

Shannon Simonelli: [00:34]

Well, I'd like to welcome our listeners back to our third and final section of our conversation. And I'd like to start with a question I posed before we took the break, which is how does all this research on mirror neurons really link to practice and our responsibility as educators and learners in the classroom. So if you could talk about that, that'd be great.

Robert: [00:55]

Well, what I said at the beginning was that I think that the twenty-first century theories of teaching and learning which will probably begin to emerge maybe even before this decade is out, but certainly within the next ten or fifteen years,--if you're a reasonably young teacher and you've got fifteen or twenty years left in your career,--is that this research will profoundly affect how we view teaching and learning. So it's very obvious that right off the bat, it isn't so much, well, you know--this is what is part of the folklore of teaching--that it isn't so much what you say, but what you do,--so that we begin to think that teaching is really about all the stuff we tell the kids. But with the mirror neurons, a whole lot of it is simply about how we move around in the room. How we interact with other people. Day in and day out, a thousand hours a year. If you're an elementary teacher you come in to this kid's brain for a thousand hours. And you're watching thirty of them, but they're only watching one of you.

Shannon:

Right.

Robert:

So that how you act and how you treat people, they're observing you. Day in and day out. And that profoundly then affects the way they operate. I think that most of us when we begin to think back of even little mundane things like how you hold a cup when you eat and how you handle the cutlery and how you tie your shoes and how you move around in the house, if you stop to look at it and then look at your parents.

Shannon:

Yeah.

Robert: [02:55]

You know, how they do it. And nobody told you this. It was just that you were in the house day after day after day and you observed how your parents talked to each other and how they answered the phone, and that bit by bit that what we are, that we're part of the genetics of our parents, but we're also part of simply observing the behavior of our parents. And I think that if you stop to realize that very much of what teaching and learning is about is simply the observation of other people. You know, my first four years of teaching I taught in a one-room country school. And I had thirty-six kids in eight grades. And so I stayed there for four years, and on the last

day of my fourth year--I was gonna go to a different school the next year, but I had some kids who had been with me for four years, you know; they were the eighth graders. And on the last day what they had done is they'd gotten a hold of my wife and they'd gotten this suit that I wore quite often. And so when I came in to teach and the kids showed up, they told me to go sit down on Henry Schultz's desk. And I said "Well, what's going on here." Well then Henry Schultz walked in from the other room, and he was a fourteen-year-old kid who'd been in the school for four years. And he came in in my suit and he taught the day. And it was an absolutely dead on. He had my mannerisms down to a T. You know, and it was a remarkable experience. And then when mirror neurons were discovered a few years ago, I suddenly realized what had happened, that they had just observed me all those years. And so I think that that's kind of where you have to begin with this. And the kids aren't only interacting to what you're doing, but they're interacting to each other's behavior. So it is the nature of the behavior, the sort of the atmosphere of the environment that a teacher sets in the classroom that the kids work together.

Shannon:

That's right.

Robert: [05:09]

But they get up and move around and they observe each other. I think that cooperative learning takes on an entirely different role here. When you begin to see four or five kids are working on a project, and different kids have different abilities in this team, and they have different roles that they play. Cooperative learning emerged not out of mirror neuron research, but this seems to be a good way to do it. And now when we look at it in the context of what mirror neurons are telling us, it's as if, my God, there's an underlying biology to this.

Shannon:

That's so exciting. And also, as you were talking about that in terms of cooperative learning and different kids have different approaches to solving a problem or answering a question, or different ideas come to them because of multiple intelligences and how different people process information. That also links in with what you were saying about "You have a banana in your head because I put one in your ear." So I can get information as a learner. As a student, I could get information from other kids in different ways which would help me fill out my understanding.

Robert: [06:19]

That's right. And this is profound when you stop to think about it.

Shannon:

Yes. It's very exciting.

Robert: [06:25]

Let me add something else here. An interesting phenomenon would be the middle-school years, or the early adolescent years when all of a sudden the kids are uninterested in the movements of their parents and teachers and other people like that. And they become profoundly interested in the movements of the Britney Spears and the Paris Hiltons and the football players that they emulate. And so what's going on here? I think all of a sudden that they spent the first ten or eleven years of their lives, they spent these years basically observing adults, that they had to learn how to do all these things. They would watch adults do it, and then their mirror neurons would tell them, they'd practice it over and over and over, and see this practicing going on. But all of a sudden when they come in to their adolescence, they realize I'm not gonna spend my life with these people. I'm not gonna be around my, I'm not gonna stay home the rest of my life.

Shannon:

Right.

Robert: [07:29]

I'm gonna marry outside of my family, or bond outside of my family. I'm gonna work with people who aren't part of my family. So who I'm going to work with are these people I'm going to school with now. So that all of a sudden then, the group that they really want to observe is their own group. And so they begin then to become very much concerned about mimicking the clothing styles and the movements and the patterns that their peers are doing. Does that begin to make some kind of sense?

Shannon:

Well, yes it does. And it's totally in support of what we know about human development.

Robert: [08:09]

Well, when kids go in to their adolescent years, the idea then of a teacher standing up in front and every observing the teacher.

Shannon:

Right.

Robert:

Because the teacher then becomes the prototype of human adults. Do you follow that?

Shannon:

Yes. Absolutely.

Robert: [08:25]

But when you move in to adolescence, then, the shift then is that they need to be in an environment where they can spend a lot of time observing each other, that it isn't the teacher who becomes less important to them. That raises this really interesting question. If you ask the typical high school student what's more important to you, the curriculum or the extracurricular program? He will almost invariably tell you the extracurricular program.

Shannon:

'cause that's where they're getting a lot of their peer interaction.

Robert:

That's right. And they're getting to make their own decisions, you know? The coach can tell you how to shoot the free throw, but he can't shoot the free throw for you. And the drama director can tell you on this place in the play you're supposed to be over here and then the phone is gonna ring, and then you walk over there and pick up the phone, and then this is what you say. All right. So now you're in the play, and the phone doesn't ring. What do you do then?

Shannon:

Right. Right.

Robert: [09:27]

Then you have to improvise, don't you? And so the excitement of that is why did they do that. Or to be on the newspaper staff and have to come up with another issue every two weeks or so. All of these things for kids is that they've mastered them in the first ten years of their lives; they've kind of mastered the very basic adult moves, and then in the next ten years of their lives they're basically transferring this in to their own life and in to their own set of movements.

Shannon:

And their way of being in the world and interacting in the world.

Robert:

Yeah. And to realize that I don't need to know my parents' moves anymore because I'm not gonna be living with them.

Shannon:

Right.

Robert:

And the sooner the better.

Shannon:

Right.

Robert: [10:13]

And the parents feel the same way. But I'd better get myself in sync with the movements of the other people. And you know, it's kind of interesting. At that context is that for example, when my wife and I go dancing, that what you have to realize is that if I move my right foot she moves her left foot.

Shannon:

Right.

Robert:

Or if she moves backwards, then I move forward. So not only are we dealing here with a kind of mirror neuron mimicking, but it's in reverse and backward. Otherwise the old Ginger Rogers, you know, that did all those movies with Fred Astaire, and she said that she could do any dance step that Fred Astaire could do, only she could do it backward and use the opposite foot.

Shannon:

And in high heels.

Robert:

Even better.

Shannon:

Right.

Robert:

But the reality is that now the question is now how do I know how she, where she's gonna move? At one point, if you're gonna be together for a long period of time, if your commitment group is these kids you're going to school with, you have to kind of be able to sense what they're thinking. And when you stop to think of all the issues that adolescent kids have,--what is she thinking of me, or what is he thinking of me,

Shannon:

Exactly.

Robert:

--All that kind of stuff is going on. It is then somehow integrated in to this incredible system that deals with empathy, that deals with multiple sensory input. And basically that our behavior then is the function of the behavior of other people.

Shannon:

That's so interesting.

Robert:

And just how you get along with people.

Shannon:

Right. And part of the image that came up for me as you were talking about in essentially the first ten years of life we're really needing the input of what does it mean to be an adult? How do we develop those basic skills/ How do we find our way in the world? The second ten years is more about how do I, what's my style of that? What's my interaction with my peer group? And that brings me back to what we talked about early, in terms of the skateboard. It's like, the first ten years of your life is learning how to just be on the skateboard and move forward. The second ten years is like developing that sense of grace and style—what's my own aesthetic in terms of doing this. Is that true? Is that how you would ...

Robert: [12:40]

That's right. Yeah. That's beautiful isn't it?

Shannon:

Yeah.

Robert: [12:44]

It's elegant. You know, and when you begin to think of this, it takes twenty years for our brain to develop and the other big question is: How is your brain organized to do this, and how does it carry out these functions? If you take the cortex, or the top part of your brain, this big kind of sheet of brain that's deeply folded around the brain stem or the core of your brain, that if you unfold it there's sort of a back and a front. The sensory lobes in the back of your brain that process vision and such and hearing and all the sensory information; and the front, that'd be about from your ears on back. And in the front part would be the frontal lobe, which basically carry out function. So that the back half of your brain basically exists to tell you what's going on in the world. You know? Is this a danger, or is this an opportunity? Or what is it. And then the front part of your brain says what am I gonna do about it? So that the back part is just basically recognizing challenges, and the front part is responding to them. And then the other big division in the cortex would be the right and the left hemisphere. And so we have then sort of a quadrant brain. And then the right hemisphere had the occipital, temporal, and parietal lobes are both in the right hemisphere and in the left hemisphere. So the sensory lobes in the back are doubled, one in each of the two hemispheres. And so one of the big questions is why do we have two hemispheres? What's the point of that? And the answer is the biggest problem that a brain always has to confront is have I ever run in to this problem before? And if you've run in to the problem before and you're still alive, that meant whatever you did worked. It may not have been the best thing you did, but you know, at least it worked. And you stored it someplace. It's just like the committee stores it in the minutes, or you store it in a file, or you store it in memory. See that's what memory is about. Memory is about basically having experienced something before and creating some kind of a storage of that information. So when we think then of what our brain is all about is basically then to be able to recognize and

respond to novel and to familiar dangers and opportunities that we confront in a space-time world. The large construct that we began this with has come back.

Now in terms of the development of the brain, is our brain develops from the bottom to the top, and from the back to the front, and from the right to the left. So the brain stem, the part that basically runs circulation and respiration, that has to be fully operative at birth otherwise you'll die. But the top of your brain which basically deals with the external world, that basically develops then over this twenty year period. And the first ten years are basically the back half, the sensory lobes develop. And the second ten years the frontal lobes develop. So the first ten years of your life then are basically about figuring out how the world works. So if you drop something, if you drop an object does it bounce, or does it break, or does it splat, and that kind of stuff. And, you know, what's the capital of Oregon? What's eight times seventy-five? All of this kind of information. How do you cross a street? All this kind of information that kids have to be able to figure out, that this is the way the world works, that develops during the first ten years of your life. And then during the second ten years of your life the frontal lobes develop, which would basically tell you what are we going to do about this. You might think that this is kind of a dumb way to develop. How do you stay alive during the first ten years of your life if you don't know how to solve problems? Wouldn't it be better to develop the frontal lobes, which are about figuring out how to do something first, and then the sensory lobes in the back? Well, then you'd be going out solving problems that you didn't understand. And our government is a good example of an outfit that's trying to do that. The other thing is, you could say well, why don't we develop both the front and the back at the same time? Well, then you'd be going out doing a lousy job for twenty years of on both of them.

Shannon:

Right. Right.

Robert: [17:07]

So the biological solution is develop the back half of your brain, that's figuring out how the world works, during the first ten years of your life, and then after that, then develop the frontal lobe. Well then, you way, well how do you stay alive during the first ten years if you don't have a functioning frontal lobe? Well, there's a real simple answer to that. You'll be hanging around people who have a function. For the first ten years of your life, then, your parents are your frontal lobe.

Shannon:

Right.

Robert: [17:34]

And your teachers are your frontal lobe. And if you stop to think of it, little kids during the first ten years of their lives, they don't get to make important decisions like where are we gonna live and what we're gonna do. They get to choose their socks

Shannon:

Right.

Robert: [17:50]

What socks I'm gonna wear today, but that's pretty much it. And even if they do get to make decisions, there's always adults around to veto it if it's a dumb decision. And if there isn't any adult around, well, what do they do? Well, they do whatever they think an adult would do. And how do they know what adults would do? Well, that's what school's all about.

Shannon:

Right.

Robert:

To tell them what we would do. And so we basically give them information. Now if you get lost, this is what you do.

Shannon:

Right.

Robert: [18:17]

So during the first ten years of your life, then, that's the way they operate. Well, then they're really not too concerned about that. They might grouse that adults make decisions, but they're in the same role that I am. We have a grandson now who's only four or five months old. So I can pick him up and carry him around, and he doesn't object.

Shannon:

Right.

Robert:

But the reason he doesn't object is because he can't walk.

Shannon:

Right.

Robert: [18:46]

But what about a year from now. What if I come and I say okay, can I pick you up, and let's go someplace? You know? What do you get? Down. Down. I can do it myself. And the reality is can he walk very well? No. But what does he intuitively realize is that only way I'm ever gonna learn how to walk is to walk. If you're gonna carry me all the time, then I'm not gonna learn how to do it.

Shannon:

And so the only way that we really learn is to have the experience of learning rather than just being given the answers or being prepared for the test.

Robert:

Then the same thing happens in adolescence, is that when the frontal lobes begin to develop, all of a sudden they want to solve all of their problems. And they don't do it very well. But the reality is that they're never gonna learn how to solve problems if you don't place them in to settings where they have to solve problems. The problem is that if a little kid falls down, they bang up their knee a little bit, and that's not gonna be the end of their life. An adolescent screws up and then somebody could get killed in an auto accident and

Shannon:

Right.

Robert: [19:45]

Somebody gets pregnant and so that it gets to be a little scary when they're adolescents. So the challenge then, I think for educators, particularly of adolescent kids, is to create environmental challenges that if they screw up, nobody's gonna get hurt. You know? It isn't the end of the world. That they deal with how do you make preferences, and how do you get choices, and that there isn't any one answer to all the world's problems. There are different ways of doing it. You go in to a restaurant, they give you a menu. What's the correct answer? There is no correct answer to that question. There's a lot of answers.

Shannon:

Right.

Robert: [20:25]

And I think that we have to begin then to think then ... Well, the one other thing, if I can just toss this in, that when we take a look at this twenty year development of the brain, the back half, the sensory lobes develop during the first ten years, the frontal lobes develop during the second ten years. That doesn't mean there's nothing going on in the frontal lobes during the first ten years; it's just that isn't not a mature system. But the development occurs in a very interesting rhythmic pattern, and that that it takes about a four year period of incompetence, followed by a six year period of competence, followed by a second four year period of incompetence, followed by a six year period of incompetence.

Shannon:

You mean a six year period of competence, right?

Robert:

Yeah. I don't mean incompetence in a pejorative sense at all.

Shannon:

Right.

Robert:

But during the first four years if you stop to think of a little kid,

Shannon:

It's all new learning.

Robert: [21:20]

They have to learn how to move, and they have to learn how to talk, and they have to learn how to get along with people. But they don't do very well at it. And you can say, well, stay home and do it. They love you there. It's not that complicated an environment. And so when they're about four then, we say you can do this kin; can you do it with non-kin? Then what we do is we put them in a room with thirty of the unwashed and illiterate and representative of western civilization. And we say, okay. Now we're gonna do the movements; we're gonna be more complicated. Reading and writing is more complicated than speaking. You're not just dealing with your family. You're getting a teacher you're not related to. The factual information is more complicated. And so the kindergarten through grade five then is we see this maturation, so that by the time the kid is ten years old, the sensory lobes, the ability to comprehend knowledge and to figure out what's going on in the world, what's gonna happen if I do this, they're not half bad at it. No matter what our critics say, the typical ten-year-old kid is a pretty smart ten-year-old kid. Now they're not as smart as a twenty-year-old, but they're not twenty years old; they're ten years old.

Shannon:

Right.

Robert: [22:29]

Well, then what we see happening is that when they turn eleven is that all hell breaks loose again. They go back to, the frontal lobes begin to develop, and so during this period from about eleven to fourteen, we see that it's very very similar to the pre-school years, So that what we call the middle-school years are the equivalent of the pre-school years. The middle-school years would be the maturation of the frontal lobes, but the pre-school lobes would be the maturation of the sensory lobes.

Shannon:

That's such a great way to explain it. It really ...

Robert:

By the time they hit about fourteen we see this sudden, you know, their brain is suddenly taking off and you see this maturation which goes on so that by the time a kid is twenty years old the typical kid is not bad off.

Shannon:

Yeah.

Robert: [23:18]

Ready to be independent. All of these kind of things take place. Now the amazing thing is that we built our entire school system around this maturational rhythm without having any idea of the underlying neurobiology. And so we have the pre-school years, four-year preschool followed by a six-year kindergarten grade five, followed by a four-year middle school period, followed by a six-year period of high school and beginning of college. It's just eloquent. It's elegant and eloquent.

Shannon:

So nice. So nice. I'm gonna let that be sort of our closing comment.

Robert: [23:57]

So now you know, I know the answer to all of this, but you know, my time is up. So all your listeners are gonna have to figure out the solution to all the world's problems.

Shannon:

Oh, my goodness. Well, I think that we've given them a good jump start.

Robert:

Yeah. You know, we need a new John Dewey. And we need a new Jane Dewey too.

Shannon:

That's right.

Robert:

And so I think that if you're a young teacher you need to realize that boy, how do you take this stuff and put it in to a theory of teaching and learning the way John Dewey did a hundred years ago.

Shannon: [24:32]

And that's an excellent point of closure because as it is such new and emerging information it really is up to each of us to sort of take it in, chew on it, evaluate what this means to us in our own work lives and how to sort of play with it and begin to apply it, you know?

Robert:

And if our profession doesn't do it, who will do it?

Shannon:

That's right. That's right.

Robert:

So that's a challenge.

Shannon:

Mm—hmm. And I think I really want to stress that it's up to each one of us to sort of say, okay, so what does this mean? There is no spoonfed answer at this moment. We really have to play with it.

Robert: [25:07]

Don't expect the neuroscientists to do it for us.

Shannon:

No. No, no, no, no.

Robert:

Nor would we want them to.

Shannon:

Right. Exactly. They're doing their part. And it's our part to do the rest, right: It's so wonderful. Well, you know, I just really want to thank you for your wisdom and your generosity of time and spirit and I'm so glad you're out there doing what you're doing. I'm just delighted that you took the time to be with us today.

Robert: [25:30]

And if any of you want to contact me, I can give you my e-mail address.

Shannon:

That's wonderful. You go ahead and say it now if you'd like.

Robert:

It's bobsyl@uoregon.edu. And if you have comments or questions, don't hesitate to contact me. I read all my e-mail and answer it.

Shannon:

That's wonderful. Wonderful, wonderful. Well, thank you so much. And that'll be on the website as well as some other supporting materials. So thank you so much, and I hope that our listeners decide to join us for more Effective Practice Briefings in the future. Aloha.