transcript

00:00:02
Speaker 1: The recording started. So could you please briefly introduce yourself as to what you do in the context of higher education?

00:00:11
Speaker 2: Sure. Amodesen Chotia so me and its interests are in charge of innovative teaching and research programs. CRI. What I am doing and what I used to do for several years is to prototype new tools to help teachers and students better learn with skills such as, let's say, learning through research or learning through questioning, but also giving the students the opportunity to prototype so to experience themselves. Some of the of the learning they have just got, the Fab Lab was a large part of it. And but we used other tools and such as. Games such as biological experience, such as connecting, learning from a disciplinary field to something more open and interdisciplinary, I would say that the Biodesign was such a case. We did it in the framework of the European project called DITOS. Their students were offered the opportunity to learn and be introduced to biological and genetic concept, and they were asked to develop it either to think about ethics engineering, but also to applied to different fields like culture, architectures, urbanism and things like that. Now I am in charge of all master trials in the field of digital science. Again, this is, I think, relevant to this research because it's not a computer science master. It's rather a master where we teach and we give students the opportunity to learn about core disciplines, but to apply it to many other students who feel that they need to know. Of course, some basic computer science skills like data science that say, and then we'll apply it with some continuous projects they will have to think. And in the second year, you know, this is the introduction to to do research in more detail so they can choose themselves. They have the opportunity to explore research a bit more and even to do a Ph.D. in feel comfortable and find an interesting topic and research to.

00:03:20
Speaker 1: Indeed, that sounds perfect, and you seems to be the ideal candidate for my interview, and so I'm really looking forward to learn much more in the context of this research from you. So thank you very much. A for summarizing it very well. So my first question would be, as you know, my research deals with higher order thinking skills in interdisciplinary research, I would first focus on the concept of higher order thinking skills and then slowly move on to interdisciplinary research. So what is your definition of higher order, thinking skills and how do you perceive it in your educational practice?

00:04:00
Speaker 2: OK, so I start by being honest about my understanding of this concept. I will try to approach it with what I know and what we what we did, what we do. And I'm not using it. As you mentioned, we never use the higher order thinking skills before us or what I can say is only approximate. And I hope it will be relevant to your research. OK, so. To me, if I understand correctly, it's giving students all learners the ability to connect things together that weren't either taught in a classical context or the use for for a learner. They say that these higher order thinking skills means that you understand first the complexity of the object of study. You no longer . You break this naive disciplinary approach where. I mean, the course is supposed to reflect the reality. So it's to me, it's relevant for students who already have a background or let's say. We used to say at CRI a home base. OK, they have

disciplinary Home base. And what you come with is you show them the complexity. So it's like the first image on energy I can do is you look at the tube, whether you look it from above or from the side, you see either a rectangle or a circle with giving students the opportunity to understand that it's even in higher dimension, that you can approach a problem and that the way you did it by mastering, let's say, the the rectangular or square of square like shape is interesting, but it's not the whole picture. So for that and to get this high, you all this sentence gives you not only need to understand that and the object of study is or the problem is complex, but you need to also understand how the other approach it. Which is, I think the difference between pluri-disciplinary and interdisciplinary. You bring. Lie by knowing that, you know, that you will have to discuss and get something from others, but also give something to us. I think this is this should give the seeds to these types of connections between people from different fields and disciplines, then they will acquire that. I don't know if there is yet a curriculum. I think this is what you trying to do about it. But if I would approach it, I would approach this way.

00:07:25
Speaker 1: Mm-Hmm. So if I understand correctly from what you said, the ability to use their own learning and identify, let's say, disciplinary practices and learning what they have learnt in their discipline and identify from other disciplines and practice and connect towards a solution forming a solution or solving a problem. In general, if I could make an overarching understanding of the summary, would that be right? Or can you clarify if not,

00:08:01
Speaker 2: so it's true, right? It's a two edged. It's right because this issue summarized correctly with, I said, I would say that now that. I'm just I think you need to build something additional to that, which is once you understand the problem and how to approach it. People also need to develop common. Tools and practices to effectively tackle the problem. And this is yet to be consolidated, I think many people. I mean, I would approach it even if I understand the statement, the general statement, I would approach it through my own. Understanding knowledge disciplines. Hmm. And I think another teacher who was also willing to do that will do it from his own perspective. And if? If we want to go faster, we'll be probably we need to standardize it. And to do that, we need to build the kind of common approach to this, to this which is up to now to me, not done. I mean, everyone would have been say, I have the right way to do it because it's just we do it know even way people from innovation will do it in their own way. Sociologist but it is yet to be so consolidated in so that the teachers teacher speak from one voice.

00:09:49
Speaker 1: Nice. Thank you. Thank you very much. So now I kind of understand the overall view towards developing and higher level of skill for students. If you were to be de-construct into such skills and put it into context, for example, your master's course or whatever that you have actually many projects related to learning and innovation that you have done in the previous years. What kinds of this sub skills that you kind of expect students to develop?

00:10:26
Speaker 2: This is a very, very open question. You. Is the. So in a sense, at the end, if the if this is an objective and not a tool, only then I would approach it the same as a natural science or anything I would. I think the first key observation understanding where you are

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and when you. Placing the different actors the different question resources. Tools that you can let the problem kind of offers or proposed observation would be the first you cannot say anything about where the from, where is the author talking to? Like, OK, I understand that he's coming from that perspective. That person is coming from the perspective and the problem. Observation is indeed the ability to build the landscape, even if it's not shared with at least construct this network with. The second is the ability to be critical with respect to your own disciplines. Mm-Hmm. But also. Positively. I mean, be able to bring some positive criticism to also the way the other approach the problem. Mm-Hmm. And so you need to be able to dialogue. Mm-Hmm. So having having this excuse is also something mean, which is not developed even in one discipline I think it's to be able to. To bring the criticism on something that is both understandable and actionable is important because it's also easy to see the difficulties of one's approach or at the end, what you need to do is to realize that this is an ecosystem. And to get the best from this ecosystem, you need to share information. What you expect from the other is an answer and not just their consideration OK. I didn't know I could not do that or this is this is wrong or how do you bring and you continuously try to solve a problem by . Finally, I would say the final one is to be able to. Not necessarily set a new research question, but atleast reformulate the problem in a way that is understandable by many, many actors or. In the way that no one can really fully appropriate the problem. But at the same time, understand that they can they can contribute to it. Mm hmm.

00:14:12
Speaker 1: So that would be observation. And the second, I'm not able to fully understand.

00:14:20
Speaker 2: So th second is about. It was kind of form of critical thinking, but it has to be interdisciplinary and open.

00:14:34
Speaker 1: Mm hmm. With respect to their own discipline and also in view of other disciplines as well. Correct. And the third one would be

00:14:45
Speaker 2: you reformulation

00:14:46
Speaker 1: the reformulation of the problem so that everybody can contribute. Great. Thank you. So my question actually latches on to the previous answer that you gave. So do you teach these kinds of expectations that you have in terms of students kids? Do you teach these kinds of skills explicitly for students? If yes, what kind of methods do you use?

00:15:12
Speaker 2: OK, so I have to say the different stage and it's a it's a personal view. Even if you expose what they said to someone else, they could give a different answer. My my view is that you need to be strong on something to first enter this. So it can. It can be. It's true for any level. But before you start doing this, you need to make sure that people are strong on their basis. So whatever they will say, whatever the level it is but their level is comfortable to them. OK, so and if we are thinking about traditional. Disciplines, some are more easy to follow this path than others in the Bachelor, I think for the first two years, it's possible to do

so, but it's difficult because you are you are again acquiring a lot of new knowledge. And before being able to say something relevant, you need to master them at some point. So what? What I would do is to. And what they did is to teach the skills, either from the third year or from the mass level where I think. CARA is probably the best example to why CARA the best example, because we have exactly the situation, I described students who are coming from different backgrounds. They are solid, also supposedly solid on their backgrounds and they they need to. Two, to dialogue and understand the problem from different points of view. So all what I said previously, I think applies to this, to this exercise and to to also not waste your time. I think I will not have to to describe what CARA is. But this is what I what I felt both as a student and as a teacher in CARA.

00:17:41
Speaker 1: Mm-Hmm. That's great. Yeah, that clearly helps me understand since I'm also part of it. So do you have any concrete ways to assist the development of skills? What kind of indications that you use that that example tells you the student has reached the expected level?

00:18:05
Speaker 2: Yes. So let me just come back to it on what I said. So what they said previously was really my my own experience. What I see is that other teachers are able to bring it earlier. I am thinking of especially what happens in the in the maker lab through the engineering engineering course is. I think really towards this objective even can be reached from the first or second year, why? Because the tools are kind of easy to to master after a few sessions and students are embarked not in the mastery of this. Troops, but rather incremental learning towards an objective, and this objective is built from the beginning, is built upon interdisciplinary and, I say, common goods and sustainable development, so they are interdisciplinary in nature and complex also to do so, we can see that students in this context because also the evaluation is different. I think so for the evaluation is are you able to do something towards solving this problem? And we see that students really use the course and the methods teach as tools. And they are in capacity to learn by increments of small, small bits of knowledge. You need that, you learn that you achieve, then you reformulate the question and you test you, you're validated and both the engineering course, the summer schools are exemplars that can be done. So I would separate I would seperate. But then your question was again.

00:20:11
Speaker 1: How do you assess such what would indicate to you that the students had reached the expected level in such previously mentioned skills?

00:20:27
Speaker 2: Well, this is also something, something specific to CRI, but you need to know the students. I think this is not something you can do in amphitheatre of 500 students. You need to do and talk to them to interact with them before this happens. So you have a. Pre course statues of the student, and you see how how they vote, how how they talk to each other and how they think about their own disciplines, how the dialogue with others and finally how they reformulate questions that makes sense to everyone that is open. And so small groups working in small groups is key to assess this. I cannot imagine an online course where I can for sure see that these students benefit from the discussion because it's not. It's not

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only your method. I think it's not the least of points that students have to go through. It's the way they think and the way they interact with other. So you need to you need to be a witness of this interaction to to really be able to assess.

00:21:57
Speaker 1: So you said the way they interact. What do you mean, by the way? And what would qualify? For example, it could be entirely subjective with new review elements that indicate a certain behavior right there. You see changes from three evaluation or observations of, to say, from a teacher point of view towards the end of the course what kind of behavior changes or yeah, variables that you look at are observe.

00:22:27
Speaker 2: OK, so the abservabable are of different nature. First, we can see is as writings for how the the US question two world wars are students or how did you ask those questions? The second is how do they do it or really, how do the decision as a form of interaction? And I'm only thinking at the moment as when they are discussing others results, then you have the case where we can also, I think this is how they do it by when we see how they present to others. And finally, what is what kind of how they put the work, their work in perspective. I think. It's a big target for all, but at the beginning, I think that students have a first very disciplinary I mean, yes, they have a disciplinary thinking and they have certitudes. And you see how they move from that to I, we looked at something different. So you know, you need to know where the students come from, where all your students come from, and you see that they start integrating elements of language, vocabulary, technical tools from other disciplines. And you see that first to get interest in the they learn something from that. The second is the way they move from certitude to questions. All these statistical analysis is wrong. For two, it seems that the complexity and the nature of the data collected brings these and that question. Some of them can be solved, and purely mathematical analyses also are required to understand something. So first, from certitude and pure technical approach to something that shows that they understand the complexity and thinks needs to be to be refined. And finally, I think it's when you have group works and you cannot. You can no longer see where ,who did what, at this point, I think you realize that the they have shared experience and they discussed a lot about it. And you can see that they are advanced in their higher order thinking skills. If you're going to see, OK, this this one did all the the statistical analyses. This one discussed the sociology part. Mm hmm. It can be a good work. But if the assessment is really about the higher order skills, all you know that they haven't, they are open to it. Or at least they want to pass it on. Mm hmm.

00:25:44
Speaker 1: So you if immediately kind of trying to emulate a certain pattern from what you just describe. To me, it shows, apart from the ability to articulate fluently the thoughts and, yeah, their ideas orally and in written format the emphasis on the ability to integrate other disciplinary perspectives. While you are thinking about their own knowledge from their own discipline and their ability to ask critical questions from different points of view or from different disciplinary aspects that questions the credibility of the knowledge itself. So is this a kind of a good summary? Would you accept?

00:26:37
Speaker 2: Yes, yes.

transcript

00:26:41

Speaker 1: Great. Thank you. Thank you very much, actually. Yeah, this was really wonderful and probably would also help me for the CARA course, a lot. Now it has given me a bit more clarity on the expected outcomes and behaviors. That is great. So my next question is related to challenges. Obviously, we have a lot of talented students. And in this context, some students suffer obviously despite their motivation to develop such a level of skills. What do you think are the challenges that student face and how can two teachers help these students? Mm-Hmm.

00:27:29

Speaker 2: The. Challenges as challenges are coming from. From the. It's both an advantage and the weakness to have this disciplinary home base, because then they see the world through this through this approach methods epistemological approach to which is good because they are solid and they can defend their thinking, but at the same time, it's how do you deconstruct it, but properly it's not like what the field you come from is not adapted to the objective of the course, but rather. Do you I mean, put that put them to the historical perspective to have disciplines where you say that they had to had a purpose and the proposal was to advance a narrow field of knowledge? OK, so it's not that it doesn't mean it's not good. It means that they have to adapt and see if this is still valid under a more global approach, what needs to be kept, what needs to be re-discussed, what needs to be built. So this year, this is the first do t they realize that they have been trapped into epistemological approach and belief but rather? What what's new? I mean, we are building something together. Are you able to to critically also analyze what's coming from a discipline? The second is to help them acquire some basic knowledge of others disciplines, vocabulary in a short time. Of course, if we are talking about some student who benefited from from that, let'ssay at CRI students from the Bachelor are. I'm diving in this for a year, and so it's much easier for them to read a paper from the onother discipline. When you have students who who come from a background to this or that they have, you need also to help them acquire knowledge at a fast pace. It's also. It's also frustrating because you and they know that they cannot. They cannot reach the level of those are expert students, but helping them narrow down there and get really the the meaningful part of each topic and projects so that they can discuss with someone else is key. I think this is this is a method to how you how you get into how you read the research and how you select specific keywords. How far do you go in the understanding of that? I mean, you can open a Wikipedia page. Probably the first two paragraphs are enough to enter the discussion. Of course, if you want to open every entry hyperlink and try to understand everything it would be, it would be difficult, stressful and probably not to be reached in time. It reminds me of Francois Taddei, he was talking about ski slopes, and he wanted to apply to Wikipedia to let's say that this page is a black one. This one is a red one. This one's a blue, and understanding the difficulty of the knowledge you are trying to acquire is key so that you do not spend too much time on this. So this is the second challenge and third challenge is, I think it's more generaised, how do you properly formulate a research question which is a research or any form of question that is the. Which proposes to invite others to contribute to it. And this is far away from discipline. I think this is something that can be taught to anyone who what. Where does it come from? And you have like a stricture before going to the research question that needs to be. This needs to be done.

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00:32:54

Speaker 1: That's very interesting. Especially I'm really attracted by the final part of questioning. Obviously, it was also was part was present in your previous conversation and a statement about the important skills, their ability to formulate questions. And that is also a challenge. So how teachers could help students to ask the right kind of questions, formulate, the right type of questions? Even if you do, how do you do it?. Is there any way that you think is suitable?

00:33:37

Speaker 2: OK, so just just keep in mind that if we're going to say that they need also to understand what they don't know. So yeah, so we can discuss, we can discuss that in a moment. But so how would they formulate? I think this is this. This comes from the the second course we are involved in, it's part of it, at least its bibliography. I mean, there are different approaches. One of them is. The nice one you have, you have two or three days, you have no other resources. And what you want to do is only base yourself and in the group on what you know. You don't have access to internet . So it's more a naive, naive approach. And what you have to do is to map. It's kind of a knowledge map. And in this knowledge map to students need to to have an overview of what is known, what is unknown or if on a personal level, also what they also know so that you can also have the goal to learn it. So the knowledge map is critical. The second is, if you have access to, you have a longer, longer term and you want to, you want to ask yourself a resource question and then I think. Then in the naive goes quite quickly. You have to know what others have done, how they have approached it and what were their results, but also what was left unknown because the idea is not to say that this interdisciplinary approach is better than others. It makes you see through new Goggles where you see the holes in the knowledge a bit like, you know, Emmental . At some point you look from afar, what you see is just a cube or whatever, but you look closer and you see bubbles that there are holes of knowledge. And I think the interdisciplinarity opens you to a new dimension. It's like you see a graphic in two dimension and suddenly you see it in three dimension. It has nothing to nothing to do with it. So being able to know what others have done through bibliography and being able also to shape something really specific to this interdisciplinary nature nature of the interactions between students is interesting, and I think it brings also some not only some novelty with some interest to the work. Mm-Hmm. You're not going to do. Of course, you can say how to do a better gene editing things, but you will fall into highly into genetics, even if you bring some things from physics and whatever. But if you if you ask yourself something more very different, have you read the book Blue Ocean Strategy? No, it's interesting. So it has been written for business schools, but I think their approach is interesting. So there are two options. One is the red oceans, where only it's full of sharks. And what you're trying to do is to beat the competitors on their own tools approach Area Design etc. So you do exactly the same, but you try to be better. The second is how you distinguish yourself from your competitors. What makes you unique? What's your value proposal that turns your work into something unique? And when we when we talk about challenges, what students need to do is also let them know that this is something different. We are not trying to to fix something from what they've learned before. It's something. For its own and what you will get is something that you couldn't get without that, but my you?

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00:38:21
Speaker 1: Great. Thank you very much. I mean, yeah, there are many things. Obviously that was nice actually to see what kind of, as from an experienced point of view, teacher point of view. And also that was nice. So as a teacher along the same lines, what will be the greatest challenge? Let's say for you to develop such skills that enable students to reach that level, which was.

00:38:51
Speaker 2: I think, first of all, to teach that the approach is not unique. Mm-Hmm. I think the beginning in the story, but. Do the examples we can give to students I can use, like if I had to dedicate a course with meaningful examples of what happened, how it worked and what was the benefit of this kind of thinking? Mm hmm. Just to give them a bit of context, but also to. Two, to show them that it's real is important for for a teacher. I mean, students need to understand that this is important. This is interesting. This is doable. So having examples of this kind, or even nowadays, we can talk also about impact. So how impactful was this was? This approach is important and one day at one stop and embark in this dispute or approach, what we can say is what? It's not about incentives, but know what is missing are modern methods. I mean, we can do it by hand. We can do it. Can you kind of craft craftsman work? And that would not be. That's interesting, but that means we need a lot of time. But if we had a. Yeah. abacus or specifically designed exercise where I can apply my own. My own approach, let's say that we are talking about digital digital tools also would be would do it in the life science or online science or that we do around psychology or education or whatever. But what I want is a way to put my topic in and get all the the steps after I saw it. Help us, at least get some. I mean, time is critical when you do that, you don't have enough time, you you can go too far. You cannot also necessarily reach the objective or you can speak around something without being able to clearly define it. So having some facts and methods about these things to great?

00:41:45
Speaker 1: Yeah, I can imagine so. Yeah, that would be great. And I hope if I can pull something off at the end of the research, that would be great. So my final question and most of the interviews I do find a little bit of the over time. I didn't want to stop you while you were explaining very interesting things. So the final question is interdisciplinary research. So first, how do you define it? Is there any specific skills that you think are important for interdisciplinary practices when it comes to students?

00:42:18
Speaker 2: Yes, so they have two or three minutes.

00:42:21
Speaker 1: Yes, I have. If you have, please, I have all the time.

00:42:26
Speaker 2: OK, so I have I have some I have some slides that I can share where I would make your co-host.

00:42:41
Speaker 1: It will enable you pushes. Yes. OK.

transcript

00:43:08
Speaker 2: That's. OK. Try to show. So I hope it's the right one. But when,.. are you seeing something?

00:43:43
Speaker 1: Yes, I can see the slides.

00:43:45
Speaker 2: OK, so you can see the slide. So. OK. But the. So what I use as an example comes also from. From research in management to fear at the bottom right. What can you tell me if you don't see what you can see is the learning? Two steps like first, you observe something and you base your analysis on that, then you decide on the strategy and action and you observe the results. What people do very often is that from the results, they just change the strategy and action. And to me, this is more kind of. pluri-disciplinary approach, what you do is that you keep you keep working on the issue, you just change of strategy and action. Where the interdisciplinarity comes in is where the results. Have the ability to change, not the interaction you have with those disciplines, but your own disciplines too. So here you come back to the very nature of the question. So it's not about the action, it's about the question when you are able to bring back the questions and and comes with a different perspective into your own discipline, then you are doing. You are doing some interdisciplinary research. I had also. In mind, this is specifically adapted to. Now with the challenges. Where you cannot solve you cannot solve a problem by yourself, but the problem is not solving the problem in itself. How can you revive your understanding? Of discipline using that. So we have to we have to separate two parts, one is how efficient are we in solving a problem which can be done by in different ways, and sometimes it's also easy to do it through pluridisciplinary approach. Mm-Hmm. But interdisciplinary something it brings back into epistemology. It's the way you interpret what has been done previously in your field, how you want to change it. Regarding this interaction, this interaction is produces a result but also changes the nature of the product that came in this form. So I like and I had the. Postponed about 12. OK, was so

00:47:14
Speaker 1: that's great, thank you. That was very interesting, actually to see and. Yeah. thank you very much for sharing that deep understanding of your perception regarding interdisciplinary research. And obviously, I can agree with that. I think that is what my research is all about trying to bring. So thank you very much.

00:47:35
Speaker 2: Yeah, go ahead.

00:47:37
Speaker 1: Yeah, go ahead.

00:47:39
Speaker 2: No, just to to to understand. So you are going to interview some people. And so what do you what do you expect from that? How what do you expect there? How will you summarize the different opinion to use for these people? And how will you integrate them into your own research? Yeah.

transcript

00:48:07

Speaker 1: The basically the first phase of the research is about me developing a foundation that would incorporate the definitions of higher order thinking skills in the context of interdisciplinary research and possibly engineering education. And in order to do so, that is not already an existing definition in the context of interdisciplinary research in higher education. So what I'm trying to do is interview researchers and educators what especially in active, in teaching and engaging with the education regarding interdisciplinary research are engineering education to understand what is their definition and understanding and connect that with literature. So from the interview data from different people, I would try to identify some patterns and try to identify philosophy. I will try to classify based on a major pattern that I get, for example, definition of interdisciplinary research, definition of higher order thinking skills, and I will try to synthesize it more or less in two by categorizing it and try to formulate an overarching definition that fits this collection of different views and perceptions. So that way, I'm hoping to at least have a view on how do teachers think and perceive researches and think and perceive what I ended up thinking tight? And how much does it matches with the existing literature from educational research on higher order thinking skills? And how can I formulate a new one that fits better the context of my research? So this is what the first phase of the research is all about, and

00:49:52

Speaker 2: how many people do you plan to interview?

00:49:55

Speaker 1: At the moment, I think 30 participants so far. Let's see if I can manage it. So what? I have finished 15, I guess, and then I'm also interviewing and sending out invitation to get more people on board. So, yeah, 30 hours of interview recordings and then transcribing analyzing. But I'm trying to interview people from my university, from CRI possibly from Australia and the US and India, so that I kind of have a different pool of participants.

00:50:31

Speaker 2: That's interesting, that's interesting. You can you can also have a look at people in the Scientific Advisory Board of Crete. Mm.

00:50:39

Speaker 1: And that's a wonderful suggestion

00:50:43

Speaker 2: because the fishing there are more. Walking to two for you. Their views on this. We have people, of course, I was thinking in in the Netherlands, which have. Saskia van der veen

00:51:04

Speaker 1: OK, I can take that name. It's always difficult for me to get the Dutch names. Just stop the recording.