Shannon Simonelli:

I'd like to welcome you to another Effective Practice Briefing in our series here for the Hawaii State Improvement Grant. Today we're talking with Dr. Robert Sylwester. He is an emeritus professor of education at the University of Oregon. He's very broadly published. His most recent book is, "How to Explain a Brain, an Educators Handbook of Brain Terms and Cognitive Processes." He also writes a monthly column on educationally significant developments in an internet journal. That address is www.brainconnections.com, and that will also be posted on our website.

So I'd like to very warmly welcome you, Bob.

Robert: [00:54]

Nice to be here.

Shannon:

I am Dr. Shannon Simonelli and I will be acting as the host and moderator and your partner in conversation and exploration.

So, I'd like to begin by asking you to talk about recent discoveries in neuroscience and put that in context to teaching and learning, and then to ask you, if you would link those new discoveries to our basic human needs for movement.

Robert: [01:24]

Well, it might be best to place this into some context. That is, here I am, a really old guy, and I'm still working. And the question is, "Why would we do that?"

The reason is that almost everything that we know about our brain has occurred within, that is really significant, educationally significant, has occurred in about the last ten years. It started about ten, twelve years ago when I normally would have retired; the whole field just exploded. It has been a very very exciting time. Most of the new developments and new understandings have occurred because of the neuroimaging technologies, FMRIs, PET scans, MEgs and all these marvelous machines that allow scientists to bypass your skull and get into your brain and actually observe events that are occurring. Basically the geography of your brain, where things are occurring and how they occur and all these sorts of things. Out of this remarkable technology has come an entirely different understanding of our brain than we ever had before. It's a very very remarkable time in the history of the world actually. It required two things to happen. One is the discovery of DNA about fifty years ago. It gave a sense of how cellular systems of our brain run. Then the development of computers which allowed scientists to finally to be able to process the vast amounts of information that neuroimaging technology gives them. So, the first thing you need to say is that it is a very very exciting time. And that in many respects a lot of the things that neuroscientists are discovering about our brain don't come as any huge surprise to educators because although we didn't know what was going on inside the brain, we could sure observe the kids' behavior. Since the behavior is the result of brain events, teachers who work fifteen, twenty, thirty years

with thirty kids in the classroom all year long, they begin to figure out stuff. So we developed a kind of a folklore knowledge of how learning takes place, and what things work, and what things don't work. When these discoveries occurred, is that in most respects, they match what teachers had already observed over the years. The brain sciences are very supportive of things that have occurred. People like Maria Montessori, you know they're looking better all the time, John Dewey and Jean Piaget and all these people who had these remarkable ideas that were in many respects rejected earlier. Take a look at them now. You begin to see that they were right.

The other thing that I think you need to say right off the bat is that many of the things we do in schools aren't appropriate to the operation of the brain. And that teachers have always felt that. One of the things that is happening in the brain science is that in many respects they are supporting the teachers. I think that one example in recent years is that the arts and the humanities have suffered a tremendous decline in the schools because they're expensive and labor intensive and very difficult to evaluate. So we kind of threw them out of the schools. The brain sciences are now telling us that the arts and humanities are very central to the development and maturation of the brain.

Teachers knew it all along. It wasn't the teachers who threw the arts and humanities out. It was the people who were paying for it. We have the same problem with the standards and assessment programs which teachers have tended to feel as being an inadequate sense of what kids are actually doing in school. And yet these are politically very powerful. I think that what's emerging out of the brain sciences now is the sense that teachers are probably right all along. Our brain and intelligence and cognition are far more complicated than simply factual information that you can reduce down to a multiple choice test.

It is quite an exciting time in the brain sciences and I expect that what will happen in the next few years is that new theories will emerge out of the brain sciences that new theories of teaching and learning and that these will be more biologically oriented than the current ones which are more behaviorally oriented.

That's kind of the background for what's happening. And why would I want to drop out of the scene that you wait forty years for all these marvelous things to happen.

Shannon:

Things are just really getting cooking at a different rate.

Robert: [06:56]

I don't know if you are a young person but if you are looking for a good career to go into, boy, I just couldn't imagine something more exciting than what's going to be happening in education in the next twenty years.

You know if you think of genetics, you go back fifty years ago, I graduated from college with a degree in biology four years before DNA was discovered.

Shannon:

Wow.

Robert: [07:18]

When you think of all the changes that have occurred in medicine and genetics in the last few years actually, and then you see that the same thing is happening now is going to happen in education. It's a very exciting field to go in to for young people.

Shannon:

It sounds like that, the image that I get is almost that as we have moved away from the things that many teachers have known for many years to be effective and move to different ideas about education, as the brain research is coming out, it's supporting what we knew and practiced for many years.

Robert:

But the good teachers always knew.

Shannon:

So it's coming back around full circle. Yes, the brain research is bringing back around full circle.

Robert: [08:04]

You should. You can't spend decades in a classroom with children and not begin to comprehend what's actually going on in their brains even though you can't see what's going on inside their brains. We probably should have paid more attention to the teachers than we did.

Shannon:

That I completely agree with. You know, I wonder if you might touch on, this might be a good place to touch on a little bit about the picture that you paint around why we have a brain; like, how does it serve us? What's its job for us?

Robert: [08:40]

The real interesting thing is that when you start to think of education and the brain, and you ask what are the really big questions about the brain? They're really the kind of questions that nobody ever thought of before. And the first one is just the one that you said, "why do we even have a brain?" It is not necessary to be a successful organism to have a brain because plants don't have a brain and they seem to do all right. The big question is, "why do we have a brain?" And the second question that would fall out of that is, "if it has a function, how is your brain organized to carry out these functions?" And then the third one which is very obvious, which makes a career for educators and is what parenting is all about, "is why does it take so long for a brain to develop?" You take a kitten or a puppy; as soon as they are weaned, they are pretty much on their own. If you take a feral cat or feral dog right after weaning, they are pretty much on their, … Why does it take, you hope it's only

twenty years for a brain to reach its maturation. Those are questions that we never thought of before because we didn't really know much about our brain.

The really fundamental one that kind of a most interesting one is, why do we even have a brain? You know plants don't have a brain and they seem to do all right. And the answer is that why don't plants have a brain? And the answer is, ‘cause they're not going anywhere. If you are not going anywhere, you don't even need to know where you are. What would be the point of a tree that would have a sensory system that it could watch loggers coming towards it with a saw...

Shannon:

Especially if it can't run.

Robert: [10:32]

It can't run. You got those roots going way down and you can't get out of there. What would be the point of it? Or if you are a plant and you're in a place where you aren't getting any sun, aren't getting any water, and you can see the other plants over there just doing really well and having a great time. There's nothing you can do about it.

So, the issue is then is if you have some form of movement, if you have legs or wings, or if you have fins or something that can get you from here to there, then what you have to have would be some kind of a sensory system that would tell you about here, what's going on here and it will tell you about what's going on over there. And then you'd have to have a make up your mind system that would say, "well, is here better than there?" Or is there better than here? If you decide that there is better than here, then you have to have a motor system to get you from here to there.

I hate to tell you but that's just about it.

Shannon:

Right. That's about as complicated as it gets.

Robert: [11:32]

That's the whole operation of a brain. That's the reason we have one. I think that you have to begin then with this whole concept of movement. That our brain is basically about, it's about movement. What it basically does is it has to be able to plan movements. You have to be able to figure out what I'm going to do and then you have to be able to regulate. So while you are carrying on the movement, then you have to be able to adjust and do things. The other thing you have to be able to do is predict a movement. You have to be able to predict your own movement. If I do this, then this will happen. And you have to be able to predict the movements of other people and other plans. And you have to be able to predict the movements of objects, you know, if they're coming towards you or away from you. So there's a car. I'm crossing the street and here comes the car. You have to be able to predict how long is it going to take. Should I go back or should I go forward. If you begin to think

of this, is that your brain is a here and there machine so it has to be able to differentiate between what's here and what's there so that space is a really big issue in a brain. Being able to figure out not only what's going on here but what's going on in other places. And then the other thing is if you think of that you have to be able to plan something and you have to be able to regulate something and you have to be able to predict something, well you're dealing here then with the past and the present and the future. So then it's a time machine. So that movement involves basically time and it involves space. It involves some energy expenditure so that if you expend energy in space and time, you take those three concepts: energy, space and time and put them in a blender and turn it up to high for a couple of minutes, what you get out of the mix is this phenomenon called we call movement. Movement is the expenditure of energy in space and in time. Movement is the only reason we have a brain, because we can move.

Shannon:

I think that is so profound.

Robert:

It is. And the problem is when we think of movement we tend to think of movement we take this very, very narrow view of movement. I hope that already that you're beginning to think that this other big thing that we've thrown out of the schools is movement.

Shannon:

Well, and so much of what kids…

Robert:

The arts and the humanities and everything else we have thrown out is physical education programs. We've thrown out recess.

Shannon:

Well, exactly. And kids that are having difficulty in schools, so often they're having difficulty ‘cause they're not sitting still. They're distracting, and then when kids get in trouble the first thing that teachers tend to take from them is recess.

Robert: [14:30]

That's right. You're punished. Well, we were talking before we started recording that a conference that you had attended, and you said that it was kind of tough to sit there for a whole week and just listen. You appreciated all the sessions where people allowed you to get up and move around. I think that's an important thing. You know, the reality is that, if you stop to think of it, teachers who are really all caught up in saying sit down and be quiet, that they really seem to be more interested in teaching a grove of trees than a classroom of full of students. When we think of movement and we have to begin to think that human beings have three movement systems. We have a sort of a leg, foot, toe system that allows us physically to move our bodies from one place to another. And then we're up on two legs rather than on

four legs. And so our front appendages, we have a set of arm, hand, finger system that allows us to pick up things and grasp things and throw things and write things, and work on email and all that. And then we have a sort of neck, face, tongue system that allows us to eat, it's involved in eating and it is involved in speech. When we think of movement as a sort of physical movement where I can go from here to there, but I can also stay here and use my face tongue system to activate a stream of air molecules that will rhythmically go on the air and bounce off of your ears, and by doing that I can take an idea out of my brain and put it into your brain.

Shannon:

Speech and language.

Robert:

So that movement involves that language is movement. Music is a form of movement. I could physically go up to a person and shake their hand and caress them, or punch them in the nose, which is giving them some information, see. Movement also takes in language. Language and music is a form of movement. Speech is about providing information, and song is about telling you how you feel about that information. These are two different forms of communication.

The other thing that we have to think about movement is that movement involves a sort of psychological phenomenon too. I move in time from being an infant to a child to an adolescent to an adult, middle age to elderly. Or I can move in status from being unemployed to employed, or employed to unemployed. Or from bond and married to not married, or not married to married. We have all of these status changes in life that involve movement.

Movement, you have to see as a huge concept and it ought to be central to curriculum. That could be humanities because humanities are about movement. They're the stories that we tell. You think of all the fiction, all the novels that you read, that they’re basically about people moving from one place to another you know, in their life.

And if you think the large, Moby Dick, the Iliad, the Odyssey, the Lewis and Clark expedition, Columbus coming to the new world. See, these are the huge stories and they're all about movement. If you think about the large religious groups, you have Muslims,--they are very central to the Islamic tradition,--the trip that Mohammed made from Mecca to Medina in 600, the Mormon tradition of the trek from the mid-west to Salt Lake, and the Jewish tradition, the Exodus. Actually the whole in the Judeo-Christian religion, the whole Bible is a movement. It's about people who are basically unhappy wherever they were and they moved some place else.

Shannon: [19:00]

Well, and for me this may take us off the point. So if it does, we can decide not to really pursue it. But for me, that brings up so much about the human spirit in terms of how movement and those kinds of experiences of human movement link to emotion and link to things that matter to the heart and the soul of being human.

Robert: [19:23]

Well, yes. And what you'd have to ask there is how much of that then, I will say of our emotional states, our temperament, and all of this is based on going towards something or going away from it.

When you think of spirit, you think of dangers and opportunities. Avoid dangers and you go towards opportunities. You can do this in a physical sense, but you can also do it, in what you said, like in a spiritual sense or a psychological sense. So if we could begin to reconstitute our curriculum around the concept of this very very large thing, that if you're human, you move.

It isn't just like you physically move. The inside of your body is a big movement. The blood is flowing through the circulatory system, and the air is coming in and out of your lungs, and you're basically a thirty foot long digestive tube with a body wrapped around it. So you're dumping food into the top of it and eliminating whatever you don't want. Neurons, you know that the neurotransmitters jump across synapse, one neuron to another neuron. So that when movement stops we die. Movement is about life. In a school, if you're going to communicate to kids what it means to be human beings, then you have to start building the whole construct around movement.

Shannon:

And the arts play a big role in that, and the humanities play in that, and all the different forms of movement.

Robert: [21:20]

Because the reality is that when you begin to think of movement, is that it's almost innate. That a three-year old kid has already figured out that if I'm going to drive a car when I'm sixteen, I'd better get on a tricycle. I have to do wheel stuff. I have these legs, but we can add wheels to legs, so I have all these technologies that allow me to move in a different way. So what I have to do is practice it over and over and over until the kid is on a tricycle and a bicycle and skate boards and he's doing all these wheel things.

But let me ask you something. If you think of a kid who is on a skate board, what they first they have to do is basically master just how to stand up and how to move on it. What's the next thing they do?

Shannon:

Well, they want to learn how to turn or make it go somewhere.

Robert: [22:14]

Yeah, but they want to do it with a little style and grace. In other words, the first thing you do once you have mastered a movement, whether the movement is language or whether the movement is picking something up or writing it down, is that you try to add aesthetics to it. A kid on a skate board, as soon as they're secure, that they're

not going to fall down, then they're doing all kinds of fancy moves. Basically, dancing on wheels.

Shannon:

That's right. They want to carve through space and time.

Robert: [22:45]

If you have to ask like in baseball or football or any of the sports, is that why do people spend all the money to go watch a NBA basketball game if the only point of the game is to throw the ball through the hoop more often than the other team does, well then why pay a couple hundred bucks for tickets and dinner and parking and babysitters and all that to go watch a game when all you have to do is wait until the game is over and ESPN will scroll it along the bottom, the score.

But the reason people go to the game isn't to simply watch the people throw the ball through the basket; but it's how did they throw the ball through the basket. We need to think then that in many cases that games or sports such as basketball are basically a form of ballet aren't they? Because ballet is movement, choreographed movements and improvisational movements. And so does the basketball team. They have these choreographed movements like the kick and roll, but if that doesn't work then they have to improvise. In many respects then, we have to think of sports which are movement activities as that the essence of the sport isn't the score. It's not the score. It is the aesthetics of the activity. Vladimir Horowitz was once asked what was the difference between a piano player and a pianist. His answer was, anybody can play the right notes.

Shannon:

Right. Right.

Robert:

How do you play the right notes?

Shannon:

Well, to me that really links with our push for coming up with the right answer for how test-oriented we are. You know, the score and the outcome as compared to part of what you're saying is that the mastery and the enjoyment and the pleasure and the personal expression that's developed through style and grace of integrating information, that's what the human experience is about. That's what learning is about.

Robert: [24:47]

Then what are we doing with standards and assessments? It doesn't show up in them. And that's the essence of it. If knowing the answer was the really important thing, then what you'd have to say is if somebody's working a crossword puzzle, then when they complete the crossword puzzle, they would have to say, 'Now I know the answer to this crossword puzzle. So what I'm going to do is erase it and do it all

over again" Nobody's gonna do that. Once you know the answer to something, who cares. Now they will do a different crossword puzzle. It may be the same format. It may have many of the same words. But they won't do the same one.

Shannon:

Well once they know the answer, if they don't go through the process, there's something lost in that learning experience that can't be replaced. That's what you're saying.

Robert: [25:33]

Yeah It is the process of getting to the answer. It is the process of getting to the end. It is the process of getting to the score in the game that's really interesting. Once the score is established that this team has won or that team has won, then you forget it. Five days after a ball game that they spent a whole year getting to play in some college football bowl, five or six days later you ask anybody what was the score in the game. Nobody even remembers it. They don't care. It was the experience of the game itself.

When we begin to think of the arts, then, it is the aesthetics of movement that separates human beings from your dog or your cat. Maybe dogs and cats have some aesthetics.

Shannon:

I know some dogs that have some aesthetics.

Robert: [26:29]

But I don't think that they operate near the level we do.

Shannon:

No. I hope not.

Robert: [26:37]

When I said then that movement is the absolutely central reason that we have a brain, and that in the human brain it is the aesthetics of movement that is central to what we do, that's when I said that the arts and the humanities … the arts are about moving in time and space, and the humanities are the stories we tell about moving in time and space. Those things are what's central to what it means to be a human being. So when you come up with the new theories of teaching and learning in a curriculum, that's where I would argue that we'd have to begin.

Shannon:

And what we're speaking about, about the way that the brain works and the development of the brain links to not only the arts and humanities, but all of education and learning, teaching and learning in terms of really creating the experience of learning, the process of learning rather than the end result or the test score, the outcome only being the primary focus.

Robert: [27:38]

I don't want people to think that I don't think that the scores are important, or factual information. The reality is that if you're a kid to be able to know six times five is thirty and C-A-T spells cat and all this kind of information, that's useful information. To know it accurately and to be able to do it almost automatically, that's important. But that's not what life is about. People don't get fired from their jobs because they don't know the multiplication tables and they can't spell. They get fired from their jobs because they make dumb decisions and they can't get along with their coworkers. So that's part of the aesthetics of life, the smooth, fluid way that we have of working with other people and in making decisions in an intelligent manner. So those will be the central phenomenon, I would argue.

Shannon: [28:37]

I'm going to let that be a resting place for us for a moment. I'm going to let our listeners digest some of this, and we'll be back in just a moment.