helps to motivate students if they know what they're doing it for. But but to be very honest, you don't really need to know why you learn those things. It's very useful and you'll find out later than just having a good understanding of math. It is. It's of course, math is. Also, it can also be a higher order. I mean, I'm not saying, but it's sort of I find it that's one of basic skills, and I believe that a lot of chemical engineers have the idea that that good engineering education rests in a number of at least starting with the number of building blocks that are very well defined and that actually don't change that much over time.

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Speaker 1: Yes, I agree. We had been through the similar experience,

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Speaker 2: obviously, but we do, of course, and a lot of the higher order thinking skills are assessed in things like internships, bachelor assignments, especially the master assignment, which is which is 45EC, which would be pretty big where that's typically the place where where everything comes together. And so I believe that at the end the outcome of our program, we still ensure that all these things have been. Assessed and tested.

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Speaker 1: But, for example, the project outcomes, the deliverables through which they demonstrate higher-order thinking skills or internships for that matter, that you say, is there a specific component or tools that you use that? That assesses their higher, the thinking ability. Do you have any indicators that shows that at the general level, if they perform on an, you know, nine out of 10, that they mean that means their higher order thinking skills are developed.

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Speaker 2: Well, we assess them not explicitly on the higher order thinking skills, but we assess them on a number of aspects about and and among the general, there is one that is

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sort of that is called the general attitude, which of course, but we have we have, we use indicators for what it's what it means, so we use rubrics. In fact. But also there it is that it is a bit and those groups are very helpful. Because it turns out that the rubrics do help different. Professor Difference. Evaluation. Seems to come more or less to the same grades in. In very different cases. There are good, but again, it's very implicit what we did there was a sort of description of what what a six means and general attitude. If somebody asked for a lot of a lot of feedback, asks for a lot of feedback, somebody. So it's those things. No, we don't. We don't explicitly assess how you order thinking skills. It's it's in the scientific scientific depth that we assess scientific advice. We assess scientific depth, the general attitude that that has, but it also involves planning of the research. There's also. Yeah, let's say the balance between being independent and asking for feedback at the right time, I mean all those kinds of things and being sociable in a responsible person and all that. Those are the two things we assess people explicitly on, and the third one in the final assignment is, is it's just the report and the response to questions. And that is also I think I find that the questions and answers are actually really important because that's really where I see it. For me, it's the clearest indicator to assess that. I regret to say with the experience that we have of being around for 20 years and this in this job is, I think I believe that you can quite quickly assess assess a student in that way.

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Speaker 1: And I think why that is when I think most of the universities around the world to have this question and answer format as one of the final exams to award students degrees. That is very interesting when you mentioned about the Rubrics's, if you can, if it's not a problem, only if you could. Can you please share?

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Speaker 2: Yes, sure. I can send you the forms. I mean, I can send you the forms that we use that. So no, they are. They are freely available that.

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Speaker 1: Thank you. So that actually comes to the end of the first section, this section of the interview, which is higher order thinking skills. Now with this smaller section., which is interdisciplinary research and higher order thinking skills. First, I would like to know what is ,obviously you work already in the field, which is quite multi interdisciplinary. Mm-Hmm. What does it exactly mean in your view and what is the most relevant higher order thinking skill for interdisciplinary approaches? So two questions. First, your perception - definition of interdisciplinary research.

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Speaker 2: Oh, I find it difficult because what is interdisciplinary? I've been looking at trying. I looked up the definition because I think also the University of Twente wants interdisciplinarity and I was trying to figure out. If our program is actually interdisciplinary or not. And I think interdisciplinarity, you actually come to a synthesis of mono disciplinary. Fields, is that is your definition of interdisciplinarity, because I say my old definitions is multidisciplinary, where you have people with quite well-defined backgrounds or fields of knowledge like mechanical engineering, chemical engineering and physics. Well, what else do we have biology or biomedical engineering and. That that. And let's say, did the interplay

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at the interface between such field, but it's multidisciplinary, but it's not what you mean.
You mean

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Speaker 1: it's interdisciplinary? Yeah. Uh, I would like. I mean, I can obviously I from literature, you know, sort of different definitions.

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Speaker 2: Yeah. But I'm not sure if everybody uses the same definition.

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Speaker 1: Yeah, that is why I want to know your kind of understanding.

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Speaker 2: my understanding was that I didn't know what it was about when university came with with the term and said, You know, your massive score, your master's curricula need to become more interdisciplinary. That was one of the things in the in the in the in the last. I think it's still a discussion piece. But anyway, there was sort of an incentive by the board that that's our master's program must develop into more interdisciplinary programs, and then I came to think, OK, so what is that? And then I looked up some definitions and. I came to, let's say, when it comes to inter-disciplinary, as I said, what I what I what I remember is that that it sort of is assumed as that that feels individual fields of knowledge really merge into something new and that an interdisciplinary student who is who is educated in an interdisciplinary manner is into is educated in a way where you can no longer speak of individual views. But there's really a synthesis of methods and there's somebody sort of. Person emerging that is that is not not a chemical engineer, not a mechanical engineer, but by the sort of hybrid.

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Speaker 1: Indeed. Yeah.

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Speaker 2: Yeah, that is that is my definition of interdisciplinarity as opposed to multidisciplinary, where we have where people have very clear backgrounds. But they actually they they they are able to look beyond the borders of their own discipline.

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Speaker 1: Yes, indeed. Yeah. That also actually now strikes me of different dimensions of interdisciplinary research. When you actually look from educators point of view, what does it mean to be an interdisciplinary researcher then? Yeah, the definition is little bit different. When you look at academically from a research process, then the definition might vary a little bit. And and that actually, no, actually it occurred to me is based on what I read is more of research definitions. But from an educator point of view, what a student.

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Speaker 2: For me, it's interesting. What is interdisciplinary? Yes. What is that? What is an interdisciplinary program? Because that's actually the what I've been struggling with. I can see.

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Speaker 1: I don't know.

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Speaker 2: .I mean, we bounce back the question to the board and say, OK, what do you mean? What actually do you mean? Because they they have this document, which is now I think it's not open still and under debate. So but but what the documents contained was it wasn't the mention of interdisciplinarity and then a description later on. I thought it doesn't match with, at least with the definition of interdisciplinary that that I read. So yeah, so so we bounce back the question then I think they also have, you know, became obvious they didn't know what to do with it because I think they or they can, maybe too. They also realize that interdisciplinarity and cross-disciplinary and multidisciplinary team that you first must have had sort of a good definition and that we don't necessarily share the same definition.

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Speaker 1: Yes, there are definitions, but we don't have a consensus. We obviously have contradictions.

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Speaker 2: And no, and I believe a lot of these things, it's also, you know, people like buzzwords, to be honest. I'm not sure if the University of Twente is really using interdisciplinarity as something that they have deeply thought about, or something that they want to sell to the world to get more students. So that's also marked as a program director, I'm very much into. I'd like to have more students into my engineering program, but what if I have, let's say, if I'm being asked to change my educational program so that we can, we can sell it better because we have some new buzzwords. I feel it's, you know, conservative to try

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Speaker 1: to challenge based learning is also another

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Speaker 2: it's the same thing. What's the, you know, European call something a problem in American calls it a challenge. So, you know, so if I take this challenge based learning, the European translation would be problem based learning, which is something that we knew from from 20 years ago. And I there's obviously differences. But again, for for for for me, as a program director, I'm more interested in what the students actually can do at the end, um. And then whether somebody can I believe you can acquire things from problem based learning through a challenge based learning. I'm sure there are definitions, but I think at the end you more or less get the same by and large, you you end up with the same products the same studes.

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Speaker 1: Well, I mean, basically, obviously there are different phases from my understanding. Just do interdisciplinary research is for me about cognitive advancement and improving understanding our developing understanding with the help of two or more disciplines, which cannot be attained with just one discipline. And much of it has to do with obviously the problems challenges in the world which are not disciplinary by nature and the world is not. And that is why, for example, as an education sector and as a researcher who I am into understanding this, how can we prepare educational setups that are more in alignment with the problems of the world? Not necessarily. All of them have to contribute in solving the problems in the same way. But we need different approaches.

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Speaker 2: yes. Yes. No. That's also, I mean, I think I struggle with the same question in a certain sense because at the one hand, I'm responsible for a chemical engineering process. It's a very classical discipline. It's very I mean, as I said with between me and my colleagues, there's a lot of consensus about 85 percent of the curriculum. We don't really have to discuss. I mean, you know, it's pretty well laid out that that that also means that we are in a sense, a bit static. And so you say interdisciplinarity is then something that that that that that doesn't affect us because we have a very clearly defined border. At the same time, I see that the students that come out of this program at the end and especially those ones that are that are working a bit between, let's say, chemical engineering and mechanical engineering between there. While we were there on many interfaces and chemical engineering and Mech and and maybe physics, there's also a lot of overlap in our research institutes like Mesa. Typically, the research teams are quite, yeah, not not interdisciplinary, but there are people from different mono disciplines collaborating in a multidisciplinary manner. And. And let's say what's what's what, what I struggle with is that should be. Should we educate our students as interdisciplinary or multidisciplinary engineers? Or should I first make chemical engineers? And then let them cross the bound, let them go towards the boundary?

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Speaker 1: Yeah, that is. Yeah, that is often the struggle now these days, and there is a clear divide between two people saying, OK, you in order to on interdisciplinary research. What needs to be discipline really strong. You cannot do this. And the other people, they argue that it is not the case. One of the Leland Hartwell, one of the Nobel laureates that I interviewed, took the position saying, You don't need to teach students discipline and knowledge, even in fact from school, they have to be taught in their discipline without the discipline. So I see this quite distinction among studies such as this one. So, yeah, I don't know whether it'll be solved.

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Speaker 2: And no, I think I'm not sure if it's a dilemma for me because what we do, we do educate our students at least. And again, I'm really looking now from just from the perspective of the the program that we do educate our people, especially in the best we face in a in a in a disciplinary way. Although we do try to, we are really very clearly making the connections with the societal problems there are and the role that but, you know, we do sketch and say, OK, this is this is what the chemical engineer can do in these issues. I also see that as people move on later in the study, especially when they stay here for the masters and they do their master assignment in a research group, very often they do actually cross the they do cross the boundary. And in many cases, actually, we are setting up such such. Master tracks, also where people into integrate things, but yeah, for me, I'm on standpoint, I find that you should first have a. You should start within a discipline. Yeah, I feel I feel, yes, I feel very strongly. So I don't agree with the noble.

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Speaker 1: Yeah, that is true. I mean, I've met my professors

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Speaker 2: as well, but I find it an interesting it's an interesting thing if we can do that, if we

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can do the best. But but probably you can do it in a non disciplinary way. On the other hand, I'm also a we are a factory. We have to have, you know, let's face it, we have to educate people because our society needs no space. I mean, that's why the factories in these factories of all sorts. And this is one of them. So we need to we need to to to educate these people. Sure.

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Speaker 1: Yeah, I mean, the time is actually running at almost appointment to end. And I would like to quickly go through the other one question that is very important. What do you think is the most important thinking skill for interdisciplinary research? higher order thinking skill that comes to your mind when you hear interdisciplinary research or interdisciplinarity.

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Speaker 2: Um. Well, I think it's very it's it's it's. It's the ability to listen and to ask the right questions. I'm not sure if that's the answer you expect, but

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Speaker 1: I

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Speaker 2: what I believe that is that I think if you want to work interdisciplinary, cross-disciplinary, multidisciplinary and especially with you are when you are raised in the mono discipline, you must learn to listen to other people because that takes a bit of effort because you have to know about their definitions, about what they mean with certain things, and you have to be able to ask the right questions to them to get to a better understanding. So he it's about reaching out and being able to reach out to the other side, that's the higher order thinking skill. And that I think you need the most.

00:40:51

Speaker 1: to be able to understand, or have the kind of mindset to understand the other.

00:40:57

Speaker 2: Yeah. To be able to be willing to cross and to be able to try to stand next to the other person, try to see the world from this perspective. So too, to listen to the other person and to to. Yeah.

00:41:10

Speaker 1: Great. I think that everything boils down to this definition of education is all about teaching or learning to think

00:41:18

Speaker 2: and as opposed to think because you are listening and listening is it's not, I don't mean it in a passive way. I mean it in active way.

00:41:24

Speaker 1: Do you think that? Yeah, I

00:41:26

Speaker 2: understand. But listening with the with the let's say with the with the with the goal of trying to sort of two to two to cross the to cross to this.

transcript

00:41:35

Speaker 1: Great thank you. Thank you very much. And then my final question. This is really the final question is that do you want are you aware of the word? Obviously, as a program director might have come across the word metacognition. Um, yeah, yeah. And how do you perceive the skill of metacognition in higher education or in general education?

00:41:58

Speaker 2: Education poor? Oh, you have to give me a week for that.

00:42:03

Speaker 1: or Reflection, for that matter, because I think it's more or less similar.

00:42:08

Speaker 2: It's metacognition, it's something it's for. I think to be I think Metacognition is maybe something that, you know, when I have a difficult problem. I didn't notice when I was 25, but I learned this in the course of times. Sometimes when I met with the dilemma that I have to balance a couple of things and there's no there's no right answer. There's no right solution. The best thing I can do is go to sleep and the next morning. Somehow, I know the I know what, what is the best or what is the least worst. And I believe that metacognition is something that I haven't really been given it a lot of thought. But for me, maybe if I have to say something, it is that I believe that this is something that is in the in the subconscious. That I cannot really reach. But it is there. And metacognition is something that that develops in the course of time, but I'm not sure if metacognition is something that. It's within the realm of education. Well, it's my maybe my, my my. I'm not sure.

00:43:31

Speaker 1: Yeah, obviously these are some of the teachers don't even have a clue of what that word means. So I'm actually happy that you have a little bit of an idea.

00:43:40

Speaker 2: And but I believe it's somewhere there and I try to as I sort of appreciate my subconscious. Yes, what it can do because actually, and I think it's actually it's also scientifically proven that that complex problems are actually best solved by your subconscious rather than by rational thoughts. And I don't really have tools to get there, but I know that, you know, just sleeping it over at night

00:44:03

Speaker 1: gives you a clarity, as can

00:44:05

Speaker 2: somehow solve things like that. That's I think it's sort of metacognition, I think, or, well,

00:44:14

Speaker 1: it could be. But anyway

00:44:19

Speaker 1: that marks the end of my interview.