

Eden Institute: Using Health Games for ASD Student and Staff Development

Moderator: Bill Ferguson, PhD¹

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Eden Autism Services is a leading-edge resource for children and adults suffering from more severe effects of autism spectrum disorder (ASD). The strategic use of games in the development of students, staff, teachers, parents, friends, and employers has advanced the quality of life of Eden's students and, consequently, their relationships, productivity, and happiness.

Dr. Ferguson: *Tom, tell us a little bit about Eden Autism Services.*

Tom McCool: Eden Autism Services is an organization that was started in 1975 by 14 families with children diagnosed with autism. They started as a school and rented property in a church in Princeton [New Jersey]. We moved to a facility on Route 1, and then last year we moved into a beautiful new, dynamic educational center that was designed by the staff for educating children with autism.

In addition to the children, we serve adults with autism. As many of our children aged out of school programs, Eden started residential programs and employment programs for adults with autism. Currently, we are serving about 70 children in our school and about 105 adults in our adult services.

What we have as a core is a combination of the use of applied behavior analysis and a risk skills acquisition program known as the Eden curriculum. So for our children and adults, we really target some very specific goals for them. Number one is reducing problematic behaviors because these are the major reasons that the children get referred to us.

We want to increase their appropriate behaviors. Communication is difficult. Most of our children and adults do not communicate with speech, so we look to develop speech but also to assist them in creating alternative communication systems.

But more importantly, we are trying to work on social skill development so that our children and adults can be active

participants in the community at large, both socially and with employment.

With recent advancements with in electronic games, we found that many of our children seem to acclimate very quickly to the iPad[®] [Apple, Cupertino, CA] and other kinds of electronic devices. We do not see much of the children using them in a competitive way, but more to engage themselves. Our staff have really responded well, and I think been surprised at some of the success that we have seen with some of the kids.

Recently, we had some Xbox [Microsoft, Redmond, WA] devices installed, and I thought it was interesting. What I heard was that as the staff was installing them, they were having difficulty with some of the way it was set up. One of our students showed them how to set it up. Which is pretty remarkable.

Last night we had back-to-school night. After all the parents left, I was invited down to one of the classrooms to see a demonstration of "Dance Dance Revolution" [Konami, El Segundo, CA] and a couple of other things that the staff were involved in. It is really very interesting which of the students really responded to participating in these kinds of things.

The other thing I just want to mention is that we know that there are hundreds, maybe thousands, of games out there, so it is a challenge to figure out what is appropriate and what is not appropriate and what may still need to be developed. That is really why we have had our contact with fellow roundtable participants MuseAmi and with Nish and his company [WebTeam Corporation].

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We have been working interactively with our staff and with these two technology companies to see what gaps still need to be filled and to see if we can develop some more appropriate electronic games, not just for the children and the adults with ASD that we have here at Eden but also our faculty and staff.

Bill Ferguson: *Excellent. Thank you. I listened very carefully to the specific goals that you set: Reducing problematic behaviors, increasing appropriate behaviors, communication, and acquiring skills. How are these goals translated into learning objectives for your ASD population?*

Nina Finkler: One of the first things that we do when a student or an adult enters our program is we have to do a global assessment of all of his or her skills. About 25 years ago, the staff at Eden recognized that students with autism really have specific and very unique learning challenges. So we developed our own Eden assessment, which looks at the different critical domains for students with autism.

The assessment is the precursor to the Eden curriculum, which is, as Tom said, the basis for the programs that we have developed here at Eden. That assessment allows us to look at the different domain areas—the students' cognitive skills, their communication skills, their motor skills, their social skills—and from that assessment we are able to then develop the specific learning objectives and tie that into our curriculum, which then gives the staff the tools on how to teach those learning objectives to the specific student.

Bill Ferguson: *To what extent have you been able to incorporate games to help you meet those objectives?*

Nina Finkler: Very often the specific goals—for example, if it is a communication goal or a social goal, the means to teach that goal or to reinforce that goal will be a game.

For many of the students, one of the core areas of deficit is social interaction. Games provide a very natural, age-appropriate means for teaching that social interaction and even those basic social skills of waiting and eye contact and turn-taking and recognizing other people and calling them by name, and games allow us to incorporate some cognitive skills: [For] counting the dice, counting the number on the dice, recognizing pictures, matching. Games provide us with a nice format to take those learning objectives that we have identified, teach them under that ABA-kind of format, and then reinforce them in a way that students now have a very functional skill that they can use with their cousin or they can use with their peers and their families can incorporate into the home.

Games are used very often across all of our skill domains, and we actually teach games as part of our curriculum. We will teach independent games. We will teach interactive games. We will teach group games so that, again, we are building a very functional repertoire for the students.

Nish Parikh: I would like to add to that—and tell you a little bit about our initiative as a technology partner. We have taken Eden's curriculum assessment kit and converted that into an app. Our ultimate goal is once the goals are established based on the assessment; we will build apps that are going to teach children based on the curriculum developed by Eden.

We are replicating the exact same approach on the mobile device as on the Web and on the kiosk.

Ours is a heterogeneous approach. The technology is developing—Microsoft has just recently launched Windows 8, so we are in the process of converting some of our apps. We have about 70 apps, and on average we are getting about 50,000–60,000 usages we are delivering every month. So our ultimate goal is to take some of the curriculum and tie that with the assessment kit and start delivering it to help the Eden staff meet their goals and achieve the skills as a supplemental intervention.

Tom McCool: Please talk about a couple of those specific games that we have used here for teaching some of these skills.

Nish Parikh: Sure. We have used a kiosk-based intervention delivery program where we have taught colors, time, alphabets, and numbers. In some high-functional children, we have used two-digit multiplications, additions, multiplications, and division. Our goal is to synchronize technology and game-driven intervention with the classroom one-on-one intervention.

We have replicated what they are doing in the kiosk in the classroom, and then we would like to extend that to homes utilizing the mobile device. Generalization is one of the biggest benefits I see. Now when the child is learning with one-on-one alphabets with the teacher in the classroom, the same concepts, the same instructions, are delivered on the kiosk and then in the home setting with the parents, and the students are learning the exact same thing.

It is opening up, you know, a different dimension of the education—the special needs education. Recently, we started this new initiative, the New Jersey Institute of Technology [NJIT], where we are in the process of extending this. Let us say, for example, we are teaching colors in the classroom using the flashcard. Then we are teaching colors using the kiosk in the classroom, and then we are extending the same approach using apps. These are all touch-and-play kind of a concept. What we want to [do is] introduce and expand and reinforce the same concept by actual physical objects. So we are working with students in a special program in NJIT where they have developed this hardware where basically it is an electronic game board kind of a concept.

The card has a sensor that the student places on the hardware device, and the game recognizes whether it is the right or wrong answer. So now that can be a very unique research project where you would like to see how effective this new way of generalizing the concept of teaching, where we are teaching electronically and we are teaching the same subject using the actual physical object.

Bill Ferguson: *So in this case, the game platform is complementing more traditional education approaches, and it also offers you some mobility outside of the school setting in the home environment or social environment as well.*

Nish Parikh: Absolutely. And also it is giving us an opportunity to deliver consistent, synchronized delivery of the intervention—consistency in terms of what prompt we are using in the classroom. We are delivering the exact same prompts on the home device. So now they are not getting confused, and we are utilizing minimum expertise from

parents or knowledge and delivering really high-end intervention, which is developed and designed by Eden Institute.

Nina Finkler: One of the other benefits of electronic games, compared to the more traditional games, is they allow us to collect data that then can go back into the classroom or go back to the parents and allow us to make ongoing decisions about student progress, programming, and so on. This really ties back into those original goals that Tom had talked about, and it gives us that real objective measure of what we are accomplishing and if we have to add new games or add new instruction. It really kind of ties that whole piece in, still grounding it in that ADA of high behavior analysis format, but tying it into less clinical type of presentations, which kind of brings it all together for our families and our students.

Bill Ferguson: *That objective measurement and feedback are important elements of what constitutes or defines a game. Do you find that your students develop a sense of competition, either for themselves or within their group? Is the competitive aspect of games important to their development?*

Nina Finkler: It is really based on the individual student. I have seen a lot of students who do not understand the competitive nature as a group or as a team, which kind of eliminates them from a lot of social interactions. But some do have that competitive nature in achieving a certain level individually or watching their own personal score go up.

This is a starting point for understanding competition and achievement, and it also serves as a huge reinforcer or motivation for students, which has a direct impact on their engagement and their performance.

Many of our students do not necessarily play the game to compete against another, but often compete against themselves to better themselves.

Nish Parikh: Just to add what I have seen, that sometimes it has helped them from a motivation standpoint also. When somebody is playing and when the child is not playing, I have seen requests from the child or his or her parents that he or she would like to be part of the program. So that has helped because somebody is having fun.

Dominique Gasdia: I work with the adults here at Eden Autism Services. One of the biggest challenges for most of our adults is to occupy their leisure time in an appropriate manner. We were talking about coming up with ideas for apps that are age-appropriate. That is very challenging because we have individuals who enjoy the apps that are spelling and reading and writing, but they are heavily geared towards children. Rewards are little stars going, "Good job," obviously speaking to a child, not to an adult. So it would be really nice to be able, at some point in the future, to use these same types of apps that are more geared towards the adults.

Nish Parikh: Absolutely. From the technology standpoint, we are working on giving users a capability of setting of their profile where they will set up their age or birth date. Based on that, we will change the whole environment. So it is the same approach, same concept. It is just a different color scheme, different characters, and different (if needed) prompts. The technology is all possible.

Lisa Breeman: One of the things that we are seeing in a lot of our language groups and social groups that we do with our students here is that the students really want to improve their performance. So the fact that you can use these games, both to help you teach a lot of goals and as reinforcement, as well as earning potential for our students, has become critical. It is very key too because they are willing to work harder or longer or try things that were frustrating to them previously. They are willing because they can earn the Wii™ [Nintendo, Kyoto, Japan] or the Xbox or 5 minutes on the iPad or something like that. That is really helping a lot of our students to push through some of their inner frustration and want to, like Nina said, further themselves in this quest to move forward.

Bill Ferguson: *I would like to ask you all as a group a question that has gotten a lot of study in the field of games, and that is the affinity that the player has for the avatar. There have been quite a few studies that indicate that the closer the avatar appears to be either like the player or how the player would like to be, the greater the affinity and engagement in the game. Has anyone run into that?*

Lisa Breeman: I think we are seeing it already with the Xbox Kinect with "Just Dance." You know, in one of the classrooms they set up, Jazzy is one of the characters, or Funky. You know, like they gave them these silly names. But the students really do want to be one of these popular characters. They say, "I want to play this game, but I want to be Jazzy in the game," or, "I want to be Funky." They really are trying to identify to find some sense of self in identifying with which character or which songs are being chosen or something like that if they are doing the dancing game. The students really are actually showing much more personality than we might see if it was just a traditional game such as "Monopoly" or something like that. We are seeing much more of this personal style come through.

Tom McCool: The other thing I would say is that most of the time when they are doing this, there is an audience, so it takes on an aura of performing, especially in "Dance Dance Revolution" or similar games they are involved in. So it is an opportunity for a lot of our guys who never have been sort of in the spotlight to be on stage, to have people not only watch them, but to cheer them on and to encourage them. That is just sort of a side effect that we really had not thought about, but they seem to react normally very positively to it, where a lot of us thought they might shrink away and not want to be in the spotlight or not want to perform. But it has sort of just been the opposite.

Bill Ferguson: *Tom, that seems to be right on the mark for one of the key goals you identified, which is socialization.*

Tom McCool: Absolutely.

Bill Ferguson: *You know, to be able to risk your "self" in the presence of others is a big step, is it not?*

Tom McCool: Absolutely. It really is.

Nina Finkler: One of the critical pieces with autism is that lack of wanting to share experiences with others. I think the games allow them to share that with somebody in a non-threatening way—they do not actually view it as work. They

do not view it as learning. It is very fun, and it allows them to want to engage and share with somebody. Even if it is getting someone's attention to help them turn on the game, at least they are sharing with somebody else as opposed to just doing it all by themselves.

Dominique Gasdia: We were talking about the avatars, and I found it really interesting that when I was trying to set up the Wii and I could not do it, one of our adult students came and moved things around and set it up for us. And so two of our adults decided they wanted to bowl. One of them was trying to find the avatar that looked most like him. He just kept looking at me, not asking for help but just kept looking at me like, "Can you help me? Nobody here looks like me." That is the impression I was getting.

Anyway, we agreed on an avatar that was most like him, and he was happy and stuck with that. They bowled for quite some time. They were taking turns. It was just a really positive experience for both of them. They were having fun. It was just a naturally occurring event. I worked all day. I have had lunch. I have cleaned up. I am just relaxing. It is not something they are working for. It is not something that is a formal part of the program. It is just "Let us have fun and let us do something that we feel like doing at the end of the day."

They chose bowling then. The other day they chose golf. The day before that, they chose golf Frisbee—a golf Frisbee fun game that they were playing. But you know it gets them up. It gets them off the couch. It gets them out of their seats, and it gets them doing things and interacting with each other.

Then you also see the other adults peeking in and saying, "Hey, what is going on." They kind of start to show a little bit of an interest, even if they are not really confident in participating in it. They really like to actually observe. It is much more appropriate to be observing somebody doing something productive, as opposed to just observing nothing really going on.

Tom McCool: I think one of the things we hear about people's concerns regarding electronic games is that the students become couch potatoes and do not get out. But the ones that we have are active, and I have even tried them, and I can see the people who were exhausted when they finished. And they are engaged in a game. They do not feel they are exercising. But I think that it gets them into physical fitness goals that we have.

We have a full gym. We have exercycles. We have treadmills. We have all of that. Some of the students really do like that. But the ones that do not like that can still be exercising. They are playing these games, and they are really exerting. Some of our students were doing "DanceDance" last night, and they were exhausted when they finished.

Bill Ferguson: *Tom, you stated earlier that communications is a key part of this. When we were introducing ourselves, Bob Taub introduced himself with MuseAmi. Bob, tell me what you are working on related to communication and ASD.*

Bob Taub: Sure. We created a system whereby you can on one hand hear what you see and see what you hear. You can sing and play a melody and have that be transcribed. With that cycle in place, which uses fairly sophisticated technology, we then branched off into areas of entertainment, so that

anyone can sing into his or her mobile device and sound like a star. The pitch is corrected and played back with complete ease of use.

Thus, there is a whole element of active participation in music as a form of communication, as a means of creative expression as well.

Then we developed an internal demonstration application that took several of the parameters of music and applied them to speech, parameters that are intended to help people with ASD in communicating verbally, the emotional content of a phrase, the volume, the speed and the timing, or the rhythm with which you speak.

In early experiments that were done at the University of New Hampshire, we found through our contact there that there was statistically significant improvement in a fairly short period of time. The user gets visual feedback in terms of how he or she is doing, as well as a kind of scoring, sort of a self-evaluation, as well as for the people working with the subjects and collecting and polling data. All of this occurs in real time and can be used in multiple places.

Bill Ferguson: *Give us an example of how that would be used, let us say, for someone with Asperger's.*

Bob Taub: I guess one of the main elements is the means of communication, the way of speaking. So if that person wants to learn to say a particular type of phrase with the emotional content appropriate to that phrase, such as, "My new videogame just came out," there is a certain amount of declaratory enthusiasm in that phrase, right? So in the particular application that we developed, the user would attempt to match the speech pattern with that level of pacing, the appropriate level of emphasis, as well as the emotional content inherent in that phrase.

The user would try to match that, and he or she would receive physical feedback, a metrics to show how he or she is doing. It is possible to layer in X number of phrases to start in an application, but the critical thing is that a therapist or a user or a parent can then layer in additional phrases and make it work live.

We believe very strongly in the notion that games can be fun and educational at the same time.

The activities are age-appropriate, with concepts and phrases. But I think the critical element, and part of the magic of all of this, is the real-time ease of use of the algorithms that provide the analysis and therefore the feedback as to how somebody is doing, even if it is saying the word "cat."

Bill Ferguson: *Let's say a student speaks in a monotone, fixed-pace way of speaking, and let us say that you create some type of an audio avatar that presents what a phrase should sound like. Then can you record the student's response and play it back to them. Are the students externally sensitive enough to recognize the difference between their voice and what they hear as an example?*

Bob Taub: Yes, they can record and hear it played back immediately. Our initial clinical testing indicates that they are sensitive to the change. And it is one activity that can be done in the classroom, at home, anywhere.

The engagement with iPads or phones, handsets, is just something that a lot of young people universally are compelled

by. The fact that the developmental technologies have been embedded in these devices is a gigantic step forward.

Tom McCool: We have a number of our children with Asperger's who have many employment skills, and what makes them stand out differently from their peers is their speech pattern. We are looking how we can incorporate a way for them to modify the speech pattern so that when they come into an employment interview and in a job, they are not automatically classified as someone with a disability. They have all the actual job skills that they need, but when they talk in a robotic way, they immediately are separated socially from the rest of the workforce.

Lisa Breeman: One of the things that is very important to us is the social stigmatism for these individuals when they go out. And because the iPads and iPod®s [Apple] and all these electronic devices are everywhere, our participants and our adults look like everyone else using socially appropriate, socially accepted devices to help them further themselves in these situations.

So when we put these applications on devices and give them to our participants and our adults, we are giving them opportunities to move forward in their own lives.

Tom McCool: Those are very, very good points, Lisa. In another part of the initial studies that were done, the applications that were innovative involved had a subjective element as well. There were pre- and post-testing conversations between the therapist and the subject. And in between a week of intense work with this application, the improvement in subjective terms of one-to-one conversation was also in the therapist's eyes significantly improved.

To demonstrate that point, he took one of his subjects into a deli without any phrases—there is no phrase in this application that says, "I would like to order a turkey sandwich, please." And that is what she did. She was astonished. That had never happened. It was a very significant and successful communication.

Eden has people coming to us because of behavior problems, acting out—aggressive kinds of things. What we see is that helping with the physical activity, helping with communication, helping with employability, we see those negative behaviors diminish and achieve our goal of generally having them apply to positive behaviors. Ultimately, we are trying to get people out into the workforce. We have about 100 adults in our adult employment program, all of whom are in situations where they are working for someone else.

You always have this dilemma. Do we change the environment for the person with autism, or do we have them adapt to the environment, which is the ideal? But we have been very fortunate that many of the employers recognize some of the unique abilities of our participants, and so we do help the employer adapt the workplace so that it can accommodate people with the kind of skills and deficits that a lot of our adults have.

But we are very successful with certain kinds of employment companies, like Wawa.

Dominique Gasdia: Oh, yes, absolutely. We have many of our adults who are employed by Wawa. They do a variety of different things, and they do it very well because it is repet-

itive, and if they can do it over and over, they can do it for long periods of times—the kinds of things that many people would not have the desire to do, like stock shelves and clean the coffee counter. There are just a variety of jobs that our adults do at Wawa.

But then we do have some jobs that our more behaviorally challenged individuals are able to do and get paid for, but there is nobody present at the location. For example, our people clean a movie theater several times a week. There is nobody there during the times that we are there, which is good, so we can actually continue teaching our adults too—to be productive in the workforce. Then when they do have behavioral issues and challenges, we are able to manage them and not have to worry about other people being around and being part of that. So we are not in fear of them losing their jobs because of their behavior challenges.

One of the other things that I have noticed about the use of the iPad as far as helping with behavior is that we have used it in a capacity of relaxation. When we start to see someone getting a little agitated because maybe he or she does not understand what is expected of them or he or she is asked to do something they do not really want to do, sometimes turning to the iPad is a way for them to lower the level of agitation, and then they can get back to that place where we want them to be. So we are actually preventing behaviors from happening, if we can catch it early enough and get them to the iPad to look at something that they enjoy or listen to something that they enjoy.

Bill Ferguson: *Dominique, you brought up the audio aspect of mobile devices. The idea that you can modify behavior by presenting listeners with music that is calming.*

Bob Taub: Yes, Dominique, you were talking about the activity score. I am curious; do any of your subjects seem to be interested in actively engaging in music? Do they play any instrument or sing or sing along or attempt to be involved?

Dominique Gasdia: It is funny that you asked that actually. I recently found a piano app that was so perfect and realistic that I just put it in front of students and they start playing it. I mean, they are not playing anything in particular, but they really are—they are not just doing it for 3 seconds. They are sitting down and doing it for 10 or 15 minutes a time and really enjoying. I have been noticing that many of our adults have been saying, "Oh, wow, this sounds really nice." And it is very realistic.

Then there are also individuals who know how to access music via YouTube. It did not take long to teach them to tap and release and scrolling. That was actually quite easy. Then as soon as they see the icon for YouTube, they know how to get on there, and they know how to get to their favorite videos and songs.

Bill Ferguson: *We recently published an article where researchers have developed a program to recognize ASD behaviors in infants as young as 11 months using the iPad. How the infants interacted with the iPad was prescriptive.*

Nish Parikh: As a technology company, we have partnered with one of the experts from UMDNJ [University of Medicine and Dentistry of New Jersey]. We are in the final phase of

developing a very similar app based on their research, with children from age 9 months to 24 months. Every 3 months parents can use this app to go through the screening process, and at the end of the process it will show the severity of the autism disorder in that child.

Bill Ferguson: *To change gears a little bit and move toward a conclusion, we have talked about the past and present use of games with ASD students. What areas do you feel games could have an impact on, and yet you have none at your fingertips? In other words, what are some areas of development opportunities that you see?*

Tom McCool: I think from my perspective, our ultimate goal is to have adults with autism living independently as much as they can and being employed. So I really think employment skill development areas are really very important. I know there are some companies that are looking at sort of the unique skills of people with autism and how they can fit into the workplace, particularly in jobs where they have difficult times maintaining. A lot of these are, as Dominique said, very routine.

We started a business about 2 years ago for people where we will take their photographs, boxes and boxes of photographs, and our participants will scan them and arrange them in chronological order and then give them back to people on disks. These are things that everybody has sitting in his or her rooms and attics and mean someday that they are going to get to do them.

I think that kind of a skill is unique to our guys, and I think income can be generated from that kind of thing. We need to look at some more of those kinds of developmental games and apps that align the unique things they can and like to do with what someone who will pay them to do it.

Lisa Breeman: Something that I would like from a communications perspective is a tool that could help our higher-functioning students or people who we do think can go out into the workplace improve their functional, social interaction—a game that can generate scenarios that would allow them to have to come up with appropriate responses.

If you were in a store and you wanted to do buy a Coke and they were out of Coke, what are some of the things that you could say, and what would be appropriate versus what would be inappropriate? Would this be the time to say, “Oh, you know, my brother likes to ride motorcycles,” or would you say something like, “Well, if you do not have Coke, do you have ginger ale?” Or something to that effect—something that could let them immerse themselves into a situation and come up with different possible scenarios of what they could say or what they could do. This, again, ties into many points that we have been talking about such as more natural means of speech, taking some of that robotic aspect out and just giving them some ideas of what is appropriate conversation. They would then be able to say, “Gee, this is a lot like when I do that game and apply it to work. This is pretty much the same thing, only instead of being at Wawa, I am at Target.” They can then generalize these skills into more functional situations.

Bill Ferguson: *That is a very interesting point, Lisa. In other behavior modification situations where the idea is to develop*

competency in reacting to the moment and the conditions, the developers have created a number of interactive simulation environments where in real time the student can interact with an avatar. If the student gives the incorrect response, the program will stop there and provide the opportunity to take a step back, give the correct response, and then the student can move forward.

Lisa Breeman: Exactly. I think that can help so many of our students or our clients really participate more fully in their own lives.

Nish Parikh: We have developed in partnership with UMDNJ a very similar kind of a model to teach eighth or ninth graders HIV [human immunodeficiency virus] awareness; not on autism, but we have developed animated stories where students go through the situations on the kiosk and they make the decision, and based on that decision the game is giving them feedback and teaching them to make the right decision.

Nina Finkler: Building upon what Lisa had said, talking not only the communication, but also setting up behavior situations, we ask, “How do you best react?” It is almost like one of those SIM worlds, where, as opposed to having the fake avatar, you set it up where this is your school. You know, you have your teacher say, “Well, it is time to take out your work.”

We have a lot of our kids here, either here or in public school, who are very resistant to work. Having them work through that scenario of problem solving and making better decisions, communication wise, behaviorally, socially, I think that type of practice. There are a lot of games that work more on the academic skills and reinforce those types, but I think it is those real-life skills that really have the greatest impact when they become adults and determine employability and then, you know, getting them to practice age-appropriate situations.

Bill Ferguson: *You kind of wonder if the ASD population might be better off in a simulated learning environment rather than in a real human environment because of their propensity to interact better with electronics and so on. I would guess that somebody could write probably a really good paper on that sometime.*

The last question. We have talked a great deal about the student population and so on. Working with that population is a unique experience also. Do you see opportunities to use games to integrate new instructors and therapists into the ASD learning environment?

Nina Finkler: One of my roles here at Eden is all of our staff training. We find that we do a lot of training with direct instruction. We stand up in front of the room, and we talk to staff. As much as individuals with autism have difficulty generalizing what they hear in training to real life, I think giving them some scenarios in a game format and say, “What should you do? What do you see is wrong? How would you change this?” You know, Dominique has found some apps that give staff behavioral situations and say, “How do you react? What should you do?” I think that type of format makes staff feel as if they are not learning—that they are

playing and kind of back-door that learning, which works for them as well as it works for our kids. But I definitely see that format as beneficial for all learners, whether you are a student or you are a staff [member].

Bill Ferguson: *Dominique, would you like to piggyback on that?*

Dominique Gasdia: I train all new staff who come into work with the children and with the adults. There is an app that I had found that is a virtual behavior, a virtual meltdown, as well, of a child, and the app gives you a variety of actions to choose from. You either do something or say something or say nothing or do nothing. It just tells you different things. It shows the user if you are increasing the child's agitation or if you are decreasing the child's agitation.

People who get to practice with this—because I will be doing that later on today actually—the trainees who practice with this are completely shocked at how the child's agitation goes down based on their actions as they have learned the information that I am presenting. First I am teaching you what you should be doing, but it is very different than when you actually have to apply it. Especially when they are new and they have never heard of ADA. They do not know any of the terminologies that I am using. They have not worked yet. They have not been into whatever program they are going to be working at yet, so I have to show them something that is interactive. I cannot sit there constantly pretending to be a participant or a student and having them try to fix the problem. So this has just been really a good experience.

Actually, by the end of the day, everyone who has an iProduct ends up loading it up on their product because they like to take it with them.

Bill Ferguson: *What aspect of games and ASD, either from a student's perspective or the administrator's or from the instructor's perspective, have we not talked about that we should?*

Bob Taub: I think that implicit in what everyone said, particularly what you were just saying about interactions, is the notion of human/computer interaction. The driver behind that from the computer side is artificial intelligence. You know, as the machine learns—the methods and means of machine learning are increasingly sophisticated. The more that one can imbue an application with stealth machine

learning, so that it operates behind the scenes, so as a user you might not recognize it. You just intuitively go with it. I think that is good for everybody, whether it is subjects or teachers or just people generally speaking. I think that is beginning to have increasingly more use.

Nish Parikh: The other thing I see happening in the near future in education work is we have lab work. Kids learn theory and go to lab. There is likelihood where the games or interactive activities will become part of the curriculum. So it is more structured, more strategic. Right now especially in the education world, teachers do their own research and find solutions and then utilize them in the classroom. So it is all ad hoc basis and individual basis. If it is more structured in an organized way as part of the curriculum, technology can be more effective.

Then we can get the parents involved with the teachers, and whatever the teachers are doing in their schools, parents are able to do the same at home.

Bob Taub: One more thing. Maybe it goes without saying, but I think it is fantastic that you here are doing something that I think is 180 degrees different from what public schools generally do. A kid walks into a public school, and the teacher says, "Put your iPhone away." Right? That is not necessarily such a great idea. Here you are saying, "Take it out. Have some fun." That is a great thing.

Lisa Breeman: To piggyback on that, I think that recognizing we are talking about students with autism—they do not respond to traditional methods of teaching. We have to be creative, and we have to find alternate ways. I think for so long, games and playing have gotten such a negative connotation in the education world. I think it has always been one or the other: You are learning, or you are playing. Particularly with this population, we have found that games are the ideal platform for learning. There are so many benefits of games for this particular population that we cannot think of them as two different categories. Games are tools for us to teach and for them to learn.

Bill Ferguson: *Thanks to you all for your time and expertise. ASD is a serious and growing concern, and the Eden Autism Services, your teachers, staff, parents, and partners are doing great things to improve student outcomes using games. Best wishes in your admirable work.*