



Augmented Intelligence: Reimagining How the World Learns

ASU President Michael Crow chats with Benedict Gomez, SVP of Learning & Sustainability at Google, in a conversation moderated by Ann Kirschner at ASU+GSV Summit 2024 in San Diego

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Chris Quazzo: We're going to kick things off with our first conversation of the morning. I'm going to be handing things over to Ann Kirschner, who will be moderating this discussion. Ann is the president of Hunter College of the City University of New York, and Ann will be joined on stage here by Dr. Michael Crow, President of ASU, of course, and professor of science and technology policy—really thrilled to have him here—as well as Benedict Gomes, who is the SVP of learning and education and sustainability at Google. We're really thrilled for their conversation. So, here to talk about augmented intelligence and reimagining how the world looks, please give it up for our first panel!

Ann Kirschner: Come on! Good, get me started... I can't play the violin, but I do appreciate the good morning. I'm so delighted to be here with Ben and with Michael to talk about how ASU and Google are working together to reimagine how the world learns, and we'll talk about Google and ASU, but I first wanted to talk about the people behind this partnership—Ben and Michael. You're both transformers, which to my mind is one step beyond innovators—

MMC: If only they could be as big as those Transformers in the movie. <Laugh>

Ann Kirschner: That's right. And you're very different people, but you've shared this goal of advancing education at an unprecedented scale. So, I'd love to hear a little bit more about how you came to think about education as the gateway to opportunity. And Ben, let's start with you. Tell me a little bit about how this all came about for you.

Benedict Gomes: I've been at Google for a long time, almost 25 years now. And most of the time I spent on search. And I had this experience a long time ago, in like 2000. I was on a small bus between Bombay and Puna. And most people had not heard about Google then. But a couple of people on the bus had heard about Google and had used Google. And, to me, this was completely mind-altering because I had not thought that what you're working on could affect people all around the world. And I saw the power of information to transform people's access to opportunities in various ways. But I've always had an interest in learning myself. My mother was a schoolteacher... She's 96 now. She was a schoolteacher in the '40s for only a couple of years because she was allergic to the technology of the time, which was chalk <laugh> So, she couldn't be a schoolteacher.

Ann Kirschner: What a quaint technology. <Laugh>

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Benedict Gomes: I know... Magic markers would be better. But she always instilled in us that curiosity in me and my siblings, which I think took us, took me to where I am today. And what I saw when I was thinking about what I do after search, I was interested in learning, is that people come to Google with that curiosity. They come to search, they come to YouTube, they come to Google Scholar, Google Arts and Culture with that curiosity. And I think there's a huge potential, especially with AI today, to transform that curiosity into much deeper learning,

Ann Kirschner: Curiosity, key attribute. Michael, many leaders in higher education flaunt their teeny-tiny acceptance rates. And the more people they turn away, the higher the quality. You've turned that equation on its head. And that led to the creation of ASU and the New American University. So tell us, similarly, some of the milestones along the way to that formulation. Yeah,

MMC: I don't know so much about milestones. I, I grew up in a working-class, working poor family and moved a lot: 21 times before I went to college at age 17, 17 schools in multiple states, four high schools in three states in the 10th grade, living in trailer parks and all kinds of neighborhoods. What people don't realize is that in the public housing projects and military housing projects that we lived in, and the trailer parks that we lived in—because as an enlisted guy, my dad in the Navy with five children was paid at a level below the poverty index for the United States at the time. What I realized growing up was that I was surrounded by smart kids, surrounded by smart people, surrounded by ambitious people, and then all along the pathway, including siblings: just wiped out, wiped out, wiped out, obliterated, obliterated, obliterated.

I remember moving from school to school to school to school, and I encountered these... I don't know what to call 'em. They were like cruel teachers who would say, "Well, really Michael, you know, you just have to catch up." Well, catch up from what? I don't even know what you're talking about. <Laugh>. Or, "You already had that, so why don't we just have you feed the rats this semester 'cause you already took this?" And so what I found was this unrelentingly uncreative, completely socially dysfunctional educational system that I experienced myself. And then by the time I got to college, and I was this consumer of learning at the highest level that I could possibly put myself through, I found that I was being thwarted by the very people I was going to learn with. They said, "Well, you can only take one major. You can't take five majors. You can't do this, you can't do that. You can't learn this. You can't learn that. There's no way to do this. You have to do this." And I'm just like, "You guys are, like, ruining us." And so, I became focused—almost obsessed, for the people that know me, know this is true—obsessed with how can we fix this? How can we use science and technology and new tools and new mechanisms and new computers and new ways of doing things? How can we make a way in which all these kids that I knew that were really smart, that ended up with less-than-optimum outcomes for their lives; by my age now, many of them are dead. How can we use better tools to overcome a historic system of rigid, factory-oriented learning? I can give you lots of stories on this. For me, that has been my driver for a long time.

Ann Kirschner: So, what I'm hearing between the two of you is essentially respect the user, respect the learner, and build the journey around that.

MMC: It's all about the learner, all about the student. Yep. The faculty is the means, not the end.

Ann Kirschner: So, talk a little bit about the partnership between the institution and the organization, Google and ASU. You know, the stereotype is universities are slow-moving, allergic to innovation, can't get



outta their own way; big tech is all about scale, all about making money. Somehow, you transcended those stereotypes to build this really remarkable partnership. So, what did you each bring to the partnership?

Benedict Gomes: You know, from my perspective, when I got interested in learning and I moved to work on it, I was looking at all these people coming into Google with this curiosity. But Google is not really an educational institution except in narrow areas, in places like Grow with Google and cloud certificates and so on. And a lot of these people do want structured learning in some form. ASU, I found, was at the forefront of educational, adopting educational technology. And they've been partners with us for a really long time: I mean, the first partnership, I believe, was in 2007 when it was one of the first adopters of Workspace for Education. And ASU has been an early adopter of every technology that is there. So, we've visited ASU; Michael has visited Google with his team, and so a partnership was formed that's, I think, a very natural partnership because for us, also, we want broad access. We want inclusive access to information. And I think that's the goal of ASU too. It's not an exclusive access, it's not counting as success by how many people are rejected but by how many people are accepted into the university and how many people make progress through that university. I think that, to me, personally resonated a lot, as well as aligning with the company values.

MMC: So, in the summer of 2001, I got this strange letter delivered to my office when I was working at Columbia University in Morningside Heights in Manhattan. And there was an invitation from a guy named Paul Allen to appear on an island somewhere off the coast of Seattle in the San Juan Islands for a group of a meeting where 12 people would get together and talk about "how do you build The Final Encyclopedia". And The Final Encyclopedia is a story, a two-volume science fiction story. So that came with the invitation, and you had to agree that you wanted to read it before you showed up. So, I go to this meeting and one of your buddies, Larry Page, happened to be at this meeting. I mean, I had read about him and knew about him, but in the summer of 2001, August, Google wasn't what it is now.

MMC: But I realized in that meeting that The Final Encyclopedia concept was now not only intellectually dreamable; it was intellectually buildable. Once you know that such a thing can be built—and while it might take decades to build it and decades to perfect it and AI systems to enhance it, and all the kinds of projects that we're working on to make it real, once that occurs, now you know that no one has to be left out of access to what they need to know. No one. Once you know that this concept of the final encyclopedia becomes possible, and Google is the closest thing to the final encyclopedia: all the things that they've built, all the things that they're doing, YouTube, search, now the learn functions, all these things. And so, this is the notion of how do you over time help guide and build the final encyclopedia so that it can also be used not just for personalized learning, but for organized, structured, tradable, certifiable learning outcomes along the way?

So, this has brought us, 23 years later, to this point where now we have this intersection of interests and a new kind of capability and a new team and structure at Google where they're moving away from just filling the final encyclopedia to now organizing the final encyclopedia and structuring it so that it can be used for everything, not just some things. And so, that's the connection with Google.

Ann Kirschner: Why do you think Michael remembers that Larry Page was at that meeting, but not that I was at that meeting. <Laugh> Sorry... Don't tell him I said that. <Laugh>

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MMC: Because you were going to say this! <Laugh> But why were you at that meeting?

Ann Kirschner: What do you mean? What was it that you were running—

MMC: A company?

Ann Kirschner: I was running a company.

MMC: And what was that company doing?

Ann Kirschner: That that company was the sort of Ur, the original online learning vision for what a university could be, called Fathom (Fathom.com). <Applause> Thank you. Thank you. Those of you who remember who remember Fathom. So—

MMC: And who was the chairman of Fathom and who was the CEO?

Ann Kirschner: I was the CEO, and you were the chairman. <Laugh> There we go. I'm sorry, Ben, if you...

Benedict Gomes: I was not involved in this company at all. <Laugh>

Ann Kirschner: So, is this a one-of-a-kind partnership between Google and ASU, or are you a paradigm for other kinds of partnerships between universities and, and companies? What do you think?

Benedict Gomes: That's an interesting question. I think we have to work out... In this context, you know, it's really helpful for us in many ways... First of all with Study Hall, right? For instance, we are working with the Green brothers and Crash Course, who have 15 million subscribers, and they teach things, dry subjects in really interesting ways. And trying to take that through curiosity into this pathway to actually turning that into an outcome at ASU. And we've been able to work with ASU on bringing that together in a way that's really simple for students, because we find that they start, they stumble with like all the roadblocks around just signing up for classes and the payment and so on upfront, so we tried to back-load many of those decisions until they know they have capability there. And so, we've been able to work closely with ASU on that kind of a partnership at that level. It takes a lot of commitment on both sides for that to happen, and it takes effort over time. So, I hope it'll be a paradigm for other such partnerships, but it takes will on both sides.

MMC: Yeah, I mean, just the conversion from, and I use this in the broadest sense, from sort of unstructured, somewhat anarchy in terms of everything being available to anyone, anytime, anywhere... That's unbelievably powerful until you need structure to trade what you have learned in a learning economy. You can't go from anarchy to a learning economy without building some sort of structures. And so, the Study Hall project—and other projects that we're working on with Google and with the Green brothers and others—are just a way in which we're trying to bring limited amounts of structure to enhance the learning economy transaction capabilities for each individual person. That's really what we—and that's going to ultimately involve everybody, so it won't be a limited thing.

Ann Kirschner: So, thanks for bringing up Study Hall, which is a key collaboration between the two of you. And I wanted to read a quote from one of the comments on Study Hall. "Thank you guys for making this content. It warms my heart every time I see it. I'm 35, going back to school for the third time. I literally can't imagine how my life might have been different if these resources had been available when I was a teen."



Exactly. So Michael, you have this orienting framework of Learning Realms and this idea of Realm 5. Could you talk about Realm 5 and how Study Hall—which if you haven't seen, you gotta go on YouTube and watch it—how it fits into that framework. So

MMC: Realm 5 for us is this notion of ubiquitous massive access to learning opportunities, knowledge and information—those are three different things—being available to the individual in the way that individual learns. And so, it's massive availability of knowledge and learning opportunities and information in a customizable, digestible learning pathway designed and structured by the individual learner. The idea for Realm 5 comes from the Young Lady's Primer in Neal Stephenson's novel, *The Diamond Age*.

Ann Kirschner: Best novel ever written about education.

MMC: So, there was this unbelievably empowering device. This is an incremental step towards that. So, you take essentially everything that's available in YouTube or Google, and you find a way to structure it into an individualized pathway to learning so that the person that you read the quote from can find sort of what they know, understand what they know, contextualize their position in the learning continuum, put themselves on an arc of learning that's for them, and then move that arc upward for them in the way that they learn. And this project allows us to create the first manifestation of that at massive scale. We have other projects underway also, but this project allows us to do it in a way where the encyclopedic base exists, the pathway structures exist, the individualization tools exist, the connections exist. And so, this is what we're enabling to bring all these things together.

Ann Kirschner: So, Ben, I know Study Hall is one of the projects that that you have collaborated on, but also Google has many areas... YouTube, which is already the world's largest classroom. So, tell us a little bit... In this AI-fueled landscape, where, are we headed?

Benedict Gomes: Yeah, so when I think about it, AI enables us to turn access to information in a way that you can retain it, you can ask questions, understand things better. So, we've always styled search as the ability to answer any question you have, but that can go a lot further if you can ask follow-up questions, if you can really deeply understand and then retain what you've learned. So, in all of these areas, whether it's in search, we are going from answers to giving you scaffolded explanations, follow-up questions that you can practice. People come to us for homework, for exam questions, for a whole host of needs.

MMC: The key being the individual gets to structure this by themselves.

Benedict Gomes: Yes. They can ask the question that is pertinent to them and what their gaps might be, right? And I use this myself all the time, right? Because, when you're learning, there are particular things you don't know. So, the next step in places like YouTube is if you can watch a video and you could put up your hand and say, "I've got a question." That is an unbelievably powerful thing you can imagine that makes it much more interactive. We are taking this one step further with something... There's a demo out here done with The Coding Train, Dan Shiffman, which is called ShiffBot because he teaches coding. But his idea was, "Can we take what he is offering, his presence, along with you to the place where you're actually doing coding?" So, ShiffBot is an attempt to create a construct around that so when you're actually doing coding, you can ask that question in the moment while you're coding, and you get responses back from his videos in the tone that makes sense for him. So, you work carefully with him to create an opportunity of that sort. In Classroom, which is used by millions of teachers around the world, we are seeing this. There's this



huge amount of burnout that we are seeing with teachers, especially after the pandemic. There's an opportunity for AI to make teachers' work a lot simpler. I've got a lot of teachers in my extended family, and they're overwhelmed by the amount of work they have to do the paperwork and all the other things they have to do around the class.

So, we are building a labs feature around Google Classroom, where we are working with teachers. We are building features like the ability to do lesson plans and a whole lot more things of that sort that will enable teachers, hopefully, to save a lot more time. And AI is making all of this possible. What would've been very hard to do, because we didn't actually have the technology for understanding language. What generative AI unlocks is fundamentally the technology for understanding language, and language is fundamental to not just communication but learning in particular. We learn through words, we learn through language, and that is now being unlocked by generative AI. And so, it enables our tools, wherever they are, to take that next step of power in enabling that journey to be a lot deeper.

MMC: So, related to that, I think importantly, is that a lot of people are fearful that somehow these technologies are going to replace the teachers or replace the professors. It has no intention for that at all. It's to enhance the teaching and learning process. It's to empower the professor to be able to enhance learning to even higher scales. It's just the opposite of what people are thinking about. You have to realize, you know, that 20% are not finishing high school. Half the people that go to college are not graduating. People are frustrated because they can't keep up with the speed with which the economy is shifting and changing. We have to find ways to accelerate all these processes and make learning just as important as—this will sound funny, but learning and eating, you know, the two things you have to do to move forward. Learning and eating, it's gotta be that. It's gotta be that common, that ubiquitous, that capable, that engageable.

Benedict Gomes: Not breathing?

MMC: What I mean is that it's everywhere. It's available. It's, you eat what you want, you customize it, you do this, you do that. There's thousands or millions of recipes, there are ways to configure things in every possible way. We've just become a little bit slavish to a group of academics who are hugely full of themselves: they just think that they've got the answers for everything. They have the methods for everyone to come up with the answers for everything. They just need to structure it in a way where people can learn more individualistically.

Ann Kirschner: How do we get that message out to the rest of the planet?

MMC: Well, it's hard because, every time I say it, then I get hate mail. I get all these people are after me. I mean, you get these guys that think I should continue to age quickly, <laugh> They chopped off a part of my nose, so that process is underway. <Laugh>

Ann Kirschner: They start with the nose. <Laugh> Ben, what were you going to say?

Benedict Gomes: I think that, for almost everybody here, you'll have one or two teachers who played that—for me, it was my mother—but a couple of teachers in my school who played that seminal role in sparking that curiosity, that desire to learn more. And that's unbelievably valuable, I think. For the people who don't encounter that, it's a huge loss. And I think part of that happens because teachers are



overburdened. They come into teaching wanting to do that connection with the student, and then they find that they have to do a whole host of other things that are not connected to that connection with the student. So I think that that magical moment, I think people are fundamentally, but—

MMC: Now imagine that we moved teachers into almost exclusively that role: you took the Nurse Cratchett(?) teachers and moved them away. In that role, the teacher becomes this learning empowerer, and the students have these unbelievable tools that they're also working with. We need to upgrade the role of teachers, expand the role of the teacher and the professor, upgrade and skill and enhance the way that people are learning, increase the compensation for these teachers, all kinds of things. We have it down to too low of a level right now. We need to enhance the level of learning.

Ann Kirschner: So, you're both at a point where you could do pretty much whatever you want and focus on the problems that you think are most important. And you've got an audience here of educators, investors, technologists... The entire educational ecosystem is sort of at this conference, which is why it's always so much fun to be here. So, tell us in our remaining moments what you're dreaming about, what you'd love to accomplish, and how this team out here can help participate with you.

Benedict Gomes: So, I think from my perspective, that learning has always been something that's been seen as difficult—for the teacher as well as for the student. I think, if we can build, if all of you can build the tools to create a tutor, a TA for every teacher... That can enable the empowering of the teaching side of it, right? And on the student side of it, I think there are all of these barriers to actually understanding. So, what's happening in Google is we have a lot of people coming in with curiosity, and curiosity is kind of unbounded and then gets killed when there are no answers or there are poor answers to it. If we can transform that curiosity into learning, by making that learning a little easier: A, you can ask questions, but B, you can find better ways to do that learning.

Now, some of that happens with these amazing creators we have on YouTube because they find that way to reach you that you could never have before. I don't work in physics at all anymore, but I watch YouTube videos and I go, "Ah, that's how that works!" One creator has found a way to break through to my brain how that particular concept can be intuitive. Now, if you can do that more broadly, make it so that when you encounter a new concept, you intuitively grasp it fully, we can turn that curiosity into much deeper learning. And I think that's not just a goal for Google, but I think it should be a goal for all of education technology to actually bridge that, to make learning so easy that the amount of learning that happens in the world just grows exponentially, so people are much more powerful.

Ann Kirschner: That's very powerful.

MMC: So, it's kind of strange. One of the greatest orators in the United States in the last 200 years was Frederick Douglass. You can read his speeches and read his books and read his writings—and he never went to a day of school in his entire life. He was taught to read under penalty of death, both to his personage and the person that taught him, yet he became philosophically enriched with a deep understanding of really complicated subjects that people major in in college. Well, how did he do that? He did that because of his motivation. He did that because of what he was driven toward and so forth and so on. What I'm still driven by is how do we find a way to find the interest and the talent and the trajectory of each individual person and empower that?

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Right now, we still have people saying, "Well, Billy, you know, you're not gonna be that good of a student. And so you can drop out of high school by your own choice." At age 16, condemning Billy to a life of unbelievable complexity going forward. And in the United States, we still allow that Billy can drop out of high school at 16 and be done. We have people that are not able to personalize or build their own identities. We still have a world where, where we think that math is a hard subject, and all our teachers say it's hard and no one wants to take it. And we have a cultural bias to not learn it. The English language is infinitely more complicated than integral calculus, infinitely more complicated, yet, somehow, we find a way to learn that without having our brains filled with concepts and words that we don't comprehend.

What we have to find a way to do is to empower learning and empower the learning individual to, to really maximize human potential. We're still operating with unbelievable achievement. We're still way below our potential. Who knows where we could end up if we got more people, more creative, more dynamic. We have a \$150 trillion economy on the planet. What about a \$10,000 trillion economy on the planet? How do we get that? How do we do those things? How do we literally drive these things forward? Right now in the United States, you can still predict educational outcomes based on a person's ZIP code: you give me their ZIP code, and I can give you a probabilistic assessment with some accuracy of the outcome. Well then, therefore, we are idiots. We have to figure this out, and this is what I'm focused on.

Ann Kirschner: Well, I can't imagine two companies, two organizations, two people better to reimagine how the world learns than Ben Gomes and Michael Crow, so thank you very much for joining us this morning.