

WEBVTT

1

00:00:00.000 --> 00:00:23.830

Raegan Davenport: The time and the space to spend with our amazing panelists today. I want to say hello to everyone and thank you for coming to our second installment of the 2024 Round Table Series for the Amgen biotech experience. My name is Regan Davenport, and I work in the Abe Program office

2

00:00:23.890 --> 00:00:37.940

Raegan Davenport: as the community of practice liaison. So I work very closely with everyone in the Abe office most closely with just joys. And who was the host? Of the Round Table Series, probably the past

3

00:00:37.960 --> 00:00:55.560

Raegan Davenport: 2 years. I believe they started 2 years ago. She was the one that was running all of the round tables. And so now her and I are supporting each other with that work. So just wanna again say, Hello, thank you for taking the time to spend with us. Please say hello and introduce yourself in the chat. Tell us where you're from.

4

00:00:55.800 --> 00:01:06.800

Raegan Davenport: For those of you that are in a completely different time zone like our esteemed panelists today. Super. Thank you for joining us, because I know it's a different time kind of

5

00:01:07.140 --> 00:01:21.470

Raegan Davenport: all over the world right now. So thank you for joining us. Again. I'm Regan Davenport, and I'm joining from Springfield, Virginia, which is about 20 min from Washington, DC, and so

6

00:01:21.490 --> 00:01:26.410

Raegan Davenport: it's great to see everyone here great to see where everyone is joining from.

7

00:01:26.700 --> 00:01:51.609

Raegan Davenport: And for those of you who are new to this series. These roundtables are designed for our incredible Abe teacher community from around the world, and we like to use them as a chance for you to get to hear from one another, to learn from experts. And we really want the focus to be on topics of spec. Excuse me, specific interest in science and biotechnology

8

00:01:51.610 --> 00:02:16.380

Raegan Davenport: for science and biotechnology teachers. So if you have a topic, or you have something that you think would be great for us to consider in our planning. Please let us know. Sarah, I don't know if you could throw the Abe Program office email in the chat for me, but it would be wonderful to hear from you about what it is you would like to see in this space, because we really want you to

9

00:02:16.380 --> 00:02:17.680

in this series

10

00:02:17.680 --> 00:02:50.230

Raegan Davenport: valuable. So we are going to record this round Table. It will be posted on our website. You all will also receive a transcript of the discussion and a copy of any materials that are shared today that we have to share. And we'll also have time for audience questions at the end of the presentation. So please please put your questions in the chat box at any time during this Round Table discussion, and we will be sure to watch for those, and I will ask your questions at the end.

11

00:02:50.470 --> 00:03:02.680

Raegan Davenport: So without further ado, I'm going to jump right in by introducing our amazing panelists today. We have Ingleborg Van Dur knew it. Did I say that? Right? Ingleboard?

12

00:03:03.650 --> 00:03:31.890

Raegan Davenport: Almost. Okay. I really really wanna make sure I get it right? Who is an Ab. E, master, teacher, fellow and biology teacher, at Ledger College from the Netherlands and she's interested in integrating opportunities to build a science skills at all levels of science. And she's been leading Pd. For her teachers around Abe. And she even facilitated this amazing game

13

00:03:31.890 --> 00:03:57.309

Raegan Davenport: with it. She's a valuable contributor to the AV. Netherlands program overall, and she assists her site by facilitating learning for teachers so welcome, Ingeborg. We are also joined by Dr. Jack Glen, Kart and Way for us. Doctor Cathcart, who's also an AV master, teacher, fellow, and Lecturer in Science and Maths. Education at University of College, Dublin, Ireland.

14

00:03:57.330 --> 00:04:16.600

Raegan Davenport: Dr. Cathcart has connected with AV Netherlands previously, and AV. E. Uk. Developing extension labs and professional development for his colleagues. So Inkabourg and Dr. Kathkart a huge thank you for joining us today. We are so pleased to have both of you with us today.

15

00:04:16.660 --> 00:04:21.269

Raegan Davenport: And so I've talked a lot. I want to let you talk. So we are going to begin

16

00:04:21.620 --> 00:04:41.749

Raegan Davenport: by getting to know a little bit more about our panelists, and their journeys as educators. So ingeboard, could you please introduce yourself? Tell us a little bit more about yourself and your pathway into teaching science? Also, perhaps the work that you've done with the Abe master teacher, fellowship?

17

00:04:43.030 --> 00:04:51.870

Ingeborg van der Neut: Yeah. Well, I started biology in Utrecht, and I already knew halfway through my study that I wanted to be a teacher, because.

18

00:04:51.880 --> 00:05:02.199

Ingeborg van der Neut: like the real scientific interest in in a small detail that was not for me, I'm more like someone who likes the broader side of biology

19

00:05:02.430 --> 00:05:13.940

Ingeborg van der Neut: so I started working as a teacher, and I did so for many years. And one of the thing I did a lot of things. I've been teacher, trainer I

20

00:05:14.140 --> 00:05:28.310

Ingeborg van der Neut: developed like in school teaching program for our schools. And now I'm in the National curriculum committee. But one of the things I really like is to get students active during class

21

00:05:28.430 --> 00:05:31.320

Ingeborg van der Neut: and

22

00:05:31.380 --> 00:05:35.510

Ingeborg van der Neut: I, we developed a lot of we call that embodied simulations.

23

00:05:36.240 --> 00:06:01.490

Ingeborg van der Neut: and it means that, like a process is either very small. For example, on a molecular level, or that takes a lot long time. For example, evolution that's hard to imagine for students, we make like we work with Lego, or we work with paper clips or we work with I don't know what? But we try to make these.

24

00:06:02.010 --> 00:06:13.380

Ingeborg van der Neut: yeah, we try to show. No, no, not show them. That's basically not they. They have to like, do the process with all these kind of things. And it really helps them

25

00:06:13.550 --> 00:06:22.259

Ingeborg van der Neut: basically not to understand, probably, but more to remember because they've done it. And so they remember better.

26

00:06:22.480 --> 00:06:36.449

Ingeborg van der Neut: And when I got in June with the AV. Program that was like a thing in my head that I wanted to work on transcription and translation, because I see that students they often like

27

00:06:36.790 --> 00:06:58.509

Ingeborg van der Neut: put it all on one heap. And yeah, well, there's something with DNA and proteins and all. There's Mrna in between. And so I wanted to make something that connects all the processes. And I got the opportunity to do that. And that's what I worked on the past one and a half year.

28

00:06:58.660 --> 00:07:01.839

Ingeborg van der Neut: basically, is that does that answer your question?

29

00:07:05.360 --> 00:07:33.630

Raegan Davenport: Yes, sorry. I was just typing. We have to love our students right? Cause. They're the reason that we are in this space. It does answer my question. Thank you for sharing about your experience in your journey into being? A teacher of science. So, Doctor Cathcart, how about you? Can you share your pathway into teaching? Science? Something about your current role in your work with the Ab. Master teacher fellowship.

30

00:07:34.130 --> 00:07:37.669

Declan Cathcart: Sure, Regan, thank you very much. And Hi, everybody. And it's great to be here.

31

00:07:37.740 --> 00:07:49.930

Declan Cathcart: So I'm Declan. I work in a regular post primary secondary school in Ireland. I've been a biology teacher there. In a couple of different schools.

32

00:07:50.200 --> 00:08:00.970

Declan Cathcart: I guess more than 20 years now, if I start counting but I came late to teaching, so I didn't really. I didn't know what I wanted to be for a long time. I just followed my

33

00:08:01.190 --> 00:08:11.859

Declan Cathcart: my interests, and that sort of brought me from after college. I did a degree in microbiology. I just liked it. So I went on further and did a Ph. D. in biotechnology in the UK.

34

00:08:12.140 --> 00:08:16.870

Declan Cathcart: Worked in a couple of different universities over over the

35

00:08:17.090 --> 00:08:30.320

Declan Cathcart: that. The years following that post docking and contract-to-contract came back to Ireland again, worked in different universities in Ireland. I'd worked in industry for a little while, worked a place like Unilever and Celtic, and a few different. So

36

00:08:30.530 --> 00:08:41.490

Declan Cathcart: so I'd had a kind of a really broad experience. of the biotechnology, you know, at at academic sort of sphere and and and industrial labs.

37

00:08:41.919 --> 00:08:58.689

Declan Cathcart: and and I'll kind of just fell into teaching by accident. I started doing some lecturing part time, as one of my. you know, in in one of the universities that I ended up working with with and just realized that actually, this is this is great. I really enjoy this. And I really liked working with students. I really liked working.

38

00:08:58.890 --> 00:09:00.370

Declan Cathcart: doing

39

00:09:00.760 --> 00:09:06.090

Declan Cathcart: so deep dive projects. Finally, your undergrad projects with students. And

40

00:09:06.140 --> 00:09:12.939

Declan Cathcart: so so the obvious thing was to be a second teacher. But it didn't. It wasn't obvious to me at that stage. And and

41

00:09:12.950 --> 00:09:16.709

Declan Cathcart: it was just actually really after I took a career break and

42

00:09:16.890 --> 00:09:18.459

Declan Cathcart: the opportunity came

43

00:09:18.470 --> 00:09:20.760

Declan Cathcart: to just fill in for somebody.

44

00:09:21.190 --> 00:09:23.450

Declan Cathcart: a secondary school teacher that I knew.

45

00:09:23.540 --> 00:09:35.529

Declan Cathcart: and I really just thought I'd do it short term. But within 2 weeks I was signed up for the teacher training program and haven't looked back since. It's the best job in the world. What can I tell you? I'm sure you guys know that? Right? So I

46

00:09:36.190 --> 00:09:48.189

Declan Cathcart: But I'll guess I went further than I started getting involved in in a sort of curriculum design I really liked the and I take what Ingbo is saying about. I really like students

47

00:09:48.290 --> 00:09:50.590

Declan Cathcart: to be active. I really like them to be doing

48



00:09:50.650 --> 00:09:58.960

Declan Cathcart: to be doing science rather than just learning about science. If you, if that makes sense, or as well as learning about science, and for me.

49

00:09:59.110 --> 00:10:02.639

Declan Cathcart: the opportunity any opportunity I have to be able to

50

00:10:02.810 --> 00:10:08.579

Declan Cathcart: to bring students into projects and into sort of deep dive

51

00:10:08.890 --> 00:10:13.169

Declan Cathcart: laboratory and extended activities where they can

52

00:10:13.820 --> 00:10:15.260

they can really own

53

00:10:15.300 --> 00:10:20.319

Declan Cathcart: the the work they're doing. They can really experience the the authentic kind of

54

00:10:20.380 --> 00:10:25.499

Declan Cathcart: world of what it likes to like. It feels like to be a scientist, and to make discoveries, and to.

55

00:10:26.030 --> 00:10:32.130

Declan Cathcart: you know, design your own work, and and and make mistakes, and and and

56

00:10:32.150 --> 00:10:44.130

Declan Cathcart: repeat things, and do all the things that that real scientists do, so that they they, you know, I think it's really important disposition. What it's is what it's all about we need. We need to. You know, I think it's our responsibility to make sure that our students have a

57

00:10:44.620 --> 00:10:48.789

Declan Cathcart: have a positive disposition towards science, and that it's not just a

58

00:10:49.010 --> 00:10:57.099

Declan Cathcart: it's not all about the content, but it's it's about the experience as much as anything else. So my Mtf. Work really was, you know, in that line.

59

00:10:57.630 --> 00:10:59.880

My background is in Mycobaji, like I said.

60

00:11:00.620 --> 00:11:12.210

Declan Cathcart: I also have a lot of experience in industry working with DNA doubt based diagnostics. So I kind of put put those 2 together into 2 different modules that I've worked on over the last couple of years.

61

00:11:13.620 --> 00:11:20.220

Declan Cathcart: I'll I'll I'll share some details with you about about those later on, but they're very much hands-on

62

00:11:20.500 --> 00:11:28.919

Declan Cathcart: real world applications of of the bio, the the fundamentals of biology, the way I look at the activities, are they are vehicles

63

00:11:29.400 --> 00:11:33.500

Declan Cathcart: as well as anything else, their vehicles for students to really learn

64

00:11:33.510 --> 00:11:34.550

Declan Cathcart: fundamental.

65

00:11:35.580 --> 00:11:41.809

Declan Cathcart: the fundamentals of the biology that we want them to know in in in you know, in a way that that, like, I said, is authentic.

66

00:11:43.550 --> 00:12:06.839

Raegan Davenport: Thank you for sharing that. Doctor Cathcart, that is so true. That piece about wanting students to experience things authentically and in real world application, so that they understand why, they're doing what they're doing. So thank you both so much for sharing your journey. Into science education, and with Abe.

67

00:12:06.940 --> 00:12:18.349

Raegan Davenport: I know that you both have a wealth of knowledge and insight in these areas, and I know that you also have some wonderful show intel examples of

68

00:12:18.350 --> 00:12:37.300

Raegan Davenport: your projects, assets, tools that you've used with students and educators that you're going to share with us. So again, we're going to leave time for QA. At the end. So if you have any questions you'd like to ask our panelists as they present, please, write them in the chat, and we will be sure to ask them at the end.

69

00:12:37.300 --> 00:12:54.910

Raegan Davenport: And so, without further ado, I'm going to invite Inglorg to share her screen and walk us through the amazing project that she created for the Master teacher. Fellowship that she has shared with teachers. So in the work over to you.

70

00:12:56.150 --> 00:12:59.420

Ingeborg van der Neut: I hope you can see my screen now.

71

00:13:00.280 --> 00:13:12.420

Ingeborg van der Neut: Yes. Oh, well, we're all ready to last. That's not the good. That's not the correct one. Wait, wait! Wait! Wait! You didn't see that, did you? Now, here we go.

72

00:13:12.680 --> 00:13:19.530

Ingeborg van der Neut: So this is the the. This is where I introduced myself to A, BE,

73

00:13:20.160 --> 00:13:22.660

Ingeborg van der Neut: and you can see, I'm a diver

74

00:13:22.710 --> 00:13:31.210

Ingeborg van der Neut: I use. For example, this is where you. This was the the exact week I was using connects to Bill DNA, for example. Here.

75

00:13:31.390 --> 00:13:40.300

Ingeborg van der Neut: These are my daughters, and you can see we love games with outdoorsy people. Well, this is a bit about about me.

76

00:13:40.670 --> 00:13:46.080

Ingeborg van der Neut: This is one of our projects started here on the top left.

77

00:13:46.410 --> 00:13:51.760

Ingeborg van der Neut: That is basically the idea where I started from.

78

00:13:52.030 --> 00:13:57.610

Ingeborg van der Neut: And I was already telling Reagan very proudly.

79

00:13:57.640 --> 00:14:07.369

Ingeborg van der Neut: Today, today, this afternoon I got to pick these up. These is the these are the cards that we use for the game.

80

00:14:07.560 --> 00:14:14.219

Ingeborg van der Neut: And yay, they're very cute, and the box is very cute, so I was very happy.

81

00:14:14.660 --> 00:14:21.650

Ingeborg van der Neut: But I'm going to show you how I got there. So this is where it started with it like a kind of id.

82

00:14:21.780 --> 00:14:32.760

Ingeborg van der Neut: And what Abe hmm meant for me is that I always have a lot of ids, but I do not really have the time

83

00:14:33.220 --> 00:14:52.249

Ingeborg van der Neut: to do it in between classes and whatever, or I do not make the time, because now there was a deadline, and I had to show things. So every time we had a meeting I had to come up with something, and so I did. And you can see the process here. It really started working well when Abe connected me to Libby.

84

00:14:52.290 --> 00:15:00.810

Ingeborg van der Neut: She's a biology, a biologist and a designer. And I really needed that, because that's not my

85

00:15:01.690 --> 00:15:12.870

Ingeborg van der Neut: my field of expertise. So she helped me out, and she she came up with this board. And this is the very good first design, and you will see that I'll show you the the

86

00:15:13.000 --> 00:15:18.619

Ingeborg van der Neut: the final result later that it was already almost there. Well.

87

00:15:19.470 --> 00:15:22.869

Ingeborg van der Neut: because this is where the students start to play.

88

00:15:22.920 --> 00:15:31.539

Ingeborg van der Neut: So there's one team on the left-hand side. They have 2 boards, and there's one team on the right-hand side, and they all have cards

89

00:15:31.860 --> 00:15:33.630

Ingeborg van der Neut: and

90

00:15:33.950 --> 00:15:49.840

Ingeborg van der Neut: This is where they put the cards that they do not use, so the other team can pick them up, but they start over here on the top. I hope you can see that, or is that well, anyway, it says, Rna Polymerase, and if they play that card.

91

00:15:49.870 --> 00:16:01.829

Ingeborg van der Neut: and then they can start playing the Exon and the Introns, and whatever, and they have to finish this one first, and then they can play the splicing cards. So it really they you really like a kind of

92

00:16:02.230 --> 00:16:05.270

Ingeborg van der Neut: bring them through the whole process

93

00:16:05.920 --> 00:16:10.659

Ingeborg van der Neut: as soon as they play the spicing cards. The interns get out.

94

00:16:10.710 --> 00:16:20.630

Ingeborg van der Neut: but they have to cap it, and they have to put a poly poly 8 tail. This is all in Dutch. I'm sorry I have the Dutch version, but I have to put a poly 8 tail on it.

95

00:16:20.740 --> 00:16:29.609

Ingeborg van der Neut: and they have to transport it to the cytoplasm, so they need all kind of cars. and they're playing turns one team, then the next team.

96

00:16:29.730 --> 00:16:33.519

Ingeborg van der Neut: I'll just finish the project. First

97

00:16:33.770 --> 00:16:35.700

Ingeborg van der Neut: go to the ribosome

98

00:16:35.810 --> 00:16:47.810

Ingeborg van der Neut: and you start making a protein. You need amino acids for that making the protein and a prismatic reticulum folding. And then here is your final project.

99



00:16:47.980 --> 00:16:55.310

Ingeborg van der Neut: But as you, as I'll show you, there are different cards. The green cards are all Rna.

100

00:16:55.740 --> 00:16:58.219

Ingeborg van der Neut: The yellow cards are proteins.

101

00:16:59.830 --> 00:17:02.419

Ingeborg van der Neut: Purple is things that you need.

102

00:17:02.440 --> 00:17:10.460

Ingeborg van der Neut: You need enzymes for splicing. You need enzymes for folding. You need amino acids.

103

00:17:10.810 --> 00:17:18.540

Ingeborg van der Neut: but these are all things you need. But there's also these cards, the red ones, and that's things you do not want

104

00:17:18.720 --> 00:17:34.200

Ingeborg van der Neut: that's got to put on the other ones play, for example, this is, temperature is too high, and the enzyme denature rate. I don't know what it's called. It's difficult word, but it changes this form. I don't know what it's called in English

105

00:17:44.640 --> 00:18:03.429

Ingeborg van der Neut: but, for example, if the temperature is too low, they have to skip a turn, because then the processes are stopped. If there's a shortage of amino acids, then you cannot make the protein. So it's a. It has a lot of biological processes included in here.

106

00:18:03.510 --> 00:18:06.829

Ingeborg van der Neut: And and the funny thing is that I really start.

107

00:18:06.980 --> 00:18:33.840

Ingeborg van der Neut: why, yeah, temperature too low. You have to skip a turn because they really start talking about the process. There's also the part of the game. You cannot just play it and do nothing you really have to like. Afterwards you have to say? Oh, for example, when I go back to the board where is the light? The the light blue part. Where do we find it in the cell. But this is the nucleus, and this is in a cytoplasm.

108

00:18:34.020 --> 00:18:47.809

Ingeborg van der Neut: You had re, because otherwise they only play like, oh, a game. And I won. Yeah, no. What were you doing? And where do we find splicing? And what's what's to be taken out when you're splicing?

109

00:18:47.960 --> 00:18:54.089

Ingeborg van der Neut: So part of the game. Important part is the discussion afterwards.

110

00:18:54.470 --> 00:19:02.759

Ingeborg van der Neut: because otherwise it's like just a game. No, they really have to look at the port. What were we doing so? There's a lot of questions to go with it.

111

00:19:04.200 --> 00:19:11.189

Ingeborg van der Neut: This is what a teacher's conference, because we do have, like a community of biology teachers.

112

00:19:11.290 --> 00:19:20.019

Ingeborg van der Neut: and there were 750 teachers in the in the conference, and 140 want to play this game.

113

00:19:20.470 --> 00:19:37.390

Ingeborg van der Neut: That was a bit too much, because we only had 48 places. But there were like 48 teachers playing my game. Yeah, so that was very nice. Yeah, well, and then II asked for about 100, maybe 200 copies

114

00:19:37.540 --> 00:19:45.570

Ingeborg van der Neut: well, that ran out of hand, because, I've there are already 800 copies wanted.

115

00:19:45.600 --> 00:19:56.159

Ingeborg van der Neut: So today I got the 1,000 copies at home, and I have to mail them to everybody. So it ran a bit out of hand. Well, that's story of my life. So I'm used to that.

116

00:19:56.340 --> 00:20:03.940

Ingeborg van der Neut: But it was quite fun to see people really interested here. Here you can see the the set of rules.

117

00:20:04.150 --> 00:20:20.690

Ingeborg van der Neut: What we do is they buy well, for the price that it takes to to make it. I mean, I don't make a profit out of it. My husband's here, so I cannot tell that I'm losing a little bit of money on it cannot tell that now.

118

00:20:20.860 --> 00:20:24.049

Ingeborg van der Neut: but They get.

119

00:20:24.210 --> 00:20:35.150

Ingeborg van der Neut: They can print the boards themselves. They can print the rules, and for for the United States I'm going to make it all printable. So

120

00:20:35.870 --> 00:20:45.600

Ingeborg van der Neut: I already made a a a version of that. But there will be a an English version. Where can people can print anything and just play it in there?

121

00:20:45.640 --> 00:20:47.779

Ingeborg van der Neut: In a classroom.

122

00:20:48.870 --> 00:20:56.509

Ingeborg van der Neut: But for, let me see. So this is a close-up. I really like this picture. Melanie made it.

123

00:20:56.580 --> 00:20:59.709

Ingeborg van der Neut: but I really like it really shows the game.

124

00:21:01.070 --> 00:21:05.259

Ingeborg van der Neut: So this was today where they where I got it delivered.

125

00:21:05.360 --> 00:21:13.629

Ingeborg van der Neut: and it was after a year and a half. So ph it was a a good moment to get it all into my car. Finally.

126

00:21:14.210 --> 00:21:22.510

Ingeborg van der Neut: and he you see the Mgen logo on it because they were kind of sponsors to it. So

127

00:21:22.640 --> 00:21:23.910

Ingeborg van der Neut: thanks for that.

128

00:21:24.680 --> 00:21:30.359

Ingeborg van der Neut: what I learned from the master teacher program.

129

00:21:30.590 --> 00:21:35.570

Ingeborg van der Neut: We had a lot of meetings with teachers from other

130

00:21:36.260 --> 00:21:41.700

Ingeborg van der Neut: other countries, and some of the difficulties we face are all the same.

131

00:21:42.410 --> 00:21:48.090

Ingeborg van der Neut: We all students that don't want to do this, or don't want to do that.

132

00:21:48.220 --> 00:21:54.830

Ingeborg van der Neut: Let me see if I can move this down. Yeah,

133

00:21:55.310 --> 00:22:00.789

Ingeborg van der Neut: But, on the other hand, not all school systems are the same.

134

00:22:00.900 --> 00:22:02.069

Ingeborg van der Neut: and I think

135

00:22:02.400 --> 00:22:15.889

Ingeborg van der Neut: while we're discussing it with teachers from all over the world. I thought maybe I should stop complaining because some things are very well organized in the Netherlands. and so that was a good thing to to learn as well.

136

00:22:16.330 --> 00:22:21.800

Ingeborg van der Neut: and there was a lot of emphasis on the the position of girls.

137

00:22:22.680 --> 00:22:32.670

Ingeborg van der Neut: In the system. But I think in our school system. It's more like that the boys are having trouble keeping up. It's the girls that get the highest education.

138

00:22:32.730 --> 00:22:40.719

Ingeborg van der Neut: So that's a kind of interesting. That is, that was something that I thought was remarkable, remarkably different.

139

00:22:41.290 --> 00:22:43.100

Ingeborg van der Neut: And

140

00:22:44.000 --> 00:22:47.660

Ingeborg van der Neut: let's go to the next 10, yeah, these are more like, Oh.

141

00:22:48.140 --> 00:22:49.250

Ingeborg van der Neut: is that

142

00:22:49.290 --> 00:22:57.920

Ingeborg van der Neut: is there in the way is this? I need headlines to create time in my busy schedule. That's one thing I really learned.

143

00:22:57.980 --> 00:23:01.090

Ingeborg van der Neut: and I'm not work made for working alone.

144

00:23:01.170 --> 00:23:17.029

Ingeborg van der Neut: Thankfully, the Abe program I could always reach out to Courtney and canvas, and Libby was always on my side with the design part and the the lost census. I'm much more of a leader than I thought I was, and

145

00:23:17.070 --> 00:23:19.919

Ingeborg van der Neut: when I had like

146

00:23:20.260 --> 00:23:29.650

Ingeborg van der Neut: when I tried to get into the program you had to describe your leadership. And for us Dutchies leadership is like a bit of a dirty word.

147

00:23:30.030 --> 00:23:32.250

Ingeborg van der Neut: Leadership is like.

148

00:23:32.290 --> 00:23:50.419

Ingeborg van der Neut: Well, hmm! You don't like shout out, oh, I'm so good at this, and I'm so good at that. You're more like. Hmm! Well, I'm not too bad at something, and I was like leadership. Hmm, but then I had to like fill it in. And then I realized, well, yeah.

149

00:23:50.510 --> 00:24:03.350

Ingeborg van der Neut: hmm, if I make a game, and I get 800 copies ordered. Hmm, maybe maybe I do know a thing or 2. So it made me realize that I have a influential position

150

00:24:03.390 --> 00:24:15.560



Ingeborg van der Neut: in the biology community in the Netherlands, I mean the the teacher, biology, teacher, community. So there was like a kind of thing I found out about myself.

151

00:24:16.210 --> 00:24:29.710

Ingeborg van der Neut: And then there was, like some other things, I found out, a lot of teachers recognize the misconceptions on subscription and translation. And it seems to be like a worldwide thing that

152

00:24:29.740 --> 00:24:32.180

Ingeborg van der Neut: students mix it up.

153

00:24:32.890 --> 00:24:43.820

Ingeborg van der Neut: and the second one, making a game from sketch to the final project takes up a lot of time, and with that I do not only mean like a year and a half, but also during the week.

154

00:24:43.930 --> 00:24:45.940

Ingeborg van der Neut: It takes up a lot of time.

155

00:24:46.160 --> 00:24:56.329

Ingeborg van der Neut: But there are also things that, for example, Libby use camera. It's a design program and by seeing her using that

156

00:24:56.480 --> 00:25:14.989

Ingeborg van der Neut: she was doing it while we were online, I learned a lot about it. And now I really feel confident about using it. And I use it for all kind of things in school. So that's it really helps me. And for now, for example, I need to send all the packages away, and it learns me about excel as well. So

157

00:25:15.040 --> 00:25:25.029

Ingeborg van der Neut: if there's some side effects that I'm learning when I didn't want to learn, but I had to, and it was useful anyway, and the last one.

158

00:25:25.570 --> 00:25:36.420

Ingeborg van der Neut: because our meeting was in San Francisco. The meeting didn't take place. We were going to the States anyway, and we really really loved the nature there.

159

00:25:36.460 --> 00:25:39.310

Ingeborg van der Neut: So that was also something I learned.

160

00:25:39.540 --> 00:25:49.059

Ingeborg van der Neut: Well, this is what I wanted to tell you and share with you. So. I think I'll stop sharing my screen. Oh, there's a lot of things happening in the

161

00:25:49.260 --> 00:25:50.420

Ingeborg van der Neut: in the chat.

162

00:25:51.320 --> 00:25:54.050

Ingeborg van der Neut: But I'll get out of my

163

00:25:54.170 --> 00:25:55.790

Ingeborg van der Neut: Powerpoint like this.

164

00:25:57.690 --> 00:26:20.169

Raegan Davenport: Thank you so much. Ingeborg like, Wow. That was an amazing journey that you took us through from start to finish. I put in the chat. But I love your last reflection. You were much more of a leader than you thought you were. I love how sometimes we just have to encourage ourselves right? And sometimes we are

165

00:26:20.170 --> 00:26:42.459

Raegan Davenport: rock stars and just don't know it. Sometimes it takes us being part of a project or being in a space that challenges us a little bit for us to let our shine come through. So I love that the game looks amazing. Super excited that you got all of your materials and everything today.

166

00:26:42.460 --> 00:26:52.090

Raegan Davenport: a super more secret insight super. Excuse me, more secret excited that you're making a version for the us teachers.

167

00:26:52.090 --> 00:27:06.950

Ingeborg van der Neut: Yeah, yeah, nice. I started off with that. But because we had that teacher meeting, I had to make it in Dutch. But it's not. It's it's more detailed. And so

168

00:27:07.210 --> 00:27:16.150

Ingeborg van der Neut: this enhanced version is, gonna get back to the English version. So the improved version is coming back to English again.

169

00:27:16.240 --> 00:27:45.879

Raegan Davenport: I'm so honest I have to send those 800 copies out, which is not a small feat, so I am so excited. I ditto what Dr. Kevkar said in the chat. He wants to play it. I want to play it, too. I think some of our other participants said the same thing like, we want to play this game. It looks like the teachers were having a great time. Experiencing your game. So that was such a great example of a way to use

170

00:27:45.880 --> 00:28:10.839

Raegan Davenport: a hand on activity to engage your students and have them. Actually, you know, experience that process. I heard you say, you know you didn't want them to be like, oh, we're playing the game, and I won't like I want you to be able to tell me what happened. We're having these rich discussions afterwards. So all of those things are extremely important. So thank you. Thank you. Thank you. Phenomenal. And I would say, if someone wants to order a copy of your.

171

00:28:10.840 --> 00:28:29.890

Raegan Davenport: but we will. You'll have to let us know when it's ready for us to say, Hey, we got this really cool game. Let us know if you wanna copy way after you mail out your 800 orders way after.

172

00:28:29.890 --> 00:28:51.190

Raegan Davenport: Oh, okay, good. Well, you'll have to. You'll have to keep us posted and and and keep the pictures coming. And just we'd love to see teachers and students engaging with these material. So again, thank you so much for sharing if anyone has any questions, for Ingeborg or about the game, please put them in the chat, because we do have some time set aside for QA.

173

00:28:51.230 --> 00:29:04.179

Raegan Davenport: With that being said, I am going to hand it over to Dr. Kafka. I know you also have some wonderful examples of things you would like to share with us that are rooted in inquiry, based learning

174

00:29:04.310 --> 00:29:11.710

Raegan Davenport: and teaching your students biotechnology. So I'm going to go ahead and let you get started as well.

175

00:29:15.740 --> 00:29:19.599

Declan Cathcart: Super. Thanks, Regan. Let me just share my screen here

176

00:29:21.730 --> 00:29:24.209

Declan Cathcart: at the moment is a blank screen. So

177

00:29:25.670 --> 00:29:27.150

Declan Cathcart: move our side of the way.

178

00:29:27.990 --> 00:29:33.519

Declan Cathcart: So yeah, everyone knows this guy, I think. This was the title of of my first

179

00:29:34.450 --> 00:29:45.550

Declan Cathcart: master teacher, fellowship project and the idea was that we had myself. I worked also with A, with a colleague of Ingeborgs.

180

00:29:45.940 --> 00:29:56.860

Declan Cathcart: And she had so had a sort of a connected project. we sort of this was my my piece, if you like of it.

181

00:29:58.480 --> 00:30:08.620

Declan Cathcart: So for the Mtf. I had put together 3 modules, and which were inquiry based, which were real sort of problem, solving

182

00:30:09.500 --> 00:30:11.080

Declan Cathcart: center of them

183

00:30:12.430 --> 00:30:13.670

Declan Cathcart: very much

184

00:30:13.870 --> 00:30:23.709

Declan Cathcart: as vehicles. For, as I said, for sort of deep learning, deep understanding for students on fundamental, fundamental biological processes

185

00:30:26.040 --> 00:30:43.029

Declan Cathcart: and importantly, sort of lab skills, organizational skills, teamwork. You know, the ability to organize themselves. All this kind of you know what what you might call life skills that I think are go beyond just this, the the

186

00:30:43.120 --> 00:30:51.799

Declan Cathcart: skills that we that we are are helping our students learn. These are these are not just science skills. They're not just not just

187

00:30:52.160 --> 00:31:03.579

Declan Cathcart: biology skills. These are these are like, I said, I think these are life skills. So the first project, I'll I'll give you the overview. First of all, the first module that I developed is on lactic acid bacteria. So these are bacteria.

188

00:31:03.580 --> 00:31:22.969

Declan Cathcart: you probably know, that are involved in lots of food fermentations, lots of cheese making and yogurt making. And, importantly, these days are very much the the focus of interest when we're looking at things like probiotics. And so II the focus was was on, as you'll see on a probiotic products that III developed a a module around.

189

00:31:23.060 --> 00:31:27.150

Declan Cathcart: And also this this particular e coli strain.

190

00:31:27.460 --> 00:31:47.700

Declan Cathcart: It's funny, even if I asked my first year, so they're 12 year olds, and and I asked them the other day to give me examples of of food poisoning, marked organisms, and you'd be expecting Salmonella will be top of the list, and E. Coli for a lot of my students is top of the list, because Ireland has more incidences of E coli outbreaks than any other European country.

191

00:31:47.890 --> 00:31:55.220

Declan Cathcart: Per capita. And the reason for that is because we're one of the, you know, such an intensive dairy producing country mentioned earlier that

192

00:31:55.880 --> 00:31:57.149

I'm trying to connect

193

00:31:57.240 --> 00:32:00.919

Declan Cathcart: biotechnology with issues around sustainability. And

194

00:32:01.070 --> 00:32:07.750

Declan Cathcart: so we do have an issue about water quality, and it's as a result of our intensive agriculture.

195

00:32:08.790 --> 00:32:28.339

Declan Cathcart: situation in Ireland. And so e coli keeps cropping up as a as a problem in in Ireland, not just in Ireland, but like I said, particularly in Ireland. But it's a, it's a, it's a, it's a global issue. And this thing keeps mutating. This particular strain is O 1, 5, 7. That was the target of my my project, but these are called shakeela toxin.

196

00:32:28.510 --> 00:32:33.070

Declan Cathcart: producing strains. They are they're particularly nasty.

197

00:32:33.340 --> 00:32:45.949

Declan Cathcart: pathogen. And so then, wrapped up with that, then was looking at nutritional health health claims. So that's that last piece is sort of an ongoing work. And the what I put together then for the master teacher

198

00:32:45.990 --> 00:32:47.309

Declan Cathcart: fellowship in the end was



199

00:32:47.360 --> 00:32:59.910

Declan Cathcart: the the. The first 2 became extended laboratory modules. So on the way as I said, I was working with Ingeborg. You'll recognize Melanie there on the left. Melanie is the Ab. Coordinator in

200

00:32:59.920 --> 00:33:11.599

Declan Cathcart: in the Netherlands. So the first time that I got to pilot these 2 Mtf. Labs, and I'll show you them in a second was in was with some students in in effect.

201

00:33:11.620 --> 00:33:16.450

Declan Cathcart: where you went to university. I believe in what you said so. It's a small world, right?

202

00:33:16.620 --> 00:33:26.129

Declan Cathcart: These guys were this was in the University of Utrecht. And these guys, were they elected to come to the University to do sort of an advanced

203

00:33:27.450 --> 00:33:31.220

Declan Cathcart: biotechnology module with myself and Andrea.

204

00:33:31.410 --> 00:33:50.389

Declan Cathcart: and so Andrea works in the University there. And this is part one of her roles. She's a a school teacher as well. One of her roles is to bring these kind of students together. These were super students. I mean, these guys were the quickest studies I think I've ever come across, because, like I said, they're they were.

205

00:33:50.580 --> 00:34:07.509

Declan Cathcart: They were all really keen to do this. This is something that they volunteered to do, that they went out of the way to sign up for, and are kind of selected by local schools to send to this program. So so they were incredibly good at, just, you know, picking up

206

00:34:08.880 --> 00:34:21.520

Declan Cathcart: the not just the the the techniques involved, but also the all you know, the the knowledge that goes behind all this. So on the day we did all kinds of microbelgy, we did all kinds of

207

00:34:21.679 --> 00:34:32.699

Declan Cathcart: yeah, I was. We did a Pcr, we did. Oh, we're 2 days I brought it. We brought brought brought it then to science onstage, and we presented the the

208

00:34:32.760 --> 00:34:34.319

Declan Cathcart: the modules, then to

209

00:34:34.400 --> 00:34:36.380

Declan Cathcart: teachers from all over Europe.

210

00:34:37.350 --> 00:34:40.780

Declan Cathcart: then got to sample some of the the work that we've been doing.

211

00:34:42.159 --> 00:34:44.379

Declan Cathcart: and then I got to go to.

212

00:34:47.380 --> 00:35:12.880

Declan Cathcart: On the back of that I got to go. And this was this was you were asking about. You know what motivates you, or or to be sort of a leader. And and II that's it's not. It really isn't a motivation to become leader. II completely hear what you're saying. It's it's almost when I when I when I hear that somebody wants to put me in a leadership role, I break out the cold sweat. That's not. That's not what I consider myself at all as

213

00:35:13.910 --> 00:35:26.479

Declan Cathcart: so. But I really do love, you know, getting together with teachers and working with other teachers and and introducing them to things that just I find really interesting, that work for me in the, in the classroom and and in my lab in my lab.

214

00:35:26.560 --> 00:35:36.499

Declan Cathcart: So so I got to go to to Switzerland then, and to introduce these labs to Swiss teachers, some German and French teachers there at a symposium.

215

00:35:36.640 --> 00:35:48.759

Declan Cathcart: and then, like is said just last year to to Niemagan. So the the most recent thing, then, has been to go to this isn't my current Mtf.

216

00:35:49.080 --> 00:35:51.129

Declan Cathcart: Role is to try and

217

00:35:51.200 --> 00:35:52.380

Declan Cathcart: bring

218

00:35:52.980 --> 00:36:14.370

Declan Cathcart: the foundation labs to Ireland, which we haven't been able to do here largely because there's a the sort of a bureaucratic. I suppose you'd say, stumbling block with teachers using doing genetic modification in schools. So we're sort of adapting the the the labs for the Irish context. So I went to went to the UK

219

00:36:14.980 --> 00:36:23.670

Declan Cathcart: to do some sort of like, I guess you call it skills and technology transfer. So that was really really great. So the first project is about.

220

00:36:24.500 --> 00:36:31.900

Declan Cathcart: as I said, it's about probiotics. This is a Danone product you can use. Iant there's all kinds of these so-called probiotic

221

00:36:32.970 --> 00:36:38.099

Declan Cathcart: yoghurts that are on the market, and from all kinds of different and manufacturers. I don't pick on Dunhoon at all.

222

00:36:38.250 --> 00:36:49.240

Declan Cathcart: and so I use different ones. A yak cold is another one. There's a few, you know. You can pick your whatever one is in your local shop. and the idea is to say that these manufacturers are claiming there are 10 billion

223

00:36:49.350 --> 00:36:51.809

Declan Cathcart: bacteria in these tiny little bottles.

224

00:36:51.820 --> 00:37:02.060

Declan Cathcart: And so that's the that's the hook that I present my students with, I say, do you really do? Do you buy that 10 billion? Is that even possible that there could be 10 billion cells in this little pot of yoghurt here.

225

00:37:02.310 --> 00:37:06.370

Declan Cathcart: So and I say to them, this is your challenge. You've got 2 weeks to figure this out.

226

00:37:06.510 --> 00:37:11.199

Declan Cathcart: What's your what's your you know what kind of strategies, what kind of

227

00:37:11.430 --> 00:37:16.290

Declan Cathcart: techniques do you think you might be able to bring to this? What kind of ideas, what kind of

228

00:37:16.740 --> 00:37:23.760

Declan Cathcart: solutions? Do you think you might bring to this problem? How can we show? How can we test? How can we find out if this is? If this is, if this is real.

229

00:37:24.170 --> 00:37:29.799

Declan Cathcart: So on the way they do, you know, they might do some microscopy. They might do some.

230

00:37:29.820 --> 00:37:35.329

Declan Cathcart: Oh, a lot of mathematics involved. Of course, some guys are straight off the bat they're going. We can just calculate this.

231

00:37:35.430 --> 00:37:40.579

Declan Cathcart: Let's, you know, figure out the size of a and of course I scaffold all this like

232

00:37:40.650 --> 00:38:01.230

Declan Cathcart: sort of steer them and whatever. But some guys just love to take the idea of of a mathematical approach. And see, is it even possible that you could get the volume of one cell and then multiply it by 10 billion? Can you even fill it fitted in this little bottle. So there's a lot of maths involved. There's all sorts of maths involved as well. When you get to the standard sort of microbiological way of of

233

00:38:01.410 --> 00:38:04.000

Declan Cathcart: counting cells. So how do you count to 10 billion?

234

00:38:04.400 --> 00:38:10.590

Declan Cathcart: You do serial dilutions? So there's a long journey. All of the the protocols and the the

235

00:38:11.050 --> 00:38:25.590

Declan Cathcart: teacher support and student worksheets and sequenced into into. I think it's 8 lessons is the way I organize. I organize it. It's up on the Abe website, and it's there for for anyone who wants to have a look at it and adapt it, you know, to your own, to suit your own.

236

00:38:25.720 --> 00:38:28.610

Declan Cathcart: your own students in your own laboratory.

237

00:38:28.820 --> 00:38:34.230

Declan Cathcart: So along the way you can, you can take this. You know. You can extend this as much as you want. You can.

238

00:38:34.690 --> 00:38:36.900

You know, there's a lot of learning to be done about.

239

00:38:36.990 --> 00:38:42.009

Declan Cathcart: you know, cell division and and cell bacterial nutrition.

240

00:38:42.420 --> 00:38:49.620

Declan Cathcart: you know, they can learn skills like like how to, you know, lots of a septic technique is involved. Of course. They do.

241

00:38:50.010 --> 00:39:07.080

Declan Cathcart: They do spread plating. They do colony counting like I said they do. Serial dilution does a lot of maths. And I think that a lot of students and a lot of teachers, maybe biology just don't appreciate that. You know, biology involves a lot of maths, and we shouldn't shy away from that. And neither should our students. So so they do all that. And then they are able to

242

00:39:07.270 --> 00:39:17.350

Declan Cathcart: figure out. Then, actually, yeah. it is possible there are 10 billion or thereabouts cells in a little pot of of probiotic yort.

243

00:39:18.000 --> 00:39:25.419

Declan Cathcart: So there's some my students. This is covid times. These are the kind of plates that they get. and they count the colonies, and they do the songs. The second

244

00:39:26.880 --> 00:39:29.710

Declan Cathcart: lab that I invested like sorry M.

245

00:39:30.130 --> 00:39:39.189

Declan Cathcart: Developed, as I said, is, is really a a means for introducing Pcr to to students. Pcr, I developed this during

246

00:39:39.450 --> 00:39:40.560

Declan Cathcart: during

247

00:39:40.620 --> 00:39:53.330

Declan Cathcart: 2020. So and I, I've picked Pcr for obvious reasons, because you know, nobody heard about Pcr and 2019, and then every student that I had in my in my my room knew about Pcr. All of a sudden, and it's such a great

248



00:39:54.060 --> 00:39:58.559

Declan Cathcart: to. for you know, it brings together so many fundamental

249

00:39:58.850 --> 00:40:07.850

Declan Cathcart: cellular processes that we need to need need our students to understand. So by by, you know, in order to really get stuck into. Pcr

250

00:40:08.210 --> 00:40:15.790

Declan Cathcart: they need to. And again, this is the inquiry based thing they really kind of get invested in understanding what's going on underneath the hood.

251

00:40:15.910 --> 00:40:29.360

Declan Cathcart: And so that means that they need to understand DNA structure. They need to understand DNA replication. They need to understand, you know, thermal stability of enzymes. You know, there's so much going on with Pcr, it just it's it's just a great vehicle, right?

252

00:40:29.700 --> 00:40:34.920

Declan Cathcart: So. But the the context, like I said, is super important. This is real world Irish problem.

253

00:40:35.020 --> 00:40:40.529

Declan Cathcart: where these sugatoxin-producing E coli are are causing causing trouble again and again.

254

00:40:40.610 --> 00:40:43.000

Declan Cathcart: you know, throwing their putting up their ugly

255

00:40:43.310 --> 00:40:57.859

Declan Cathcart: head every now and again. It's in the news in Ireland, and the reason is because these particular E coli strains and their their, you know, versions of them. Their new versions keep arising. They produce 2 main variance factors. One is the sugatoxin.

256

00:40:58.380 --> 00:41:02.570

Declan Cathcart: which is dangerous in itself, particularly for very young and and elderly people.

257

00:41:02.900 --> 00:41:05.280

And another factor that's associated with

258

00:41:05.330 --> 00:41:10.260

Declan Cathcart: pathogenicity of this strain is this Adhesin protein? Right? So these are the 2 genes that

259

00:41:10.300 --> 00:41:12.830

Declan Cathcart: are in the literature. And so what I did was.

260

00:41:13.150 --> 00:41:21.460

Declan Cathcart: I just pulled together as many different papers as I could, and all the sequences that I could find. Of all the different variants of these these E. Coli strains.

261

00:41:21.630 --> 00:41:27.810

Declan Cathcart: and made a bunch of w what we call degenerate primers. Right? So these are. These are mixtures of primers

262

00:41:27.990 --> 00:41:33.840

Declan Cathcart: with slight differences in the sequence. To make sure that at least one of them is going to match

263

00:41:34.770 --> 00:41:39.620

Declan Cathcart: whatever kind of known strains, known mutants there are out there. Right?

264

00:41:39.840 --> 00:41:50.280

Declan Cathcart: So this is, you know, these, this, this is a, this, this works in the real world, right? You could take samples from suspected e coli contaminated

265

00:41:50.340 --> 00:41:51.969

Declan Cathcart: water, and

266

00:41:52.170 --> 00:41:54.149

Declan Cathcart: if there is anything

267

00:41:54.870 --> 00:42:02.500

Declan Cathcart: you know, any e coli strains amongst the the ones that we know that are causing trouble out there. Then this Pcr should pick it up.

268

00:42:02.980 --> 00:42:03.940

Declan Cathcart: So

269

00:42:04.130 --> 00:42:11.359

Declan Cathcart: again, you know, you know, with some students with some groups. I've I've really gone into this in detail with them, with others.

270

00:42:11.370 --> 00:42:14.599

Declan Cathcart: you know. I don't know the time, or it's not their level.

271

00:42:14.660 --> 00:42:24.799

Declan Cathcart: So you know, like I said, there's room for for maneuver. Y in some cases it's just, you know, these are the Pcr primers. What you expect to get then is you get 2 bands.

272

00:42:25.120 --> 00:42:40.060

Declan Cathcart: On the right hand side you can see the 2 bands for the 2 different genes, or you can do a single band. Pcr, which is slightly easier and less more robust, let's say. But this Pcr works great. It's it works in student hands. No problem.

273

00:42:40.160 --> 00:42:48.540

Declan Cathcart: so they yeah, like, I said they. They they really kind of get a lot out of out of the whole experience.

274

00:42:50.350 --> 00:42:51.800

Declan Cathcart: There you go. Thank you very much.

275

00:42:54.170 --> 00:42:55.470

Raegan Davenport: This is my.

276

00:42:55.850 --> 00:43:02.280

Raegan Davenport: thank you for sharing Dr. Cat's heart. Again, another example of

277

00:43:02.480 --> 00:43:27.419

Raegan Davenport: a real world issue that students are able to explore. While they are learning about biotechnology and micro biology and all of these different areas of science. So I love that about the 10 million cause. I often, as an adult wonder that? I don't know if the market in the Netherlands and Ireland is as vast

278

00:43:27.420 --> 00:43:32.649

as it is in the Us. But there are probiotics for everything you can

279

00:43:32.780 --> 00:43:55.959

Raegan Davenport: keep them in the refrigerator. Don't keep them in the frigid, or you can get them in yogurt. You can eat this, you can eat that. So? That is interesting. I found myself paying a very close attention when you send that like. I've often wondered that myself. So what a great great you know, sort of issue or challenge to get to your students to have them work through and use math and all of the other different

280

00:43:56.160 --> 00:44:04.229

Raegan Davenport: subject areas, thinking about all of that, how all of that goes into. So thank you both so much. For sharing

281

00:44:04.410 --> 00:44:32.839

Raegan Davenport: these rich examples, and ideas and projects with us, and the way that you are able to use them with both students and other educators. So we have a relatively small group here. I don't know if anyone I've going to look in the chat, but I don't know if anyone has any questions that they would like to ask either of our panelists today. Feel free. Now, if you would like to unmute yourself and ask your question if you have one

282

00:44:32.880 --> 00:44:36.780

Raegan Davenport: or if you feel more comfortable putting it in the chat

283

00:44:40.260 --> 00:44:43.310

Raegan Davenport: to make my screen big so that I can see everyone

284

00:44:50.230 --> 00:44:57.130

Raegan Davenport: no question. So I have a couple of questions that I am wondering about. So

285

00:44:57.490 --> 00:45:09.199

Raegan Davenport: you all have made these wonderful projects and resources. Have you had the opportunity to share your projects

286

00:45:09.210 --> 00:45:32.520

Raegan Davenport: with teachers and students outside of your Abe site. So I know you both said that you went to some conferences and you presented. But do you have any plans to continue to share the work that you've done? Or are you in the process of developing any more work that you're hoping you can share. With educators around the world.

287

00:45:39.540 --> 00:45:49.109

Ingeborg van der Neut: The yeah, definitely, we both are because we said we were gonna meet in Finland. So obviously, we gonna present it Europe wide

288

00:45:49.250 --> 00:45:52.619

Ingeborg van der Neut: but I'm also gonna be on a

289

00:45:52.920 --> 00:46:00.210

Ingeborg van der Neut: it's a kind of AV small conference in March, I think.

290

00:46:00.280 --> 00:46:02.940

Ingeborg van der Neut: I'm gonna present a game as well.

291

00:46:03.660 --> 00:46:13.390

Raegan Davenport: And yes, I do always have plans for new things, because I think I wanna do something on which is very difficult, but the immune system.

292

00:46:13.760 --> 00:46:18.269

Ingeborg van der Neut: That's my next go to

293

00:46:18.280 --> 00:46:32.669

Ingeborg van der Neut: but but that's a very difficult thing, because I'd it's very complicated if you want to involve all the different types of sales? It's it's hard. But where do you like?

294

00:46:33.190 --> 00:46:35.769

Ingeborg van der Neut: What do you cut off? And what do you keep

295

00:46:35.830 --> 00:46:42.539

Ingeborg van der Neut: in your That's a bit of a difficult thing with immunity. So but it.

296

00:46:43.460 --> 00:47:11.980

Ingeborg van der Neut: I wanna get it. So challenge, I was, gonna say, sounds like, that is your way of saying that you are in the planning stage or the ideating stage of how you're going to make this all come together because I have full faith in the fact that you could make it happen after seeing your game like. It's with screws and kind of screwdrivers. Not that the whole screwdriver. But you got those bits is that called bits as well.

297

00:47:11.980 --> 00:47:16.959

Ingeborg van der Neut: But yeah, so they have to that you can put on there. Yup.

298

00:47:17.290 --> 00:47:20.040

Ingeborg van der Neut: so that's like an Antigen antigen.



299

00:47:20.190 --> 00:47:22.480

Ingeborg van der Neut: We're thinking about something like that

300

00:47:23.170 --> 00:47:29.800

Declan Cathcart: sounds cool. Yeah, I'm right there with ingabort. Yeah, I'm I'm totally fascinated by the immune system.

301

00:47:30.870 --> 00:47:33.130

Declan Cathcart: And it's such a

302

00:47:33.250 --> 00:47:58.220

Declan Cathcart: constantly quickly changing area. And it's so complicated. But it's so interesting because it's so complicated. And like, like, you say, it's very hard to know where to go. Okay, I need to stop here because this is gonna overload students. But but then you find it very hard because you want to tell them about this other cell that does this amazing thing and how this interacts with this cell. And so it but it it can get out of hand. I'll know exactly what you mean. I'm I'm looking at

303

00:47:58.570 --> 00:48:01.829

Declan Cathcart: at a another Pcr kind of

304

00:48:03.690 --> 00:48:06.530

Declan Cathcart: a backstory, I guess.

305

00:48:06.630 --> 00:48:13.939

Declan Cathcart: where we're looking at with Ab. Ireland, we're looking at developing a lab that focuses on detecting

306

00:48:14.710 --> 00:48:20.719

Declan Cathcart: Covid. But other viruses as well in in sewage, just as a way of monitoring.

307

00:48:22.320 --> 00:48:27.960

Declan Cathcart: Yeah, via viral loads and viruses that are circulating around

308

00:48:29.760 --> 00:48:33.580

Declan Cathcart: around. Yeah. you know, around the country around the world

309

00:48:33.730 --> 00:48:36.390

Ingeborg van der Neut: does the Government do that in Ireland.

310

00:48:37.220 --> 00:48:41.789

I'm it does. I don't know if the Government are doing it. I think that there are. There are

311

00:48:43.350 --> 00:48:50.459

Declan Cathcart: research projects in in new city and the University in Dublin. That's why it's of interest to us, because it will it. It connects

312

00:48:50.590 --> 00:48:56.880

Declan Cathcart: real world research that's being done in the in the labs in Ucd with with, you know, with

313

00:48:57.400 --> 00:49:10.849

Declan Cathcart: second, were a second Level student, so that they they again. You know, it's it's trying to bring authenticity into into the work that they're doing. So we're because 9 elevens they do so they produce. They. They have like a report every week.

314

00:49:10.960 --> 00:49:18.680

Ingeborg van der Neut: Oh, where they they. When I tell, yeah, it's going up or it's coming down, or this region has a lot of

315

00:49:18.700 --> 00:49:24.700

Ingeborg van der Neut: virus in the sewage. So it I know that they they do it in the Netherlands.

316

00:49:24.710 --> 00:49:30.259

Declan Cathcart: Yeah, maybe here, too, I'm not sure this is just it's it's something that we're looking at at developing here anyway.

317

00:49:31.930 --> 00:49:32.800

Declan Cathcart: And then.

318

00:49:34.620 --> 00:49:41.609

Declan Cathcart: yeah. So also, like, like, I said, trying to look at at different ways of

319

00:49:42.690 --> 00:49:55.859

Declan Cathcart: bringing students into into the university to do genetic engineering protocols. That's the only thing we're trying to do which I know. Like, you know, a lot of Ab teachers would already be doing this in in their, in their

320

00:49:56.070 --> 00:49:59.509

Declan Cathcart: with their students doing the the Rfp

321

00:50:00.180 --> 00:50:10.069

Declan Cathcart: transformation of E coli. So we're looking at doing different kind of versions of that. And and coupling Pcr with that as well. Collie, Pcr, and that kind of thing.

322

00:50:10.710 --> 00:50:15.089

And yeah, I've done quite a bit of of bringing these the labs to

323

00:50:15.240 --> 00:50:25.329

Declan Cathcart: to not just students. So my students, but also students in in New City that we brought in I mentioned the students in in the Netherlands, but also they're but teachers. So

324

00:50:25.400 --> 00:50:38.849

Declan Cathcart: 2 2 kind of distinct groups, one of the student teachers that are in the the university that I work with. I bring them in to the Angen Labs, and we spend a day doing a deep dive into all the the 2, the 8 2

325

00:50:39.210 --> 00:50:47.260

Declan Cathcart: Mtf. Labs that I've involved in and and but also in service teachers as well. I've been trying to.

326

00:50:47.330 --> 00:50:53.290

Declan Cathcart: And I've been doing workshops with with them last year and gonna do another one this year. So yeah, trying to

327

00:50:53.480 --> 00:50:56.089

Declan Cathcart: try. And just, you know. trying to spread the word.

328

00:50:56.950 --> 00:51:21.759

Raegan Davenport: I love hearing that. Because the work that you all both are doing is it's phenomenal. And so I have one last question, and that is if teachers are feeling inspired because they have seen all of the wonderful work that you've done. If you could leave them with one sort of bit of advice as they. Consider

329

00:51:21.760 --> 00:51:37.799

Raegan Davenport: if this is something that they would like to do, or a journey they would like to embark on. What would that tidbit of advice be in Gabor? Do you have any advice? If folks are feeling so inspired after hearing about the work you've done?

330

00:51:38.550 --> 00:51:40.860

Ingeborg van der Neut: Well, I think a

331

00:51:41.430 --> 00:51:53.199

Ingeborg van der Neut: I'm not a huge fan of Nike Nike just doing might be a good advice, and don't be afraid to make mistake if it doesn't work in the first time. That's okay.

332

00:51:53.420 --> 00:51:57.460

Ingeborg van der Neut: I mean, it's it's also okay to show students. That's

333

00:51:57.510 --> 00:52:14.720

Ingeborg van der Neut: it's okay to make mistakes. So just try it. And the next time it might go better, or you decide. Hmm, no, this is not it. Let's go somewhere else. But sometimes we're like we think it has to be perfect, and because it never is, not, especially not in the first time.

334

00:52:14.790 --> 00:52:21.559

Ingeborg van der Neut: You stop doing it. And it's like with our students, our students. We also want them to make mistakes

335

00:52:21.660 --> 00:52:25.529

Ingeborg van der Neut: sometimes it's more. No, I think not. Sometimes

336

00:52:25.880 --> 00:52:31.730

Ingeborg van der Neut: for me as a teacher it's more important to see what they do not know, or why they make mistakes.

337

00:52:31.820 --> 00:52:42.829

Ingeborg van der Neut: and not that one that raises his hands and gives the correct answer. And that's exactly the same with ourselves. We are allowed to make mistakes and just do it.

338

00:52:43.330 --> 00:52:52.519

Raegan Davenport: I love that. Just do it. That is succinct into the point, straight to the point. What about you, Doctor Cathcart, any advice? If anyone

339

00:52:53.160 --> 00:53:02.070

Declan Cathcart: a related a related idea that I think that like we're, we're, you know, we're we're always trying to engage our students. And I think maybe a better word to think about

340

00:53:02.090 --> 00:53:08.839

Declan Cathcart: rather than just engagement, because I think that that the tendency is that we kind of focus on. Just it needs to be fun then.

341

00:53:08.850 --> 00:53:14.880

Declan Cathcart: and needs to be more than fun. I think what we need is we need to rather than just engage. We want our students to be perplexed.

342

00:53:14.900 --> 00:53:19.139

Declan Cathcart: We want them to. We do want them to struggle, and we shouldn't shy away from our students

343

00:53:19.150 --> 00:53:21.379

Declan Cathcart: struggling. But it needs to be productive struggle.

344

00:53:21.470 --> 00:53:26.010

Declan Cathcart: And so sometimes I think we underestimate what our students are capable of.

345

00:53:26.120 --> 00:53:30.150

Declan Cathcart: The only issue really is that we need to provide the right kind of

346

00:53:31.750 --> 00:53:33.930

Declan Cathcart: the right kind of context.

347

00:53:34.740 --> 00:53:38.030

Declan Cathcart: And we need to give students ownership.

348

00:53:38.270 --> 00:53:59.149

Declan Cathcart: And if we can give, do those things. And we we're, you know, and you know we're we're experienced educators. So we know how to scaffold things to support our students. We don't leave them floundering. We don't leave them, you know, lost but you know, students surprise us. You know we we we'd be. We shouldn't forget that.

349

00:54:00.350 --> 00:54:09.499

Declan Cathcart: It's easy to kind of like, I said, underestimate our students. And they're they're they're they can do amazing things, you know, if they're given. Yeah, the right opportunity and the right support.



350

00:54:10.380 --> 00:54:16.419

Declan Cathcart: And if we have the time. Ill really think you know we we can. We can. We can expect great things from them.

351

00:54:17.130 --> 00:54:40.859

Raegan Davenport: I love that. So you heard it here. Just do it. And Doctor Cathcart is saying, you know, we we are experienced. We know this. It's okay to make mistakes. Let's just, you know, go for it. Basically, I love that. I love that. So as we come to the end of our time together today, I'd like to say a final and huge Thank you to our panelists.

352

00:54:40.860 --> 00:54:58.029

Raegan Davenport: Ingabort, and Dr. Cathcart. We hope that this roundtable was beneficial for you, and we hope that it gave you our audience, our panelists, some ideas for your own classrooms, or for experiences that you might want to craft as well.

353

00:54:58.120 --> 00:55:21.590

Raegan Davenport: So next month in February. We are looking at exploring precision medicine for our roundtable. So stay tuned for more information about that. And as we all know, the AV teacher community is what makes this program thrive and grow. And so we want to thank all of you for being here and for everything you do for your students all over the world.

354

00:55:21.990 --> 00:55:46.070

Also a huge thank you to the Amgen foundation for supporting the Amgen biotech experience. It's been my pleasure to spend this time with you today, and I hope you all have a great rest of your evening, or in Dr. Cathart and Ingleworth's case night, because it's late where they are at. So thank you so much. Thank you both so much for joining us, and if you have any

355

00:55:46.070 --> 00:56:07.740

Raegan Davenport: questions please feel free to reach out to the AV. E program office. I believe Sarah put the our email in the chat earlier, but you both did an amazing job. Great presentation. Thank you, Sarah. And great great overviews of your experience. So I hope everyone takes care and has a wonderful weekend. So thank you both so much.

356

00:56:08.160 --> 00:56:18.310

Raegan Davenport: Thank you. Rigid. Thank you, Sarah. Thank you. Bye, bye, everyone. Thank you.

357

00:56:18.450 --> 00:56:27.940

Declan Cathcart: Can I have your email address? Can we put it in the chat here? Or, yeah, I can. Yeah, absolutely. It's it's it's simple. It's it's my name, declan.passcard@gmail.com.