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UTILIZING LIFELIKE, 3D ANIMATED SIGNING AVATAR CHARACTERS FOR THE INSTRUCTION OF K-12 DEAF LEARNERS
PRESENTER: JASON HURDICH
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>> I'm happy to be your facilitator for today's session. Jason Hurdich from Vcom3D will be presenting. We have interpreters ready and available. For some of our international visitors you might hear a little bit of background noise because they will be doing simultaneous interpreting into a variety of languages. Jason will be presenting for about 30 minutes then we'll have ten minutes for questions and answers. So please do hold your questions until the end of the presentation. After the presentation we have

an evaluation form and we'd like to ask you please do fill it out after the session. Thank you for coming.

>> Jason Hurdich: Good morning. Everyone enjoying the conference so far, having a good time? Okay. The moderator said I'm Jason Hurdich from Orlando, Florida. And now this is normally a two-hour presentation so trying to condense it down to a half hour is really challenging. Our company's been doing a lot of research projects. Did you have a chance to see that ASL story, "The Forest" done with signing Avatars? That's the project that this presentation is based on. Also we're working with Apple iPods, the telephone and we're developing a system to work with the iPod, as well. Okay. I was worried if the interpreter would be able to keep up with me because I know sign really, really fast. The captions are still rolling so I guess we're okay. Our company does have a booth here downstairs. If you want to ask more in-depth questions. If you're wondering about anything we're doing, stop down at the booth on the first floor. And I know I have very limited time to present but please feel free to stop at the booth and you will have a chance to ask people questions. We have signing Avatars and our goal is to help students improve the attention span and provide more interactivity in their education. We really want to see deaf children have more access to two-way communication. We think it's really critical. Often students don't have that much chance to participate. At Florida school for the deaf and blind we conduct an evaluation based on children's educational experience with signing Avatars. And they shifted from text only instruction to using sign Avatars and that was at one school, Florida school for the deaf and blind. The increase was from 17% comprehension to 67%. So I thought I would go back and talk about the foundation of our company. We have two products called one is Sign Smith Studio and another is called gesture builder. So if you want to know more in-depth information about those you can meet us at the booth downstairs. Oops, hang on. Sign Smith Studio looks like this. This is the -- this is the interface and we have a lexicon of 12,000 signs. You can sign in English, more signed English or more ASL grammar. You type in the input and the program provides 12 different characters. 12 Avatars. You see the background here is changeable. You can control the background color, the background images. And you can make those match whatever story you're telling with the Avatars. Many words have a number of different senses. You can have a -- a can, a ball, a ball might mean a dance or it might mean the object. With a can you can have the ability to do something or like a soda pop can. Many words are multisense. They have multiple meanings. With our program you're able to choose which of the meanings you want. So can, you have got to be able to. Got a container, maybe a large container, and the program will -- is automated to the extent you can pick the semantic field you want. Now I have limited time to demonstrate this but if we had a phrase or a sentence that I wanted to show, I mean suppose I wanted the word Rochester. I wanted to create a new sign for Rochester. In our lexicon it might already have Rochester there or I can add it. So I type the word Rochester and it's not in the existing current lexicon but you can make your own sign. Now, the way you build a new lexicon item is with our program called gesture builder. Now, this is basically an ASL linguistic program. It incorporates hand shape, movement, and all the parameters of an ASL sign. The phonological features. You could use it for any international signed language. It's not constrained to ASL only. You can work in different areas in Iraq or in Europe, in Africa. We have hand shapes for all of the international signed languages or could develop them. Now, the hand shape, for example, if you're going to say one cent. The contact is at the tip of the index finger. The sign for one cent. So you have got the place of contact. Now, where does it touch on the body? The tip of the index finger would touch above perhaps the eyebrow. Then you need to code in the

movement, the motion. So this gesture builder program allows you to develop signs based on the phonological features of whatever sign you want to make. So Rochester, I've got Rochester ready made. So then once you develop the sign in gesture builder you can incorporate it right into Sign Smith Studio. So that's one example. Our time is limited. You can see how you make a new sign and then incorporate it. We're in Rochester New York at NTID for a conference. So you can add whatever election I ton you need. Add it to the library. It gives you a great deal of control. You can control the speed, how fast you want the Avatar to sign. Some students might need a slower presentation. While others can handle a much faster delivery. We're here in Rochester New York at NTID for a conference. Or you can sign it very slowly. So it does give you a great deal of control. Downstairs on the first floor if you come down to the booth we can show you and demonstrate a lot more. Now this technology is still emerging. We're incorporating facial expressions now and I want to show you the kinds of capabilities we'll have sooner in the near future. What I've already demonstrated was our early research. We do have a federal grant from the National Science Foundation. They provided money for helping us to improve our Avatars. We needed to include all the features of ASL grammar, hand shape, nonmanual features of the language, the different things that carry meaning whether you're leaning forward or backward, the tilt of your head. So all of that -- we're using this funding to help improve our work. Now I did bring a demo. We have a demo ready and it's captioned so the interpreter can sit back a bit. This is what I'm going to sign. I had more hair back then. I think I'm getting balder. But now I'll show you the same segment with an Avatar. You noticed the body posture. How the entire body moves. The body language involved. That was our first step. It was our baby step trying to get life like Avatars. Plus we wanted to add a range of facial expressions, as well. The of the research that we did cooperatively with Galluadet University at the Clerc Center as well as the model secondary school for the deaf identifies how the deaf children signed, their signing style, learning styles. We worked with teachers who were teaching, second, third, fourth grade. They don't all sign the same. A teacher teaching a group of fifth graders might sign quite differently than a group -- than a teacher working with a group of second graders. We videotaped over 40 hours of those teachers using ASL in natural language situations. And we used these videotapes as a model to improve the gestures in our Avatars. You know there's gender differences, as well, in sign language style. Men and women sign a bit differently in a number of ways. Then with ASL facial grammar, the nonmanual features. We were focusing on those to make improvements. Let me show you some examples. ASL is a really rich productive language. Now you know that Galluadet has been doing some research and finding what is important when people read with deaf students. And it's more than just translating from English to ASL or vice versa. What you need to include is a whole rich context. If you have a sign like fly or airplane, a student says they are going to fly to Colorado but they might have a much richer way of expressing that. It can be signed number different ways. Now if you want to get someone's attention you can do that very emphatically or do that in a real laid back manner. There's all kinds of adverbial information incorporated in non-manuals or in how you sign. With younger and older students their signing style can be very different. You need to include cultural information, contextual information, that needs to be made accessible to deaf readers. Now, as I mentioned before we really want to emphasize that deaf learners and readers need two-way communication. They can't be passive learners. They need to be actively involved in the communication. Role playing was another way to enrich the educational experience and we can follow up the signing of the Avatars with role play experiences for the students. Now, some of our very early research

found that facial expression is really important. It's one of the greatest concerns. Initially we had very few facial expressions that we could accurately capture but the linguistics of American Sign Language has so much facial grammar that it was important for us to accurately reflect that. In the last two, three years, we made great strides with ASL facial expressions. The adverbial information carried around the mouth and the grammatical information with the eyebrows is really critical. So we filmed at Galluadet to find different examples of facial grammar and we found so many it was almost overwhelming. So we had to figure out how to model this with our Avatars to capture a range of grammars. And a range of meaning. And it really challenged us. Also, we needed to capture register accurately. How formal or informal language usage was. In any given situation. You can see the grammatical information in the eyebrows or the adverbial information in the mouth with the eyebrows and information around the mouth is really critical for deaf people to get the message. So where we're going with this research was trying to capture the nuance of meaning with both facial grammar and body language but it's more than that, really linguistic and figure out how this communicates meaning. So how can we -- how do ASL teachers use this when they are signing? How do they put together the signs and all these non-manual features? Now, we have a Virtual Tutor for the deaf, perhaps Rochester school for the deaf RSD at some point in the future when students are home for the families that may not sign, they will be some connection still between the school and the students or people who live in rural area whose are really far from deaf centers will benefit from the kind of outreach we can do with large audiences or rural audiences. And we want to include instructional activities that help people understand how to use this facial grammar appropriately. We want to take a daring step for the next generation product and see what happened. We wanted to really challenge ourselves. We needed to have a proof of concept. Now, one deaf teacher at the Kendall demonstration elementary school is really noted for his story telling ability. And what we did was we got an English script, English transcript written animated the story, took several months of work to get this done, the team, we are all deaf linguists and it's important that people be familiar with the language. So we have a credible product so we have deaf people who are linguist, have the linguistic background, and that's who produced the animation. And I applaud NTID, as well, for how they have been helping out. The person, okay, the person who made the videotape, became a father last night for the first time so we really congratulate him. Now, this is a four-minute version. Give you a chance to see the full story. What I'm going to do is take one clip and show you a sample. Now this was done collaboratively with Galluadet University. This is some good research. We're not stopping there. This is like the first step in figuring out how we want to incorporate body movement and facial grammar. This story was made on the fly. You can try this yourself on the fly. Type up a script, have someone sign it, and you don't need to depend on doing a really expensive editing and using a great deal of resources. In the classroom with students you can just do this on the fly. Use your own creativity. There's no limits. The gesture builder and the Sign Smith Studio give you the tools to do this. So we evaluated how this worked. We had students read the English script first. And then read it again with the support of the Avatars. The students reaction to the Avatars, students from Kendall demonstration elementary school, it's on the property of Galluadet -- it's on the campus at Galluadet. A demonstration elementary school right on campus. The students were age seven to 11. About age seven to 11. And we interviewed the students and then copied down their answers. Now the teachers from Kendall, here's their responses. A really positive response from both the students and the teachers at Kendall but we still want to continue to make improvements. We

recently obtained a phase II grant from the Federal Government, about a half million dollars to continue making refinements. And we want to continue to improve these products. We really want to make it deaf friendly. We want more deaf teachers involved, as well. Could be used with interpreters in ITP programs, with sign language classes. We would like to site used as broadly as possible. Here's the results of an evaluation. We asked was it easy for your students to view the Avatars and comprehend. An average of nine out of ten. We asked how motivated the students were. Sometimes they tend to let their attention drift when they were watching people sign. But this was more game like and it seemed to keep them highly motivated. The response was the teachers said their students were motivated 9.8 out of ten. How much they liked the Avatars and if it helped the reading comprehension. The teachers said it was 9.3. Many of the students families don't sign at all. In issue is how they can continue their education more independently and this might provide a tool. Now we received funding for another grant from the U.S. Department of Education. What we have is an iPod and the story can either be put into an iPod, this is an iPod touch. And you can download it, if you went to a museum. Suppose you go some place where they have presentations or even if you're driving somewhere, it has a lot of different applications for mobile usage. You saw that story, "The Forest," that I just showed. Well it can play on the iPod touch. That means the parents can stay involved in their children's education. Parents who don't really sign could type the English text into the program and have the Avatars sign what they have typed in. It's one way to fill the gap when students are away from school. We evaluated this project. It was a six-month phase. And the average for ease of use was 8.3 out of ten. When people are using technology for the first time, even like an iPod, with the wheel that you use to control it, it can be difficult. So they enjoyed good success with that. The motivation was a complete ten out of ten. The children were highly motivated to use the device and enjoyed using it. Successfully supporting reading comprehension was rated 7.7 out of 10. And we want to expand what we're doing in the future to incorporate text captions, as well. We started out last October with phase II. Focusing on making improvements to this project with iPods and iPhones. Again there are many terms with multiple means. Sometimes deaf students aren't sure which meaning to use in which context. So we're building that in. Idioms are really a challenge for many of the deaf students like -- doing something with flying colors. Succeeding with flying colors. Or other idioms. We want to make this bicultural both with English and ASL. There's often words that provide challenges for deaf students in terms of their literacy. So this is another tool where teachers can make vocabulary lists that students struggle with and use this as reinforcement at home. Plus the parents will be able to play an active role in supporting their child's education. You know you hear all the time deaf students lag behind in their literacy skills but they graduate from high school at a fourth grade reading level. This is how we hope to address that. Now, bicultural, bilingual programs. Honestly many schools claim that their curriculum is bilingual and bicultural. To have a truly bilingual, bicultural program teachers need to have equivalent skills in both languages and understand both cultures. And frequently they don't have a complete full grasp of American Sign Language, grammar and culture. The ASL grammatical features and as a second grammar, second language for them. It's really challenging for many teachers to develop competence in the facial grammars and using body posture appropriately. So the linguistic principles don't get transmitted or aren't incorporated in the message. These Avatars are one way of incorporating the full rich linguistic features of the language. And students should develop their language skills better. The improved literacy in American Sign Language should support the growth in English literacy.

They should be mutually re-enforcing. We had an ASL round table. If you're ever at Galluadet University a linguistic round table with Galluadet and Georgetown. It's a really hot topic today bilingual, bicultural education and should remain so in the future. Often with touch screens, deaf students aren't -- if deaf students aren't aware of some of the terminology, they can literally touch on it and get a link to the signing Avatar that can then explain the terminology, the phrases, and also we want to build in support of captioned text. So the students will have access to both the written English and the Avatar with a captioned message. As I said, right now we have about 1100 words. And students can have an iPod touch with them. Now, our goals for the future with a National Science Foundation we have the Avatars and we're improving facial grammar with those. Bilingual, bicultural approaches are a huge issue as are the level of deaf students' literacy skills. We want the students to be able to have control themselves of the word order and also sign order with signed messages. We want to use the iPod. Our program with the iPod will improve over time. Like I said, we want to include the multiple meaning words. We'll have a larger library, larger lexicon so thank you very much for coming to our presentation. I welcome you to come down to the booth and look at the programs in more depth. We have many more examples. And you have a chance to see it. I think we have run out of time. We have only 30 minutes. So we have a chance to kind of touch on some things here but please do come down. Any questions.

>> I think it's going to work in both particular ways. We can't make too much of it automatic then the teacher wouldn't have any opportunity to input and the student might not necessarily be able to learn it as well as they could. The teacher might not know the linguistics behind it to put it in themselves. So some of it will be automatic and some will be teacher input. Have to be a balance. Like in XCEL some of it is automatic program and some you have to learn the program and then which parts you can input but then it takes care of a lot of it. The power is in the learning itself. I think so it would be easier for them to do if it was automatic but then they also have the onus of inputting, as well. Any other questions?

>> What sorts of class activities like American school for the deaf, Kendall, the Florida school for the deaf and Kendall, I'm wondering what sort of activities would use this? What sort of materials support this? What do you use for evaluations? What is this based on?

>> Jason Hurdich: For the evaluation basically every state has their own criteria that one must follow. Florida has the particular kind of comprehension test that they give to the students, what have you, New York has the regents exams. What we do is extrapolate from the different exams and then we have to follow those guidelines to determine whether we're fitting it. So you know it's kind of hard. A lot of students often fail the tests that are the state requirements. We're hoping that with the stories and ways we can integrate the different technology we're using that we can use what they need in each of these states to follow. So I'm wondering actually in the classroom, okay -- I see, in practice. No, I mean, really, I mean the tests aren't for state exams, whatever. I mean we have a long way to go. We can't do that. The state wouldn't allow us to interface with them. We're developing our own dictionaries. We're hoping the skills will transition in some of the tests that go from state-to-state. So the teachers are already making their own signed dictionaries for this is what they are saying? They can do that themselves? What would be some of the pros and cons of using this approach? We found. Honestly a lot of the teachers aren't cognizant of what ASL linguistics are. Some of them this is the first introduction to this. They didn't have any idea how to go about it. They never thought of the best way to describe the particular features. So they are actually making the transition, these bridges as they are learning and as

the students are learning. Simply by the sort of sense of play they are engaged in by creating the programs. Basically it's helping generate their knowledge of linguistics and they become more fascinated with it as well. The benefits are so many and I perceive we'll find more as time goes on. There are other applications, too. There's other countries that can use it that we have BSL interest, British Sign Language, a lot of other countries can use this. We have a library. As said we have international signs or things we can add. It's an ever changing, evolving program. It's not solely ASL. This has a worldwide application and we can add more of the hand shapes as we needed. We wanted to start using this at my school. If I was going tone gauge in this? What would I need? I would need gesture builder and the Sign Smith Studio. How would I get this?

>> Jason Hurdich: We have a tutor involved that's in the program. But you could always contact us and we would be helpful in the process as you decided to institute where you're working to. We have a free trial. Also it's a CD that's available in the back. If you wanted to play wit for a month and see how it goes you could feel free to avail yourself of that, as well. Any more questions? I'm sorry, what was that?

>> What is the time frame for having this available for the iPod?

>> Jason Hurdich: Well, summertime. We're hoping this summer we will have this out. We are hoping that everything will be available and the animation, everything. You can get it through iTunes store actually. I think it doesn't cost very much. Usually it is $1.99 -- excuse me, 99-cents. Soon it will be available through iTunes, as well.

>> Video clips will be able?

>> Jason Hurdich: Yeah, come fall time. Characters are changing. We're in different generations of character development. 2009 we will be doing a total turnover. "The Forest" that gentleman will have a total different character. There was a question in the back about children Avatars. The answer is yes, we will have children Avatars. We will have different races, different cultures, we'll have children, we'll have different cultures and countries represented, as well.

>> [inaudible comment]

>> Jason Hurdich: Most the time. Well, this is amazing. It's a very sophisticated program the Sign Smith Studio. It has a way to identify words. I think about 90% of it will match the right sign. 90% agreement for verb agreement. If not it can change very quickly and adapt to what the appropriate one would be. If you come down to the booth I would be glad to demonstrate that for you. Any other?

>> I want to know more about the virtual visual tutor. Can you tell us a little bit more about that?

>> Jason Hurdich: Yeah. For example, there's a lot of educational games that don't have access to us, deaf folks, it's all spoken. In a game environment what we're trying to do I believe in the fall or possibly in the spring we're going to have a physics program so we're going to have an Avatar and you put something, put the program in and then there's going to be people explaining or the Avatar will be signing different sorts of concepts of physics and so this is something that you will be able to interface with. You can go to like also doctor's offices like an interview in a doctor's office. Sort of demonstration of what that would be like. So you know there's so many different uses for educational situations and we just keep adding and adding. No end to that. How much does this cost? Sign Smith Studio?

>> Jason Hurdich: We have a paper with a list of all the different materials on there. If you want a fee schedule you can see that. Please come down to the booth. I am so happy to talk about my work and I can go much more in-depth with you.

>> So if we were to purchase this, how many computers could we actually input this program into at a time?

>> Jason Hurdich: Well there's different levels. Use it in the classroom for one use, but then if you're going to use it all over the school then there's a whole different kind of way you have to input that and also pay for it. So there's different rate. We'll have to show you the fee schedule for that later, too.

>> Is it window specific or Mac.

>> Jason Hurdich: Right now it's only Mac. Mac is extremely complicated and difficult interface to work with. Next year we're hopping to do the PC component, as well. We're going back and forth in being able to have compatibility with both sorts of computers. Our goal is to have both of them usable.

>> [inaudible comment]

>> Jason Hurdich: That's a very valid concern. I think the key to this whole thing is to involve the deaf community. You go to Galluadet. I'm here. I have gone to Connecticut. I have spoken to the community. Garnered their feedback and felt a very valuable tool. It won't succeed if you don't have that input and validation for them. The key to it all is collaboration from the deaf community and make sure. They wanted more facial expression. They wanted the grammatical features. Feedback has been invaluable. All the leaders in the deaf community who we consulted and gotten their opinions from have seemed positive. Basically the idea is credibility and without that there's no way it could succeed. Last question. Okay. Is there one? Anybody? Nothing else? Have something? No, later. I'll ask you later. Thank you so much. This is a conclusion of this session. And if you wouldn't mind please filling out an evaluation form. We'd appreciate it. It's important that you put down which session it is. And this is T10D is the name of the session. Most important part of the form, actually. You can give it back to me at the door when you leave or if you don't want to use the hard copy you can feel free to go on line and fill out the thoughts. Please come down to the booth and meet me. Anything would you want to ask me I'm willing to answer. Thank you.