Teachers talking about Knowledge Building

BP: **[00:00]** I'm—I'm Ben Peebles. I teach Grade 5/6 at the Eric Jackman Institute of Child Study. And at first, back when I was just starting out as a teacher after I had just done my—my teacher training and all of that, I—I probably thought all of this was a little bit nuts, right? Like, I did not understand this at all, to be perfectly honest. And then ...

Male: (Inaudible) people have questions.

BP: ... later, as I watched colleagues and as I watched people like—like Zoe who were in the school already teaching in this way, I just—I saw the—the power in it and I think the—the power in it is what you saw from the students speaking on the screen. This is really how they talk. This is really what they're capable of. And I think that's—that—that's what was so amating—motivating as a teacher, is once you see that, you have to have your students doing that, too, right? You just have to because you see that that's what students of this age are capable of.

So, and I think that's the thing about teaching, and to—the thing about imagining your class as a knowledge-creating organization, imagining it functioning in that kind of way, not as a question-answer type of a place; not as a place where tasks are given, but as a place where children come up with what they want to know and where they really need to know things.

I think what I'm constantly surprised by, and when I go back to the school this afternoon, what I will be constantly surprised by is the depth that children are wiling to go and the depth that they just have to go to. And I guess maybe before I pass back over, and just to give one example.

Last year I was(?) teaching Grade 5 and 6, so electricity is part of that curriculum, right? So we were working on electricity, and you know, the children have all sorts of, you know, materials to experiment with and—and they're—they're learning about circuits and all of that. And what they start to realize as we go is that they need to know about atoms, because they've learned somehow that electrons are important to electricity, and they need to know about atoms, and they need to know about what electrons are and how they interact with atoms, and they need to know all of this. And as our unit proceeded, the curriculum says the children should learn about AC/DC power and they should learn about circuits, right? That's what it says, right? They should basically know how to sort of wire a light bulb, and that's about it.

But the students had to know. They just had to know. So they, you know, formed groups to learn about atomic structure. They formed groups to learn about all kinds of things. You know, we had a group that was trying to figure out what quarks were and all these—this sort of thing, and this is Grade 5 and 6. But it wasn't anything that I was making them do. It wasn't any task that I was giving them in—giving them. It was what they needed to know.

And so, you know, as I—at the beginning of that term, you know, when it was time to work on this, I was writing on their schedule, you know, "Electricity is what we're going to be working on." And you know, by the end we were writing, I was writing, you know, "Physics" on the board. And the whole unit just changed, right? Into something that went far deeper than the curriculum, actually.

So (inaudible)?

[Talking over each other]

GW: Sounds good. Yeah, (inaudible) physics.

BP: Yeah. Yeah, physics.

GW: Hi, my name's Glen Wagner and I've been a knowledge builder now for—it's my fourth year, four and a half years of working with Marlene and bringing knowledge building to my classroom.

And one of the things in my practice over the last 24 years, and I—I've always tried to get kids to ask questions, but I've always had such a difficult time in what to do with those questions. I mean, and I'm not talking about questions of clarification. We're talking about questions that really have an interesting impact on what the kids want to learn about or perhaps the nature of the universe we live in. It could be questions as diverse as—and I'll get non-sciencey here, but you know, you know, why don't democracies fight each other? Or you know, why is exercise good for you? I mean, all these little, simple things that, you know, you really start scratching your head. You think, "I—I don't know," you know?

And so, these are the kind of questions that the kids also do come up with. But in my world specifically, in the area of—of physics, I try to introduce my students to the idea of modern physics. What are the experts looking at right now in the last five years? What are some of the big questions that they're grappling with? Can my students grapple with those questions as well? And I thought, "Yeah, I think they can. They might not be able to do it at a **[05:00]** really deep, mathematical level, but they certainly can look at the problems conceptually."

So what I did over the last four years is I've set up a process in my classroom where I expose the kids to different areas of modern physics. One could be on a, like, black holes and galactic formation. Another one might be dark energy and dark matter. Another one yet: where did the universe come from? And also, the physics of the really small, the quantum world.

And so the kids, on their own choice after they've been exposed in a variety of ways, both through video or readings, pick an area that has really turned their crank, that has really turned them on, something that really interests them. And so, they get into these individual groups, and then the beautiful start—beautiful things really start happening. That's when they start asking these really cool questions that I really would have never thought to ask. And so, I ask them. You know, "What are some of the really interesting questions in these areas that you find most interesting?"

And so, they come up with a set of questions, maybe a half a dozen to a dozen questions. And then they have to pick within their groups, "Okay, what questions do we want to start with?" And you just stand back and let them go crazy, and they do a phenomenal job with it. And I often augment their work with trips to the Perimeter Institute, which is just up the road from where we are, or the Institute for Quantum Computing. Now, we're awfully lucky. We can actually go there for a day trip, but sometimes you can get guest speakers that come into your classroom as well.

So—so they do this over the span of about six or eight weeks and at the very end they create something called an e-portfolio, which is a summarization of the work that they all did. So I simply ask them, "What areas did you go really deep in that really, really interested you the most and you thought you made your biggest advances?"

And I won't go into it too, too much except to say that it—just recently over the summer, I—I had a look and I tried to categorize what the kids were learning on the one hand and what the experts were saying on the other. And so, all I did was try to very simply match up from an expert's source to what the kids did in here. And not only did it match but at most of the time, it actually exceeded the knowledge in this first-year university textbook. And so, I knew that they were onto something and I knew that the kids were learning at an incredibly deep level.

And it was a question that was posed to me about four years ago from somebody at the Perimeter Institute and he asked me. He says—and he looked at this screen of all the notes. He says, "Glen, how do you know they're learning something?" And of course, that was my driving question, right? Just the way the kids have their own driving question. And so, it's something I've been humming and hawing about and worrying about.

So if I wanted to talk to a teacher, some of you guys, and say, "Well, how do you know they're learning something?" Then I have an answer for you, okay?

I'm going to leave you with this. I at one time, this was about two years ago, I had a student. I was—well, I was showing a video to my class. It was just the follow-up to something and I—I wish I could remember what it was. I think it was on dark matter, dark energy. It doesn't really matter. But at the end of the video, the kid in the back comes up and he says, "Mr. Wagner, Mr. Wagner, you—you know the question that that guy asked duh duh duh duh duh?" And he says, "Yeah, yeah!" He says, "That was my question. I came up with that question," right? Right?

[Laughter]

So these beautiful things really do happen. And you know, there's nothing more thrilling, I don't think, than you playing in the same sandbox as the experts are. And all of a sudden, you really feel that, you know, you're part of not only of a community within the school, but you're also a community within the entire planet Earth who are dealing with these really interesting questions.

So that's what gets me really excited about knowledge building and I try to keep adding little bits and pieces to my different classes. And it's a slow process and I'm getting there and—but it—it's a matter of now building down. So going from the senior physics stuff, I go down to now I'm doing it in health care and I'm hoping this year to do it in my Grade 9 science class.

So anyway, if you have further questions about what it is that—how I specifically set it up, I'd be happy to tell you. It's—it's not as hard as you might think. The hard part is just thinking to yourself, "Yes, they can ask those questions." And they will work on them. It's not like you give them a question; they're going to go off and, you know, you know, play something on their—play Facebook. They don't. They really get into it if you give them the chance to ask those questions that really interest them.

Okay, that's mine.

[Applause]

ZD: Hi, everybody. My name is Zoe Donahue and I teach the Grade 1 class at the Jackman Institute of Child Study.

I think for me in Grade 1, it's not hard to get the enthusiasm you want children to have. They are nothing but enthusiastic and curious. They really come to school ready to ask questions, and I think that often the message kids get at school is the teacher has the questions and we're just going to find the answers **[10:00]** to them. Or even a process where kids' questions are asked but they're never really answered. They're asked, they're put on a chart, they're stuck on the wall, and there they live. And then really, you're going back into the questions the teacher has that answer the very sometimes narrow requirements of the curriculum.

So I think the big difference for knowledge building is that the children's questions are at the centre of what we're doing and that the children's questions are answered by the children. So beginning, as Marlene said, with what are the children's theories? Often, what are their misconceptions? Because if we don't hear their misconceptions, we can't work with their ideas. They will hold on to those misconceptions if we don't let them say them, and we can teach all we want, and in the end they're still going to think the same thing that they thought before.

So having the children's misconceptions come out, hearing their theories. My little six-year olds will say the words, "My theory," and they'll say, "My theory is."

And then somebody else will say, "I'd like to build onto that," and they will say what they think. "I agree with what so-and-so said, but," and they'll tell something else.

And then somebody will join in and say, "Well, I noticed something." We were studying water last year, so one of the children might say, "Well you know, the other day at recess, the yard was all wet from the rain and then at the end of the recess it was dry. Here's what I think happened to that water."

And then somebody else will talk about condensation that happens in their bathroom mirror. "You know, after my shower it's all wet on that mirror. Where's that water from?

And another child will say, "Well, I was in the car the other day and I drew on the windshield. There was water inside the car. How did that get there?"

And so, you see the conversation build, where children are bringing in their own experiences. They're saying what they think. Children think about these things all the time. They live a life of question and curiosity. We need to bring that into the classroom.

So even at Grade 1, where we start off with a lot of conversation, we do use Knowledge Forum as well, not until later in the year because most of them when they come in actually can't read yet. So once we get them reading and writing, they start to use Knowledge Forum. Their ideas are in this public space where everybody can read them and build onto them there. We do experiments, we go on trips, we have experts come in.

And in the end, the knowledge that the children build as a class and as a community stays with them. And parents tell me that their kids come home and talk about what they're learning at the dinner table. They ask their parents questions. They become more observant. So knowledge building really pervades the children's lives. It's not just something you learn at school. And we find at our school that children care about topics they studied in kindergarten. They still care about them in Grade 6. It's not, "I learned it, I was tested, and then I forgot." It's not that at all. It stays with them.

And even as a teacher, the things I teach stay with me, and I find that I continue to be interested in them and I notice articles in the newspaper or a conversation will pique my interest because I taught it in this way. So even as a teacher, the learning is—is better. It's exciting. It's always different. And I wouldn't teach any other way.

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