Stanford eCorner

Education Reimagined [Entire Talk]

Sal Khan, *Khan Academy*

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Sal Khan, founder and executive director of Khan Academy, discusses elements for a new vision for education. While offering examples of how his organization is bringing disruptive approaches to traditional learning experiences, Khan touches on the early days starting Khan Academy and the power of collaboration in creating change around the world.

Transcript

It's always great to be here and I actually do like to start just kind of getting a gauge of where everyone is. So I saw how many of you all are students, actually how many of you all are not students? Would - might be more interesting. Okay, so there actually are - and how many of you all are undergrads? And how many of you all are grad students? Okay that's interesting. And how many of you all have used Khan Academy at some point? Oh okay. And how many of you still use Khan Academy every now and then? Okay, that's good to know. And how many of you have no idea what Khan Academy is? There is always somebody, okay good. Good. That's good. I will talk to you. So as - I guess a lot of folks know Khan Academy, its associated with these videos, but hopefully what we'll kind of talk about over the next hour or so is that it's - at least in my mind much, much, much more than just videos and will continue to be so, but to get everyone on the same page, I will start with this little montage of videos just so people get a feel of what they look like.

So those are the videos, but as I mentioned it's much more than just videos. This right over here is our computer science platform that we launched about two years ago and it's really our thinking was, well can we show people the creative side of computer science where it's not reductionist what's a for loop or a variable, but really build portfolios, create games, screensavers, explore mathematical concepts, whatever else. This right over here is kind of I would say that the meat of our experience which is students can pick missions to work on in mathematics, they can work on their skills, it starts to build a statistical model of what they know and they don't know. It suggests exercises that are appropriate to the students. The videos are there in case the student might use it, when they're done, they get this mission completion, there is all sorts of - all sorts of game mechanics around it. And we will talk more about where all of that stuff is going and what other types of experiences we have in the pipeline so to speak. But I will - before I go there and before I talk about kind of how all this happened, this is kind of a snapshot of where we are right now. It's being used in some way, shape or form, almost anywhere, 10 million users every month, 300,000 teachers are using us in some way, at least they've been registered as teachers and we just crossed the 2 billionth exercise done on Khan Academy, it's about 5 million a day. But I will rewind back to I guess the humble beginnings of this and it's fun to talk in this area because all of this happened not too far from here or it at least eventually happened not too far from here. If you rewind back to 2004, I was a year out of business school, I had just gotten married, family was visiting me up from New Orleans.

It came out of conversation that my 12 year old cousin Nadia was weak in mathematics. I asked her what was going on. She took a placement test at the end of sixth grade. She says it had unit conversion on it. She had - she gets confused about unit conversion, ounces to gallons, miles to kilometers and because of that she bombed it and they placed her into a slower math track. And so I told her look, I think with a little work you can get up that curve and I don't think she or her mom fully appreciated the implications of being put in a slower math track in sixth grade because that kind of carries with you the rest of your life. And so I said, and I will tutor you, if you're up for it. And so Nadia agreed, she goes back to New Orleans, I'm in

Boston. We're on the phone everyday, half an hour everyday after work, after school for her and we start working with each other. And first few weeks kind of painful, she had psyched herself out, she is - I'm not good at math, I can't get this stuff.

But slowly but surely things started to click. About a month into it she started to get unit conversion and kind of catch up to where her class needed - where her class was and then she got a little bit ahead of the curve. I started teaching her some algebraic concepts and things and at that point I became what I call a tiger cousin. And so I emailed her, I called up her high school - her school - her middle school and I said I really think Nadia Rahman should retake that placement exam from last year. They said who are you? And I said I'm her cousin. Hence, they actually did let her take it and she did very well and she went from the slow track to the advanced track. And so I was - and we continued to work together and I was like wow I didn't have - that was a very small intervention I did and it had an impact on Nadia's trajectory. So I was kind of hooked and so I started working with her younger brothers and then a bunch of things happened over the next roughly two years. First, my boss, the firm I was working for and I use the term very generously because it was me, my boss and his dog, we - the dog was the chief economist. We - it was a small hedge fund and my bosses wife just took up a position as a professor at Stanford Law School and so because of that we moved the firm out here, we moved right on Sand Hill Road that kind of five story building right next to the Safeway over there.

And the other things that happened was I - word got around the family that free tutoring was going on and so I found myself working with 10, 15 cousins everyday after work and school for them. And to help myself kind of scale up a little bit, I - my background was in software and I think anyone who has ever dabbled in software has always fantasized well, this could be really useful for education or to give people practice problems or whatever else and I'm not the first person to think that. And so I started writing this little exercise generator for my cousins, just to give them as many problems as they need, if they need they had - if they needed help with something, it would give them hints, it would give them solutions, put a little database behind it, so I could keep track of what they were doing. I had to put it on as a web app, so I - what domain names available and after a long time I said well you know it's just me and my cousins, Khan Academy is available, I will call that. And it kind of sounds like something real. And so I did that and you fast forward, so all the way, so now I'm living out here and I literally used to ride my bike through campus everyday on the way to work and I was at a friend's house, this is like November 2006 and I was showing everybody all the stuff. A lot of my friends knew that I had this crazy project with my cousins and I was showing the software and everything and one of my friends, his name is Zulie Ramzan, and he said, well this is cool Sal and this is neat software and everything, but I only have one question. How are you scaling up your tutorials, your lessons? And I said no you're right, this is really hard. What I could do with just Nadia or just Nadia and her brothers when there was one, two, or three people, I can't do now with 10 or 15. I'm doing these crazy conference calls sometimes, one week Sasha asked a question and I had kind of already covered that the week before with Ali.

And so Zulie says well, like crazy idea, why don't you just record some of your lessons as videos and upload them on to YouTube. And I said no that's a horrible idea; YouTube is for cats playing piano. It's not for serious mathematics. But I went home that weekend, got over the idea that it wasn't my idea and I decided to give it a shot. And those first few videos were on pre-algebra, basic algebra whatever else, uploaded them, I start telling my cousins hey look here's some of the concepts that I think you all would - you all have asked a lot of questions about, so why don't you review them or get introduced to them through these videos and then when we get on the phone, we can dig deeper. And after about a month of that, I - they gave positive feedback, they said that they found it really valuable and to the point that they even said that they liked me better on YouTube than in person. And on a whole bunch of levels that's a completely counterintuitive comment, that somehow the virtual OnDemand version of a cousin could be better than the real thing. And - but what they're really saying is that the first time you are being exposed to a concept, you don't want someone who might be judging you or is waiting for you to understand it. You want to be able to ask the silly questions without judgment, watch something over and over again. What they weren't saying is that they didn't appreciate me in their life.

That they appreciated that I took interest, that I was trying to motivate them, that I was trying to give them the bigger picture that I was there to answer questions that they had. So I took that as positive feedback, I kept making more and more and more content and obviously as it's on YouTube it's public and it soon became clear that people who are not my cousins were watching. And the initial comments they were just something like thank you, that started coming in and even that's a big deal, I don't know how much time you all spend on YouTube. Most of the comments are not thank you. There are something a little more colorful than that. But then I started getting comments of hey I've just retired from the military and I want to go back to college and this is what gave me the intellectual bridge to re-engage and do college-level mathematics. Got letters, this is the reason why my child with a learning disability is able to engage in school, this is the reason I am passing algebra, this is the reason I didn't drop out of high school, these really intense things. I got this letter in those early - this was like 2007; this was like a year into it. I brought my wife, I was like this is incredible. This mother, her - both of her sons had dyslexia and said this is - these videos are the only things that's connecting with them, they like the handwriting and they like the kind of narration and because of what it's doing for their family, her whole family prays for my family every night and which is heavy stuff.

I mean put things in perspective. I was an analyst at a hedge fund. There wasn't a lot of prayer or a lot are praying for us at

least. And or at least in that way and so you can imagine, so this was an incredibly satisfying just hobby for me, but then you fast forward obviously the traffic, it keeps growing and growing and growing and the videos kind of take a life of their own. They were initially there as kind of this supplemental thing for my cousins, a thing to complement the software thing that I was working on and I was still working on the software, but the videos started taking more and more of my time and - but you go to 2008 at that point they were probably several 10s of 1000s of people using the videos every month. At that point I still didn't think this was what I was going to do for my life. I actually liked my career, kind of being an investment manager or analyst whatever you want to call it. But I did set it up as a not for profit at that point thinking oh maybe I could get some donors and maybe we can get enough funding to hire a small team to start working on this in a more substantive way, maybe working on the software part of it. But then by 2009, at this point now we had probably about 100,000 people who were using the site every month. And I frankly had trouble focusing on anything else.

This is what I was excited about; this is what every cycle I was like what's the next video I can do? How could I make this better? How could I cater to these requests that I'm getting from users? And so my wife and I, we looked at our financials and we had some savings, but it was essentially for a down payment on a house here which you all know is not a simple matter. But we said, well look this looks like there is something here and it looks like the time is right, let's give it a year essentially live off of savings and see if we can get this, this not for profit off the ground and I think all entrepreneurial beginnings whether they're not for profit or for profit, they do start with a little bit of this wildly optimistic maybe even delusion because you do get data points. A lot of people say oh, this is great, this is great stuff you're doing, you should talk to us, we might be interested in funding it, and so that gets you really excited. But then you start the meetings and you have all these great meetings, but then you start to see a pattern that wow a lot of people like this but it's not quite what they invest in. It's not quite what they fund. This is a different thing than they do and that kept happening for the next several months. As you go into the spring of 2010, I started to get worried. We were digging, my son had just been born, we were digging into our - we had to move into a house with higher rent, we were digging into our savings about $5,000 a month and I was getting $5, $10 donations on PayPal, it was amounting to about $500 a month and if it was any of you, thank you. But as you could imagine it was kind of a fairly stressful thing and I was starting to wonder if could I even go back to my old job? What will they think, and all that. And but I did even in moments of weakness start updating my resume and - but then all of a sudden a $10,000 donation came in.

So I immediately said who - what's going on here and I see her name is Ann Doerr, she's based in Palo Alto. I immediately e-mailed her and I said thank you so much for this incredibly generous donation. If we were a physical school, you would now have a building named after you and Ann immediately e-mailed back, she said well you know I'm local and I have started using your site with my daughter, I also use it myself to understand I had all these videos on the financial crisis and economics and whatnot. I would love to learn more about what you're up to. And so I think it was like three days later where we meet in Downtown, on University Avenue at a Indian buffet restaurant and Ann asks me so what's your goal here? And I said, well look when you fill out the paperwork with the IRS to become a not for profit, there is a line that's mission; I guess a line or line and a half and I filled out a free world-class education for anyone anywhere and Ann says well that's ambitious, but how do you see yourself doing that? And I told her this is just - this is a mission. It's not like - I don't plan to just check it off tomorrow and then move on to healthcare or something. But I think we can make a lot of progress. I showed her screenshots of the software, I said in my mind it's not just about videos, we obviously could do a lot of videos, we could translate the videos, but it's more than that. We have to create interactive experiences, ways for students to get feedback, ways for students to connect with each other, ways for students to work on projects kind of I only dreamt about the computer science stuff at that time, ways for them to tutor each other. And Ann says, well you know somewhat surprisingly you've made a lot of progress here, I only have one question.

How are you supporting yourself? And in as proud of a way as possible I said I'm not and Ann kind of processed that and we part ways and 10 minutes later I'm coming into my driveway in Mountain View and I get a text message from Ann. And it says you really need to be supporting yourself, I've just wired you $100,000. So that was a good day. And it just - things started just getting crazier and crazier from there. You fast forward about a month, I was this virtual teaching, video making guy, but I have never viewed that as somehow replacing a physical experience. I have always viewed this as liberating the physical experience. Hey, if people can get explanations at their own time and pace, if they can get problems and feedback at their own time and place, they can then kind of get core skills at their own time and place that frees up the human experience for more interaction for conversation for simulations. And so to kind of explore that idea I was running - this was actually the second year I was running a little summer camp with a friend Aragorn Berliham out in Portola Valley and we were in the middle - it was for middle school kids and we were in the middle of a simulation, I had six kids playing a game of Risk and while that was happening the other 20 students were training securities based on the outcome of the game of risk, very good game. And one student invented naked shorting on his own, it's not naked - you know shorting without owning the security you're selling it without actually borrowing it, but anyway it was fascinating, that was a 12 year old. I told him we could get him an internship.

But the - but while that - while that thing was happening all of a sudden I start getting text messages from Ann, which you could imagine I now take very seriously. And they read along the lines and they were hard to read, they were like six or seven in a row and I couldn't tell which came before which, they read along lines of I'm at the Aspen Ideas Festival, in the main

pavilion at the Aspen Ideas Festival, Walter Isaacson on stage with Bill Gates. Bill Gates last five minutes talking about Khan Academy and I didn't know what to make of this and so I immediately boot the nearest seventh grader off of a computer and I start looking for some evidence of this event that Ann is referring to. And after about 20 or 30 minutes I did find the footage of the event, it was Walter Isaacson, head of the Aspen Institute asked - sitting on stage asked Bill Gates what are you excited about these days? And Bill, I call him Bill now - Bill just starts - says there is this new site called Khan Academy, I use it with my kids, I use it myself, and he goes on and on and on and it was clear he had spent a lot of time on the site. And you could imagine what I was feeling, I was - it was surreal, I was excited, but then I started actually getting nervous. Those videos were for Nadia, not Bill Gates. And I go home and a few friends started to catch wind of it - a few of them were actually in the audience and they immediately emailed me and whatnot I showed my wife and then I what do I do now? This thing clearly happened someplace in the universe, but what's the next step? Do I call him, do I - and I'm assuming he is not listed and they frankly left me in that limbo for the next two weeks. Two weeks later I am in our walk-in closet about to record a video and all of a sudden the cellphone rings, it's from Seattle. I answer it, hello. Hi this is Larry Cohen, I'm Bill Gates' Chief of Staff; you might have heard that Bill is a fan.

Yes I heard that. If you're free in the next few weeks, we would love to fly you up to Seattle and learn more about what you're doing and see if there is ways that we could work together or possibly support you. And I was looking at my calendar for the month, completely blank. So I said yes, maybe on Wednesday I've got to cut my nails and do some laundry, but I think I could meet with Bill Gates. And so we met and the meeting frankly was very similar to that meeting with Ann, what do I hope to do? I kind of painted the vision of I had all these slides that I had and what this could be, how much more than just videos. And they kind of processed that right around the same time, folks from Google reached out, asks the same types of questions, told them the same thing. And all of these things just they went really from famine to feast within a matter of months where all of these people, all of a sudden say we think this is a real thing, that's worth supporting. And so in October of 2010 Gates Foundation and Google gave the first initial funding and since then there's been many other great supporters to kind of build the real vision of a free world class education for anyone anywhere. And what we kind of focused on in the beginning what was the extension of that software that I started working on in my cousin - with my cousins. And this right over here is kind of a zoomed out version of our knowledge map and the knowledge map is no longer our primary navigation interface, but I like to show it just because it at least it's a conceptual depiction or a visual depiction of how we think about at least math you saw on the videos the site goes well beyond math and it sounds like a lot of you all have experienced Khan Academy well beyond math.

But math is still where we have invested the most. And the general idea is each of those circles are concept in math at the top are basic arithmetic and as students show mastery it moves them down that graph, that map and on a lot of levels that's common sense. That's how a videogame works, you beat level 1 and then you go to level II, it's the way a martial art would work, you practice the white belt and then once you master the white belt exam then you become a yellow belt, it's the way musical - practicing a musical instrument would work. But we always point out that's not the way that a traditional academic model works. The academic model, especially the academic model of roughly the last 200 years groups students together usually by age and then it moves them together at a set pace and what typically happens in the classroom is some part of classroom is devoted to lecturing on a new concept, some part of it is reviewing the previous night's home work, students go home, they do more homework, come the next day review homework lecture, homework lecture, homework lecture. After about two or three weeks of that, they have an exam. And let's say that exam the current unit is on basic exponents and on that exam let's say I get 80%, you get a 90%, you get a 95%, you get a 60% and even though that exam however imperfect it might be, even though it identified those gaps, the 60% person didn't know 40% of that exam, the - even the A student didn't know 5% of that exam, the class then moves on to the next concept. A concept that's likely to be building on top of that, negative exponents or logarithms or whatever else. And to kind of understand on some level the absurdity of that, imagine if we did other things in our life that way, say homebuilding. So you bring the contractor in and you say well we have been told that we have three weeks to build a foundation, do what you can.

And so they do what they can, maybe it rains, maybe the some of the workers don't show up, maybe they fall sick, the supplies won't show up, after three weeks you get the inspector to come and the instructor says well you know that part is not quite up to code, that concrete still not dry, I would give it a 75%. So great, that's a C minus, let's build the first floor. Same thing, we have two weeks, do what you can and 80% second-floor we have four weeks do what you can and you keep doing this process and all of a sudden you're working on the fourth floor and the whole thing collapses. And if your reaction to that is what are our reaction typically is to kind of failures in education, it's like oh we must have had a bad contractor or we may be we did have enough inspection or maybe the inspection wasn't good enough and maybe that was some of it, but the obvious problem was that the process was broken. We were artificially constraining how long someone had to do something, then we went through the trouble of doing an inspection of assessing the current state of things, but when we identified gaps we just ignored them and then we built on top of those gaps and then we are surprised when all of a sudden we have a kind of a failure of the entire system. And so what we believe in is instead of holding fixed when and how long you have to learn something and the variable is how well you learn it, A, B, C, D, E, F, should be the other way around. What's variable is how long and when you have to learn something and what's fixed is you should get it to a high level of at least proficiency and preferably mastery.

This right over here, right when we got out of the gate, it was kind of surprising to me, but it was always the dream to be used in schools and some schools reached out to us, especially locally in Los Altos and they said what - how could you imagine this being used in a real classroom? And we said well, we don't think the lecture should be the focal point of the classroom anymore. We don't think if lecture isn't the focal point of the classroom anymore, you don't have to move everyone together at the same pace, you don't have to separate the strong from the weak students anymore. Instead students can learn at their own pace, watching videos if they need to.

Doing exercises, getting feedback, and the classroom should be a place for interaction. And we can arm teachers with dashboards like this and this is just one of 50 ways that teachers can look at the information. And you can use this to facilitate kind of peer to peer learning where a teacher can say, okay look it looks like James is having trouble with solid geometry. A teacher - if I'm the teacher I could either say okay I am going to sit next to James while everyone else works at their own pace or even better I could say okay, it looks like Marsha is proficient in that, maybe she could be - tutor James or maybe Ben has already mastered it, he could tutor James and then they both benefit. James gets the benefit of getting personalized attention, Ben or Marsha get the benefit of learning to kind of empathize and communicate and explain concepts and frankly and learn the concept that much deeper. This is some data from a charter school in Oakland, California. It's Oakland Unity, it's serving an under-served population, it's a ninth grade algebra class here and I want to be very careful with this slide because I don't want anyone to walk away with the impression that Khan Academy is this - it's this miracle thing that you can just drop into a classroom and the butterflies will fly and the flowers will bloom. It's a tool. And like any tool it's going to be as effective as the folks who are using the tool and a lot of what the results I'll talk about in a second are in my mind primarily due to the teaching staff at Oakland Unity and just to get a sense, this was a school that in 2010 was in the 20th percentile in the State of California amongst ninth grade algebra classes and in that one year without any Khan Academy they did - they were able to get to 76 percentile. So a huge jump just by amazing teachers and when we even asked the teacher Peter McIntosh, who was the head teacher, what did you do? He said, well I just wanted them to kind of take ownership of what they were doing.

So he was already even without Khan Academy trying to get into a self-directed personalized learning world. But then he said he felt it asymptoted because there is only so much that I could do with the students and we were kind of hungry for this and then I learned about Khan Academy and then that's what took them to the point where in 2013 there is only nine ninth grade algebra classes in the State of California who have outperformed this classroom. And what's been interesting about this is Peter McIntosh he says, yes the math is nice, it's great - it's nice that they have great math scores, but he sees it as something more than that. He sees it as a mindset changing tool where these students were typically and this is not just this classroom, this is a lot of classrooms. They were passive, they would say teacher tell me what to do next. Yeah, I'm not good at math, they will engage in a problem for four seconds and then they will give up. And then sometimes view the teacher as the antagonist. Hey, that person is going to try to fail me, they are going to give me a hard test; I have to do a little gamesmanship with them. And it changes that to okay, this is my goal. Here are all the tools that I have to reach my goal at my own time, at my own pace, and my teacher is a collaborator, they're trying to get me to where I need to go and as soon as you have that self-direction, you have that ownership over your learning narrative, that pays dividends in every class you take and they saw that that these kids actually improved in other classes, because they learnt to take ownership of things.

Now the one thing that we remind ourselves is this is schools but still the great majority of students are students using 90% of the 10 million who come to Khan Academy every month are just people who are using it on their own to tap into their potential like maybe a lot of you all were when you used it in high school or even use it today. And so, this next video is kind of one of the coolest examples that we've seen recently on this. So I actually dropped out of high school twice, both during my freshman year. And when I eventually came back, I was put in sort of lower level math and science classes because I was so behind. Then I discovered Khan Academy, and I was able to skip two years worth of math just through using the site and I came into school, I took the exam with students who had been enrolled in the class all year and I was actually able to get the highest or the second highest scores in the class. So for me Khan Academy really changed the trajectory of my entire life, because without it I don't think I ever really would have been inspired to learn and to love math and to love science. I ended up graduating as a valedictorian and going on to Princeton, where I am now a computer science major, and I am absolutely passionate about learning about computers, about math, about science and without Khan Academy I don't think that these things would really matter to me the way that they do today. So I was like to say a massive thank you to everyone at Khan Academy, Sal and the team, please keep doing the good work that you're doing, because you're really changing lives. And what's neat about that is when we found out he's a computer science major. We said hey you know we have internships, for those of you all in the arts, I'll tell you that as well and we'd love for you to apply and he applies and in the interview process strong hire, strong hire, strong hire and actually had some of our engineers like who is this guy, he is just rocking the interviews and - why are you surprised? We helped educate him.

So actually he - we gave him an offer. He accepted, he is coming this summer which is super exciting for us because it comes full circle where we are essentially solving our own labor problems. But it's neat, he will be able to hopefully make Khan Academy that much better for the next generation of Charlie's out there. This is something that maybe some of you all heard about a couple of weeks ago, we made an announcement the College Board made the announcement that they are launching

a new SAT in 2016 and part of that and this was what's kind of neat about it, it's the first time that the College Board has recognized they've always kind of known, but they're officially recognizing that there is this at least perceived inequity and probably real inequity around people's access to prepare for the SAT year, their familiar - their familiarity with the SAT. And so their new president, David Coleman, he reached out to us and we would obviously been talking about this for some time, we only announced it a few weeks ago but the goal is leading up to that new SAT so this time next year we are going to be launching and I want to use the word very carefully, essentially the best free test prep for the SAT. But what we are excited about here is, there's two things we talk about is Khan Academy gets a lot of credit for the free for anyone anywhere, but we take the world-class part just as seriously, that we just don't want to get a free pass because we are free, but we can be a little bit substandard. For us, it's about being world-class that we want to be the best tool that just happens to be free. But above and beyond that the reason why they really wanted to work with us is that they appreciate that we are not about hey you have the SAT tomorrow, here is 10 test taking strategies to kind of slightly optimize your score, that we're really about learning, that we are about taking someone from one knowledge date and with enough perseverance and effort they can get to another knowledge date. And maybe on top of that they can polish and get familiar with the test and some strategies and whatever else. So our real goal is to - and if I use the word test prep very carefully, this isn't going to be what would you normally associate is kind of something superficial, this will be a very rich tool, heavy on analytics where students can go, get as much practice as they need, it understands where they are, understands what they need to work on and so that they can really kind of put their best foot forward when they show up for a fairly high stakes examination.

Everything I have talked about so far has been kind of the English-speaking world, the developed world, but as you can imagine some of what we are talking about could have even larger implications in the rest of the world and this isn't something that I personally spent a lot of cycles thinking about, I was just working on whatever I thought was interesting next or working with schools in the U.S and whatever else, but we had other NGOs and groups taking our stuff off-line, online and taking them to all over the planet this actually had started as early as 2007. And all of these are actual pictures of Khan Academy being used and all of these are fairly exciting stories in their own right, but probably the most exciting one at least on this screen is the one in the top right. I used to say at talks like this, who knows maybe one day this will be used in Mongolia just imagining that's kind of the furthest place. And then I get a letter from the young woman in the top right from Mongolia and it's actually kind of similar to Charlie's where she had some text and she said and she had a link to a YouTube video, I click on the video and it was similar to Charlie's thank you, I'm enjoying this, this has really helped me enjoy my math whatever else. And my initial impression was that oh, that's great and - but she spoke English quite well, she clearly had access to the site, clearly had access to YouTube, so I immediately assumed that she must be middle class or upper-middle-class. But then I read the text of the e-mail and it turned out that there were a group of volunteers from Cisco who are using their vacation time to go to Mongolia and set up computer labs with broadband in orphanages. And so what you see in the top right there, those are girls in the orphanage using Khan Academy and Zaya was one of those orphans. And that by itself was kind of the science fiction epic thing to even process for us, but then on top of that Zaya has since been one of our top contributors in the Mongolian language in terms of actually trans - once again like Charlie contributing and giving back to the resource that hopefully helped her. And kind of in-line with this how do we reach more people on the planet; we have been working on an internationalization effort especially intensely this last year and a half or so. And once again it's not just about translating videos, that's definitely part of it but it's about translating the entire experience.

And the first full experience we launched was Spanish this past fall where everything I showed the computer science, the exercises, the teacher dashboards and the videos are fully translated, and what's really neat and this was kind of a side-effect. We actually didn't design for it, but it just happened. You could actually have a classroom where you have five students who - they might be weak in English, they can operate on the same mathematics, the same standards in Spanish and then the teacher could get the dashboard in either English or Spanish. So it's kind of a neat way of your English shouldn't be your barrier to necessarily progressing in mathematics. So it's something we are pretty excited about. But to get a sense of what this all looks like in other languages, I will show this next montage. So these are just more pictures of Khan Academy being used all over the planet. This is just people like e-mailing this stuff to us and we just get excited about it and the one thing that I tell everyone I talk to, I tell to this the team at Khan Academy, I remind them on a regular basis, I tell this to our supporters, to our volunteers, and I want to emphasize it's way more than just me now. We have 60 full-time employees. We have had nearly a hundred teachers who have helped us write content, and not just teachers, professors, grad students helping us write content, we have had 14,000 people help us subtitle videos or work on the translation project in some way.

So - and obviously there are so many teachers who are giving us feedback and whatever else. So it's much much more than definitely me and even just our core organization. But what I would tell everyone is this is kind of an exciting time and frankly it's not just in education, there is other stuff going on as well. But even in education it feels like, we're definitely an inflection point information revolution whatever, whatever you all hear a lot about that. But whenever there is new inflection points there is new problems, but then there is kind of a chance to create new institutions that address those new problems. And it was kind of a delusion when I'm literally walk, sitting in my walk-in closet, thinking well maybe Khan Academy could be something like that, but it's becoming more and more real and our hope is that really over the next 10, 15, 20 years that just maybe we could - it's not going to happen overnight, this thing called learning, this thing called education that has historically

been the key determinant between the haves and have knots, we can make it that much more equal, we can get that much closer to it being like clean drinking water or shelter, a fundamental human right. Thank you. We will take questions. Just so you know I planted those first four people just so that you guys I wanted to see how independently you think. So, yes I'd love to take questions.

Yes. Yes, so the question is the idea of self-paced learning or personalized learning and using the classroom for more interactive things, these are - it makes sense and these are maybe good ideas, but how do we actually get them into the system, into the public school system especially you read about all of the barriers and all of the resistance to change and whatnot. I don't know the answer for sure. I think there are some reasons for optimism and then maybe some smaller reasons for a little bit of pessimism, but I think there is ways to get around it. The optimism, Los Altos, which was the very first district to reach out frankly before we even thought about seriously that a district would even want to do this. They're a public school district. Obviously they're in kind of a special place in Silicon Valley and they are driven to large degree by the parents who really want to see innovation happen for their students. But you know they have a very forward thinking school board and superintendent and teachers and at least showed us that a lot of these - but a lot of the people that they - people often point the finger at oh unions if you have unions you're not going to be able to do anything whatever. They have all of those things, but they were able to move fast and they were able to experiment. So to me the big lesson was where there was a genuine will and a genuine desire at least in a school district like Los Altos which is smaller and doesn't have all of the issues as some of the larger school districts have, they were able to move.

Now with that said, there was definitely a difference between when we started with four classrooms and five classrooms and you had your four or five teachers who are just early adopters, they got it before we even showed up and kind of like Peter McIntosh at Oakland Unity and they - and it was like it was a great experience but then when we went district wide, we started to see a little bit more of the reality that - and once again this isn't about good teacher, bad teacher, it's just about what - if you're a teacher how - what do you imagine the role of a teacher to be. And I think a lot of educators view their job as to cover the material to at least if I've covered it maybe I've done my job, I can go home and I can sleep properly. It takes a huge leap of faith if you're a ninth grade algebra teacher and little Jimmy is really - you know that he doesn't even know how to divide decimals, but you kind of it takes a huge leap of faith to let him work on that knowing that if he builds that strong foundation, later on algebra is going to be that much more intuitive for him, instead your impulse well let me just at least cover the algebra and let him learn to pattern match it a little bit, so he can kind of pretend to answer the questions, so I've done my job. So our takeaway is a lot of the classroom - optimistic, the classroom penetration has been far faster than we would have expected. At the same time the full implementation is not as much as we would have expected and so what we are trying to do now instead of trying to go into district A or district B, or school A or school B and say hey lets see if we can change together. We're now going the other way where we're looking at the universe of people using us. For our first passage just looking at the data like who is using us in a substantive way, then when we see that we keep filtering it down to like these people are interesting, let's visit them, let's see how they're using it and we start to identify this handful of people who are getting it. Frankly, they're getting it better than I would have gotten it. They're really pushing the envelope, let's understand how they did it and some of these people are in public school systems, some of them are in charter schools, some of them are in private schools, what did the teacher have to do to kind of let the system let them do it, but then what are their practices and so we are in the midst of that that that part of it where we are trying to understand what they are doing document it, and then share it with other teachers and then also helping them to push where - push their boundaries further where they have been able to do that much, but maybe if we help them and we recognize them, their school or their district will let them go even further. So it's an open question.

My general sense, very few people view education this way. But education is actually - it's fundamentally aspirational. It's all about everyone is always looking like okay who is, what's the institution that's better? What's the neighborhood that's incrementally better than mine, what are they doing? And I want to emulate them. And you see that throughout your AP test. AP test is actually an example of a systemic change that happened without government intervention. It happened because in the '60s I think or maybe '70s Phillips Andover decided that hey, our students in calculus or chemistry or physics, this is a university level course, we should get - our institution should get credit for this. And so they started working with the Association of Colleges and they started to get credit for it. And then you can imagine someone else said our students are just as good, we are just as good of a school, we are also going to do this. And then over the next 30 or 40 years we are now at the point where know - there is very few high schools in the country that kind of - even aspire to be half decent don't offer AP courses. And so in our mind is if we can either highlight or help catalyse even a handful of exemplar look at what they're doing and it isn't just good to watch, but look at their data, look at the outcomes both objective and subjective, look at their students, they are healthier and they are able to do things that you wouldn't have expected, the students to be able to do.

I think you're going to have kind of an aspirational effect. Now once again, it's not going to happen overnight, but I think it will happen over time. I think we got lucky where we fell into Los Altos. Most school reform people go where it's most broken where there is 20 variables that are really hard to fix. And even when they do fix it, they do these Herculean efforts, then the next district says well if this is such a good system, how come they're not doing it in Palo Alto? How come they are not doing it in Atherton? And what was interesting about this Los Altos experiment is as soon as we did it in Los Altos, all of a sudden Palo

Alto wanted to talk to us, all of a sudden Atherton wanted to talk to us, all of a sudden the private schools wanted to talk to us and the schools that were facing much more difficult hurdles in the inner city wanted to talk to us. So it kind of helped us understand this dynamic of yes, if we can create some exemplars I think we can start to have cracks form and people start moving in the right direction. Yes. How do you think this will translate into the university setting, specifically how Khan Academy provides education, but universities provide both education and certification? Yes, And so how do - how will this translate into the university setting and Khan Academy is kind of focused on you said education, I will say education is made up of learning, credentialing and socialization and right now most of what we're doing is the learning side of things, while university is kind of all three of those things. And I think there is a bunch of it in my book, The One World Schoolhouse, the last third of it there is a chapter on like what would a university, the idealized university of the future look like? And in my mind so when I think about it from - we're always hiring, we look at some of y'all's resumes and what always impresses us, if I see Stanford on your resume, that's impressive because I know how hard it is to get into Stanford. If you went to someplace else you said I got into Stanford and you actually showed evidence of that, it's pretty close.

I mean it's like a great experience and everything, but beyond that I then care about now what you've done? What is your and it's hard for me to decipher a GPA or A or B in this class or that. I want to see a portfolio of creative works. I want to see hey have you written an app, have you written a book, have you have a painting or sculpture whatever it might be, that is a huge signal to us. And what I would also love to know what do your peers think of you? Are you someone who contributes to a community who people want to work with, that's the person that I want to work with. And so I imagine the ideal credential of the future is that. It has kind of a baseline, these are your skills, your competencies and frankly I think pretty much everyone who walks in, who gets admitted to Stanford is kind of already there, I mean that can get improved and they can learn more specialized things or broaden their knowledge, but they have already - their critical thinking skills are already quite quite good. But then on top of that, I want to see what you have made and I want to see kind of how you fit into a community. And so the university of the future I think would be very focused on that. It would be you come and I was just at Carnegie Mellon last week and I told them the same thing: Carnegie Mellon or Stanford or MIT I told the folks at MIT this, especially with this caliber of student, they should come and you have the community you have all the great things the dorms, the clubs everything else, but your day to day is not in a lecture hall taking notes, trying to prepare for the next exam. Your day to day is making things.

Your day to day is making things on campus, doing research, collaborating, starting businesses, doing art installations, using the community around and you are in Silicon Valley, leveraging this, doing internships at every firm here, it could be in tech, it could be in design, it could be in anything. And so when you come out you have this amazing community, this amazing connections with all of your peers, but you also have this incredible experience base and this incredible portfolio that would carry way more weight than any GPA. So I hope that - and I've heard even Don Hennessy say things to the effect of - yeah, he doesn't see why there are 300 person lecture halls in universities anymore and whatever else. And so, and I have heard other university presidents say the same thing. So the hope is - what's interesting about this whole MOOC thing that's happening, I think the single biggest thing is as soon as the MOOCs came out, you had a bunch of people going how do we know they work? And then, how do we know we work. They immediately said, wait we have never really had to address that question; we have never done a double blind, like: here are the students who took physics in 1998; here are the students who did not take physics in 1998. Now that it's 2008, let's randomly find them and give them a physics test and let's see if there is any discernible difference between the scores on the two. So it actually started making higher ed and I'd say outside the ivory tower especially, the Harvards, the Stanfords, the MITs start to really reflect on - we've been kind of getting a free pass for several 100 years. Maybe it's time that we introspect on ways that we can up our game and that's I think overall been a very healthy thing. But yes I see the - I think in five or - I think definitely 10 years you're not going to have the 300 person lecture hall anymore.

There in the back in the tie-die shirt. Yes. So obviously Khan Academy has been incredible with mathematics, and sort of quantitative subjects. How are you going to transition into more creative things? It looks like you did a lot of really awesome stuff with computer science, but what about teaching someone to understand Shakespeare or write a paper and deliver a speech or paint or something like that? Yes, good question. So right now at least with the math stuff we've handled a lot of the kind of the core traditional math skills, but even there I would say we haven't gone into the creative part of math. We are not telling students hey create a novel proof, how are we going to measure whether they did that and then things like that. So how do we start to think about that and as you point out, our computer science was kind of the first stab at that where we didn't want to just say hey, learn to write a for loop, okay now you know that now go do while loops and whatever else, we said no look it's a creative thing, you should start with a blank slate, we can give you examples, we can give you tutorials, but the real goal is for you to build a portfolio of work and get peer feedback on that portfolio. I mean this is what happens at design schools and schools of architecture and fine art schools and things. And so what I imagine and once again I view Khan Academy as a piece of a whole education spectrum. So even Khan Academy today if I'm architecting a school, the way I view it is education is this huge spectrum of things.

At this end it's kind of the most - this end is the most kind of rote, your multiplication tables and spelling and whatever else and then as maybe as you go more and more in this direction, it's more and more open ended, more and more creative, more

and more opportunities to succeed and fail. And if Khan Academy, I'd like to think is already not just doing, it's already hopefully giving you some intuition of traditional mathematics and this and that the computer science tackles a little bit here. We have some videos on some things that touch on the humanities. It's not claiming to give you the full even - frankly math education. It's - but it's covering some of the pieces that would be helpful to be exposed to in a math education, so that you can focus more on this part of it. So in a classroom that would free up more time hopefully for Socratic dialogue, for critiques, for peer feedback. In a humanities setting, I think anytime that there is an opportunity for explanation, why not make it as a video? And once again, I wouldn't force it on people and this is coming from someone who has made 4,000 videos, I think the videos are the least important part of Khan Academy that they're there in case you need them. If you do have - hey, I'd wonder how that works, that's a nice thing to have that explanation on demand, but I don't think that should be forced on someone. So I could imagine say in something like history. It doesn't hurt to have a scaffold; it doesn't hurt to have a big picture.

So we have done a few videos already on Khan Academy, you saw the Walter Isaacson video we're partnering with the Aspen Institute and there is going to be some neat conversations with Walter Isaacson and some people that you'll be surprised to see on Khan Academy, people that you have seen in the public sphere and - but talk about things that they don't talk about on CNN. To talk about the third amendment. How come that one never gets the attention. And dig deep and be intellectual about things and so that gives people scaffold and Khan Academy will give some opportunity for people to communicate about it and whatever else. But then if you have that kind of as a scaffold, then you can go deeper in the classroom. The teacher doesn't have to give the lecture anymore once again. It can be more about Socratic dialogue. And frankly this has always been happening in a good humanities class where hey, read the book or read the article and let's discuss it. And now this will just give you more resources to experience at your own time and pace and then you can go into the classroom and go deeper. Writing I actually could imagine very similar to the computer science where it's you get a place to write, we could suggest projects for you; we might give you some workshops so to speak.

But you write, you get peer feedback, you build a portfolio, you get rated on your portfolio, you rate other people's work. So I think there is ways we can do, but I won't claim that that's going to give you everything. Going forward, what would you say that Khan Academy's biggest challenge will be? So the question was going forward what will be our biggest challenge? And so as an Executive Director of a not for profit, I will say we're always fundraising. So that's our - but I think our biggest challenge is I think it's staying true to our mission. Its not getting distracted, not - I'd say we have found ourselves, we're not for profit, we're obviously kind of in a different - we're playing a different game than everyone in Silicon Valley, but at the same time, it's tempting because we're in this place that has certain value systems, some of them positive, some of them can sometimes not be positive. Where you do say oh, they have that many unique users and we have this many unique users and they - we grew 50% this year, they grew 51% this year, but we have to emulate what they're doing otherwise we're going to fall behind in all that. And it's human nature to kind of find - it's healthy actually to have that competitiveness, I mean, that's sometimes missing from some non-profits. But I think what we've keep reminding ourselves is we're not for profit for a reason that we want to kind of play the long game that we don't want to just grow fast, have some type of exit or some type of acquisition and then who cares what happened, I'm done and I will go do what I need to do. That we want to be around in 100 years or 200 years and we want to be at a place where 5 or 10, Silicon Valley has a - when it's five people, it's really kind of Wild West, you started getting some people, as soon as you have some traction in the marketplace, you start attracting kind of talent from - and you start getting kind of your best talent right around that phase, then kind of you go into the IPO, right as you're approaching the IPO you start to get a few people who start thinking a little more in terms of dollar signs, then the IPO happens and then people are looking for the next adventure and then you see a lot, I mean this story is told over and over again in Silicon Valley, 10 or 15 years in the future, it's not the place that the hotshot Stanford grad wants to work anymore. It's - they want to do the new company that was where this company was 15 or 20 years ago and we don't want to be that.

We want to make sure that we're always attracting the best people that we're always a organization that's innovating, that's always focused on our bottom line, which is our mission. And so, yes I think we have growth that we can be proud of for us. If we had to pick two different realities, one reality where a billion people are using us, but they're using us at a - it's a nice place to look up stuff and answer their questions, that's one reality and another reality is 10 million people are using us. We don't grow at all, but there it's a substantive experience and we are changing their life and we're like - we are actually helping to educate them and we can measure it. We would rather do the second of the two experiences, because then at least in our mind that's a more substantive place to be. I will go, you told me... okay. I understand that you are thinking of actually starting a school. Can you tell us a little bit about that? Yes. So - and I will do this on a leap of faith, no tweeting about this.

I don't know how much control I have this part. No, no it's okay to bring it up. No, no it's not like a top secret thing. So the simple answer is yes, we're exploring it and in my book I kind of outline what a school in the future could look like and I think hopefully we all appreciate from this conversation is that we don't view Khan Academy as just a website. We view it as an organization that's out to create tools and catalyze change. And the idea behind a school is, going to that earlier question about how do you create change and how do you create aspirations, we've seen even the most forward thinking schools, they still have a lot of constraints around them. Some of them imposed by others, sometimes imposed by their own minds that hey the bell is going to ring every 55 minutes, or we have to separate physics from calculus from art and or we have to separate kids by

age group or just even the way school is - even if they believe everything we say, just the way the school is built keeps them from doing a lot of what we are talking about. And so, there is nothing like having a five-year-old that makes you think about well what's he going to do and that my daughter, two and a half, what's she going to do. And so maybe we hit several birds with one stone and it's - nothing is final yet, but yes we're exploring in this area kind of starting a I guess for lack of a word a lab school and the whole idea is it would be - and once again I said no tweeting, because I don't want to make it seem too formal, because we don't - nothing is in stone yet. And frankly we also want to give it room for it to breathe and fail.

I mean, if you're really experimenting you're going to fail. So then we want it to have room to fail, so it doesn't have oh after one month look it's not working, this thing isn't the right project. But the whole idea is rethink all assumptions, and then - but then share everything. And then just kind of open it up to the world and hopefully make it a place where we can have teachers visit, we can have educators visit, and officials visit and see what we're talking about of what is possible. And what I've told everyone involved in this is, this isn't - if we just kind of create another school that gets kids in Silicon Valley into Stanford or whatever, that's not a big - that won't be an achievement for us. I mean that's almost a self-fulfilling prophecy on some level. In order for this to be aspirational and to create change, we have to show things that people haven't seen before and show that 12 year olds, 13 year olds are capable of engaging in the world. They're capable of contributing to organizations, of starting things, of having novel ideas, of taking on real responsibility for themselves and for their peers. And we will see, we will test where that boundary is. Fabulous.

I'm sure all of you agree that this is truly inspiring. Join me in thanking Sal Khan.