The Learning Curve

Episode 19: Case Based Learning with Dr. Dimitrious Papanagnou

[00;00;00;03 - 00;00;13;25] **Jacob Santos**

Welcome to the Learning Curve, an audio series presented by the Academic Commons.

[00;00;13;28 - 00;00;25;18] **Jacob Santos**

Your hosts for today's episode are myself, Jacob and Leah. Our mission is to illuminate higher education, teaching and learning through the power of shared experiences and research informed practices.

[00;00;25;20 - 00;00;59;22] **Leah Miller**

On this episode of The Learning Curve, we'll be discussing case based learning with Dimitrios Papanagnou MD, MPH. You'll hear how case based learning can enhance a curriculum, build self-directed learners, improve questioning skills, and help us embrace uncertainty. Doctor Dimitri Papanagnou is a professor of emergency medicine and serves as senior associate dean for Faculty development at the Sydney Kimmel Medical College and associate provost for faculty development at Thomas Jefferson University.

[00;00;59;23 - 00;01;09;13] **Leah Miller**

He is an emergency physician and medical educator whose work explores how we prepare clinicians for uncertainty in clinical practice. Welcome, Dimitri.

[00;01;09;15 - 00;01;12;04] **Dimitrios Papanagnou**

Thank you so much for the invitation to be here.

[00;01;12;09 - 00;01;15;10] **Jacob Santos**

We're very excited to have you here with us today. Dimitri.

[00;01;15;12 - 00;01;20;24] **Leah Miller**

To start us off, could you describe your teaching practice in three words?

[00;01;20;27 - 00;01;34;03] **Dimitrios Papanagnou**

Oh, this is a good question. I would say adaptive, intentional and reflective. Yeah. Final answer adaptive intentional and reflective.

[00;01;34;07 - 00;01;58;16] **Jacob Santos**

I feel like we've had a theme in the last couple episodes we've recorded of intentional being in there. It seems to be a common trend. We love seeing it. Now, you also mentioned the word adaptive, and I think adaptive will play into our first topic, which is case based learning. So could you describe for our audience case based learning and what it looks like in your learning environment?

[00;01;58;17 - 00;02;21;23] **Dimitrios Papanagnou**

Yeah. Thank you for that question. And thanks for the opportunity to speak about case based learning. Case based learning is one of the cornerstones of our curriculum and the medical college. And it's a really great program that Dr. Susan Truong, who's the CBL case based learning director, put together with the curricular leadership almost a decade ago when we launch our new curriculum.

[00;02;21;23 - 00;02;51;18] **Dimitrios Papanagnou**

Jeff, M.D. At the time, we were really thinking of pedagogies to synthesize and to interleave all the content that our trainees are expected to learn all the basic sciences, with the clinical sciences, how do we take all those lectures that they were learning about in silos, and how do we just kind of mix things up and case based learning seemed to be the best approach for us at the time.

[00;02;51;18 - 00;03;18;28] **Dimitrios Papanagnou**

And it was a very authentic approach, a very intentional approach, because essentially we were priming them to think how they would be expected to think and problem solve downstream when they entered the clinical environment as early as day one. So the way that our model worked. Students come in on day one and get introduced to a case. Case is facilitated by a faculty member.

[00;03;18;28 - 00;03;40;22] **Dimitrios Papanagnou**

And in the room there are about ten students. So students are working together with their peers on a case facilitated by a faculty member on day one, and they're with one another for two hours. If a really good CBL session were to happen, the faculty facilitator is barely speaking. They might be chiming in periodically just to kind of steer them in the right direction to give them a prompt.

[00;03;40;22 - 00;04;03;11] **Dimitrios Papanagnou**

But as they go through the case, students are expected to hit roadblocks and ultimately identify learning issues. So like, well, what is a cause of X or what is the best treatment strategy for Y? And as they go through the case, they're expected to capture these learning issues on a dry erase board or on their notes and then revisit them when the case is over.

[00;04;03;15 - 00;04;21;12] **Dimitrios Papanagnou**

The case is over in about two hours, and when that is over, the facilitator will essentially say, right, well, what are your learning issues for the next time we meet and students take inventory of all the learning issues that they've captured and they might say, well, you know, we Googled that one. We know the answer to that now.

[00;04;21;12 - 00;04;39;23] **Dimitrios Papanagnou**

So that's not a learning issue anymore. Or we came back to that and we figured out the solution for that. So that's not a learning issue. Learning issue three and five are very similar. Why don't we collapse those. And after that conversation, students will ultimately have a pretty clean list of things that they need to know more about.

[00;04;39;24 - 00;05;12;04] **Dimitrios Papanagnou**

To further dive into the case. And then they'll assign those issues to one another. Okay, I'll take learning. Issue number three. You take learning issue number four, and the students go home. And their job for the next two days is to learn everything and anything they can on their respective learning issue and to be prepared to teach one another their learning issue. Once they come back on day two, round robin, all the students will go around and say, okay, well my learning issue was was X, let me talk to you about that.

[00;05;12;04 - 00;05;29;00] **Dimitrios Papanagnou**

And then we'll see. Students do really cool things to teach their peers their learning issue. So once all the students go around and present their learning issues, then they can tell themselves, okay, well, now we have the requisite knowledge. Let's go back into the case, and the faculty facilitator will give them additional prompts as they go through the case.

[00;05;29;00 - 00;05;47;28] **Dimitrios Papanagnou**

There are some sort of resolution. Things unfold. They learn a little bit more about diagnostic testing or how the patient did. There might be a time lapse where they get to see that patient five years down the road, one week down the road, two days down the road later in their hospital course, whenever. And then ultimately the case gets closed.

[00;05;47;28 - 00;06;07;29] **Dimitrios Papanagnou**

Following that, the faculty member shares with the students what the learning objectives were. Now learning objectives very different from learning issues. Students identify what their learning issues are. I don't know this. I need to learn this. I need to be self-directed. I'm going to go out and learn it. I'm going to I'm going to teach my peers about these learning issues.

[00;06;08;00 - 00;06;33;05] **Dimitrios Papanagnou**

Learning objectives, however, are created and designed by the designers of the case and essentially leaders of the curriculum to sort of say, well, this is your case. I hope you had fun and enjoyed it and learned a lot. But at the end of the day. These are the things that you are responsible for. These are your anatomy, learning objectives, these, your biochemistry, learning objectives, etc. and they are ultimately responsible for those learning objectives.

[00;06;33;05 - 00;06;54;01] **Dimitrios Papanagnou**

So it's quite possible that they may not have discussed a learning objective that was on that sheet during their case, because you never know how a case might go. Every group is different, so it gives the students the opportunity to know what they're responsible for, and they are given the appropriate resources to essentially read up on those learning objectives.

[00;06;54;01 - 00;07;30;13] **Dimitrios Papanagnou**

And then every week at the end of the week, they get tested on those learning objectives through a short quiz. So what case based learning affords is the ability to talk about a lot of different topics and weave them on to a case which has been very successful for preparing our learners to not only think in the way that they're going to be expected to think, but also to problem solve, to identify their learning issues, to step into the role of educator and teach their peers, and also to assume some responsibility in their learning.

[00;07;30;13 - 00;07;45;24] **Dimitrios Papanagnou**

So it does a lot of things that are baked in there that are not necessarily explicit. As we sort of think about, how do we get our students to become self-directed, self-regulated, lifelong learners?

[00;07;45;26 - 00;07;49;23] **Leah Miller**

That was an incredible answer for what CBL is and how it looks.

[00;07;49;23 - 00;08;18;20] **Leah Miller**

In your curriculum. And I also appreciate you mentioning CBL and self-directed ness, which is such an important skill to really incorporate into the curriculum. It's very learner centered. They have a lot of responsibility for their own learning. And you really summed that up nicely. And I'm just curious, were there any challenges you encountered with CBL, and if so, how did you overcome them?

[00;08;18;22 - 00;09;03;06] **Dimitrios Papanagnou**

So that's a great question, Leah. And as I think about that question, my first reflexive thought is to think about challenges that learners may have encountered. But I'm going to take a step back and think about the challenge that we had with rollout and implementation. So prior to implementing a case based learning curriculum, where a lot of that content is assigned to these cases, where that knowledge and that teaching now lives in a case, and you hope that that will come up and percolate in conversation that now lives in those cases. Historically preimplantation, we had a lot of standalone lectures and sessions that went over a lot of these topics.

[00;09;03;06 - 00;09;30;05] **Dimitrios Papanagnou**

And what that required was letting go of the fact that we need to tell everything to our students. Well, you need to know this, and let me explain this and relinquish that and sort of trust the process that they would learn A, B, and C on their own independently. And when we get accustomed to doing that, you know, accustomed to thinking, well, I need to teach in this, I have a slide deck.

[00;09;30;05 - 00;09;48;24] **Dimitrios Papanagnou**

I need to deliver this knowledge to them. This needs to be in a classroom. They have to see this diagram, my diagram, my slides, and to sort of let that go and essentially throw them in a case and trust that they're going to get there on their own when they get there in their own means could be really challenging.

[00;09;48;24 - 00;10;22;28] **Dimitrios Papanagnou**

And when you have a curricular change and there is curricular reform and you do something like that, it could be very challenging. And it was challenging kind of coming to terms with the fact that, yeah, well, we're not going to go through the slide deck and it's important, but it's probably important for them to realize that what I'm going to be teaching them is a learning issue or should be a learning issue, and that they're going to go about learning about that on their own, because if they could do that skill early on, and that's great practice and deliberate practice for them when they hit the clinical environment, and they're going to be encountering learning

[00;10;22;28 - 00;10;44;02] **Dimitrios Papanagnou**

issues day in and day out and all that stuff that we would want in a controlled setting could still be shared with them. Those could be resources, right? Those could be resources that are linked to some of those learning objectives that they get at the end of day two to help them with. All right. Well, you're responsible for this learning objective.

[00;10;44;03 - 00;11;16;05] **Dimitrios Papanagnou**

You may want to consult this PDF or this article, this slide deck that you would have gotten in a more traditional setting. And what also ensures success. Are the instructions that we have for faculty. Earlier, I mentioned that the less a faculty member speaks when facilitating, the better, but occasionally the faculty member might need some prompts or might need some notes to help them think about important, salient features of the case.

[00;11;16;06 - 00;11;45;12] **Dimitrios Papanagnou**

And as you write these cases for students, you're also thinking about what does that case version look like for the faculty member. So having those notes, there having those questions. Those prompts are also essential. We're not giving this all to the students. There is some scaffolding there. But as you as you nicely summarized, the goal is really for our students to step into self-directed learning.

[00;11;45;12 - 00;11;53;19] **Dimitrios Papanagnou**

And and CBL, or case based learning is a really great pedagogical vehicle for us to get them to think that way.

[00;11;53;21 - 00;12;17;22] **Jacob Santos**

That was an incredible answer. I really love how you approach that challenge, that very real challenge of the fear of letting go and giving control to the students. And glad you gave it the attention it deserves, because it's a concern that a lot of all teachers have. So I love how you approach that, and the idea of trusting in the process and knowing that you are there to facilitate and guide them.

[00;12;17;22 - 00;12;46;25] **Jacob Santos**

You can help them where you need to. They can get there. And that's that's really awesome to hear about that process. So looking at these case based learning lessons, I'm curious, you talked about how there is this kind of merging of all these different topics that they need to grasp and understand, in their case based learning. How do you go about pairing for those CBL lessons and kind of the questions you ask as part of that?

[00;12;46;26 - 00;12;49;03] **Jacob Santos**

What makes an effective question?

[00;12;49;09 - 00;13;16;27] **Dimitrios Papanagnou**

Oh, that's good. That's that's a really insightful question. In terms of preparation, the only stakeholders in this process that would essentially prepare are the faculty facilitators. Because students are entering the case, they don't exactly know what the case might be. They might have a roadmap to sort of anticipate some of the diseases that might come up so they can read up in that sense, but they're not necessarily preparing for that case.

[00;13;16;27 - 00;13;48;29] **Dimitrios Papanagnou**

Dimitrios Papanagnou

The faculty member who's facilitating that case, however, will require that preparation. And that's where that document or that case version is really helpful for the faculty member to be really familiar with how the case begins, how the case evolves so that they're able to answer questions. I think knowing what some of those prompts are, to get them to think about learning issues, things that should be learning, issues that really percolate as learning issues come up.

[00;13;48;29 - 00;14;10;10] **Dimitrios Papanagnou**

I think it's important for them to be familiar with that. I think it's important for them to be familiar with what they're not supposed to disclose are all essential features. So when you think about that and you write that down, there's really not much preparation that needs to happen, right? Once you have those safety nets and that scaffolding and that script.

[00;14;10;16 - 00;14;56;01] **Dimitrios Papanagnou**

So you don't necessarily need to find content experts for that case to facilitate that case, so long as that case is well designed, the faculty facilitator is familiar with the case and the evolution of that case, and has some prompts and some guidance there to help steer the group in that direction. And that's been really wonderful. You mentioned questions, and I think for faculty facilitators that truly want to get learners to be self-directed and to help them move in a direction that matches where their learning issues will take them, it's it's essential that faculty members really ask open ended questions.

[00;14;56;03 - 00;15;12;17] **Dimitrios Papanagnou**

Effective faculty facilitators are able to think about a variety of question types that they can ask to support different kinds of learning, depending on the situation.

[00;15;12;19 - 00;15;48;09] **Leah Miller**

You mentioned that as a facilitator, knowing the case well is the primary or perhaps the only necessary preparation. But you also mentioned that the right questions are essential. So I'm wondering, could you elaborate on how you organize the type of questions to get at different levels or orders of learning moving learners up to higher order thinking skills?

[00;15;48;11 - 00;16;31;19] **Dimitrios Papanagnou**

Yeah, that's that's a really good question. And I love talking about this because we never teach people how to ask questions. And more specifically, we never take the time and never create the space with educators to get them to reflect on the questions that they're asking. So a lot of this question stuff, you know, if we kind of if we think of CBL as the trees, if we kind of take a bigger look at the forest, the questions that we ask as as educators come up everywhere, you know, questions are typically the medium through which learning is going to happen.

[00;16;31;21 - 00;16;58;29] **Dimitrios Papanagnou**

And when you look at most of the questions that get asked, a lot of them are sort of questions like what is or who is or what are right. If you think about the syntax in which that question begins, if you kind of fill in the blank, you can sort of predict what kind of thinking, what kind of thought processes that question is going to invoke.

[00;16;59;00 - 00;17;20;10] **Dimitrios Papanagnou**

Right? So if you think about questions, lower order questions that I mentioned before are those that tap into your memory. What do you remember? They might invoke convergent thinking like, I'm like, I'm thinking about the one thing. But as you move from lower order questions to higher order questions, we're getting people to think a little bit more divergent.

[00;17;20;12 - 00;17;45;28] **Dimitrios Papanagnou**

Okay, yes, I know that the most likely cause for the patient short of breath is asthma. What else could be causing this patient to be experiencing shortness of breath? All right. Well now I'm generating a differential. And I'm thinking I'm thinking more broadly I'm thinking divergent. Right. So higher order thinking invites divergent thinking. And then you might get the learner to even go even higher and think, you know, from an evaluation kind of stance.

[00;17;46;02 - 00;18;13;25] **Dimitrios Papanagnou**

Right. Like how might we what if the patient presented this way and not this way? How would the treatment strategy differ? So the way that we ask questions tap into different cognitive processes. Right? I mentioned evaluation, I mentioned memory and convergent thinking and divergent thinking and evaluative thinking. And if you think about Bloom's Taxonomy, Bloom's taxonomy kind of is a little similar.

[00;18;13;26 - 00;18;41;18] **Dimitrios Papanagnou**

Right? There's knowledge, there's comprehension, there's application, there's analysis. There's evaluation and creation. Right. And the questions that you ask could get learners to think in higher levels, even according to Bloom's right creating. Well, this patient needs medication. And you figure it out that she has this disease and she needs this medication, but she doesn't have insurance and she doesn't have access to a pharmacy.

[00;18;41;20 - 00;19;06;12] **Dimitrios Papanagnou**

How could we develop a treatment strategy for her to send her home that would allow her to get her medication so that she could get better, right. So they're engaging in that kind of thinking. And that's what's so cool. When you layer on these educational frameworks that we have and make them real. Right. Because questions are real. The questions that we ask are learners are real.

[00;19;06;12 - 00;19;31;11] **Dimitrios Papanagnou**

They are going to make their brains fire and light up in different ways, simply based off, sometimes based off of the way that we ask them. Right? Think about a question that asks how right? How do we make things happen? How do we ask questions that begin with what if? Like what if? Now you're inviting possibility, you're inviting imagination.

[00;19;31;12 - 00;20;07;03] **Dimitrios Papanagnou**

If you ask questions like why? Right? You're inviting them to sort of seek understanding. So getting educators to just take a moment to reflect on the questions that they're asking could be very helpful, because it's going to invite their learner to think differently. Now, there's one thing I just want to clarify. I'm not saying that lower order questions that are convergent, right, lower order questions that tap into memory, that tap into convergent thinking about one answer are bad, right?

[00;20;07;04 - 00;20;31;14] **Dimitrios Papanagnou**

All questions are good. In fact, the way that we diagnose and knowledge gap could essentially be through a lower order convergent question. They're great. Another point around questions. Yes, convergent lower order questions are great. Well, what is this? What is that? What's the source of this? Right. If you ask a lot of those questions in series, just think about that.

[00;20;31;14 - 00;20;54;06] **Dimitrios Papanagnou**

Think about what it feels. If you're in a clinic, if you're in a clinical learning environment or in a lab or in a classroom, and the educator just asking you in series a lot of these questions that are kind of testing your ability to recall that knowledge, it feels like malignant prodding that just like prodding. Right. And and that does something to the psychological safety in the room.

[00;20;54;09 - 00;21;37;11] **Dimitrios Papanagnou**

So I love this kind of art of the question because it taps not only into what kind of thought processes the learner is going to engage in, but it also, in a way, sets the climate of the room of that space. And I think having a framework to organize faculty members, educators, kind of thought processes around the questions that they're asking and should be asking can be asking could be a really powerful educational tool that I don't think we fully tapped into.

[00;21;37;12 - 00;21;40;27] **Dimitrios Papanagnou**

And I think there's an opportunity there to do more.

[00;21;41;00 - 00;22;11;24] **Jacob Santos**

There was so much of that answer. I love the what if the real intentional grammar behind the structure, the question, the syntax you're using, and being a very intentional with that. I really love this breakdown of asking the question. Now, we've talked a lot about kind of convergent thinking and students trying to find the right answer. So students have kind of been conditioned and think in many ways to look for that right answer or that one convergent solution.

[00;22;11;24 - 00;22;24;05] **Jacob Santos**

How does CBL help them work through that incomplete, ambiguous, or rapidly changing environment where information is going to adjust and change?

[00;22;24;08 - 00;22;51;26] **Dimitrios Papanagnou**

Yeah, that's a great question. And I know we're talking about distinct topics in education, but I think that question is an opportunity to interleave some of this stuff. I think CBL is great because it is messy. Maybe in the beginning collecting data, convergent thinking, right. Is there this symptom is a patient experiencing this constellation, these these clinical manifestations then.

[00;22;51;28 - 00;23;22;01] **Dimitrios Papanagnou**

Okay. Well now let's think divergently. What are the possible causes. And then moving between convergent and divergent thinking moving between higher order and lower order thinking. It just reflects how some of these learning issues sort of percolate. And I think faculty having the understanding that various types of questions could be helpful at various points in time of that case, could be very supportive for learners.

[00;23;22;01 - 00;23;45;12] **Dimitrios Papanagnou**

And it doesn't just have to be faculty members that are asking questions. Students could be asking questions. Some student that might be thinking about an issue might be like, hey, what if this? And then that too can steer the group to navigate that case in a different way. So we want that to be modeled, and students should be generating questions that are of their own right.

[00;23;45;13 - 00;24;07;07] **Dimitrios Papanagnou**

They should be asking themselves what they might be struggling with, what their was learning issues are, because that is essentially going to dictate their problem solving and their ability to problem solve. Now, another reason why I love case based learning as well is because they are entering the case without knowing anything. I think we mentioned this earlier, but there's a lot of uncertainty there.

[00;24;07;10 - 00;24;37;18] **Dimitrios Papanagnou**

And most curricula, especially in the in the health professions before they go into the clinical environment or any profession really, before they go into the world. Right? There are in these sort of controlled learning environments, and these controlled learning environments oftentimes give this false sense of certainty. And that is so far from the case when they enter the real world.

[00;24;37;21 - 00;25;02;14] **Dimitrios Papanagnou**

So it's one thing to think about what to do. But how do you implement that plan and how do you navigate that uncertainty is something that case based learning can do very, very nicely because clinical practice, any practice, is uncertain. And if we get trainees to think about that uncertainty and to sit with that uncertainty, it normalizes it.

[00;25;02;15 - 00;25;34;10] **Dimitrios Papanagnou**

So case based learning can do that. And that's why we like that. It's a great space for self-directed learning. It's a great lab to experiment and toy with uncertainty and use that as a variable. It's a great place for faculty facilitators to think about the questions that they're asking, not asking. And when they are asking a question, what's the syntax that they're using to lead into a question?

[00;25;34;13 - 00;25;41;26] **Dimitrios Papanagnou**

There's a lot that can happen there, and there are a lot of tools that faculty have. And one of those tools is the question.

[00;25;41;28 - 00;26;15;01] **Leah Miller**

You really brought everything together there with uncertainty. And I mean, uncertainty is inherently uncomfortable. So taking it back to one of the first things you said, intentionally building experience with uncertainty and sitting with uncertainty into the curriculum, into the cases it is it is so important for faculty to facilitate that and ask questions that get toward that and have learners experience that before they hit the clinical environment.

[00;26;15;01 - 00;26;28;24] **Leah Miller**

So to kind of summarize our whole thing, what 1 or 2 pieces of advice would you give to someone who wants to explore case based learning?

[00;26;28;26 - 00;26;58;24] **Dimitrios Papanagnou**

So another great question. Just going back to the uncertainty, if I could just give advice to educators, to faculty to let their learners know that uncertainty is okay and to model that uncertainty right when something comes up to actually say, I don't know and I don't know, but we'll solve it. And to think out loud and to have learners hear that thought process.

[00;26;58;27 - 00;27;32;16] **Dimitrios Papanagnou**

So I think being explicit about uncertainty, admitting one's uncertainty and modeling that and modeling one stop process, whether it's thinking out loud, I think is great. And that is also a really great tool that can go into CBO. Another piece of advice is reflecting a bit on the questions that you ask. What questions are most comfortable for you when you're working, when you're teaching and you just spout out a question, what does that question look like?

[00;27;32;18 - 00;27;55;00] **Dimitrios Papanagnou**

And I think that also dovetails into CBL. But for for folks that are thinking about trying CBL for the first time, I think start small don't necessarily need to develop a curriculum around CBL. Maybe you think about your entire course and you think, all right, well, you know, there's an opportunity for me to do something really interesting this week.

[00;27;55;04 - 00;28;40;29] **Dimitrios Papanagnou**

Maybe for that one week, see if you could generate a case and try that for that week and see what happens. Embrace the messiness, you know, ask some questions. Ask different questions. Bringing the uncertainty. Admit the uncertainty and let learners kind of sit in that uncertainty. Ask them how that was and also share that that feeling is going to come up and that feeling is normal, and normalizing that uncertainty and normalizing that uncertainty early, before we wire learners to feel that there is a need to have closure and certainty early, because that is so far from the case.

[00;28;40;29 - 00;28;50;24] **Dimitrios Papanagnou**

And I think those would kind of be my actionable recommendations for faculty that are there thinking about some of the things that we've spoken about today.

[00;28;50;26 - 00;29;13;23] **Jacob Santos**

All right. Well, Dimitri, that brings us to the end of our interview today. That was a wonderful final answer for us. Great, actionable points to consider an act upon. Thank you so much for taking the time out of your day to be here with us. Share your knowledge and expertise with us. It's been an absolute pleasure.

[00;29;13;25 - 00;29;20;01] **Dimitrios Papanagnou**

Jacob and Leah, thank you so much. This was great and hope to see you next time.

[00;29;20;03 - 00;29;32;14] **Leah Miller**

Thank you for joining us this month on The Learning Curve. You can find more information and resources related to this episode at academiccommons.jefferson.edu/thelearningcurve

[00;29;32;16 - 00;29;44;01] **Leah Miller**

And we hope to see you at some upcoming academic commons workshops. If you would like to be featured on a future episode of The Learning Curve. Please contact us using the button on our show page. Thanks for tuning in!