Ben Kahn: Welcome to the UP Tech Talk podcast special series on the future of education.

Maria Erb: Talking about likely scenarios for learning in both the near and distant future. Our guests for this series include both UP faculty and guest academics and futurists from across the United States.

Ben Kahn: Look out for new episodes in this series on the first Friday of every month during the fall semester.

Maria Erb: We talk with our guests about a lot of fascinating topics that are sure to spark your imagination. We invite you to continue the conversation on social media by following us on Twitter at @UPTechTalk.

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Hello and welcome to a special episode of the UP Tech Talk podcast. This is Ben Kahn, academic technology specialist and trainer at the University of Portland. I'm joined today by my co-host, Maria Erb. Hello Maria.

Maria Erb: Hey Ben.

Ben Kahn: Maria is the instructional designer here at UP. Today we are so happy to have with us a guest brought in from his home in Vermont. We're joined by Dr. Bryan Alexander, who is an educator, futurist, speaker, and writer. Bryan, thank you so much for joining us.

Bryan Alexander: Glad to be here. Thank you for the opportunity.

Maria Erb: Bryan, it's so wonderful to have you with us. Like I said a minute ago, Ben and I are just huge fans of yours, and we loved your keynote at the New Media Conference. Just loved it. [crosstalk 00:01:50].

Bryan Alexander: Thank you.

Ben Kahn: Flourishing in an age of technology-driven disruption and chaos, so good.

Maria Erb: Yeah. I thought we'd start off by talking a little bit about some of the current trends that we're seeing now in the technology realm and how they affect what we probably are going to be seeing in the education realm in higher ed. What do you feel are going to be the dominant trends of the next, say, 5 to 10 years?

Bryan Alexander: That's a great question. Just yesterday, I hosted a conversation with the editor of Inside Higher Ed, and Scott Jaschik had the idea. I asked him this very question. His response mirrored mine, so I want to give him credit for this. He said that one of

the biggest is the notion of using technology to improve or expand instruction, so not so much to replace it, but as to give access to people who don't currently have access and to improve what we can get. That's not a particular technology. That's more of a strategy involving hordes of technologies and practices.

A second thing he mentioned was the rising problem of inequity that we have in the United States at least, that we have managed to build higher ed in a way that is massively biased. We still have a difficult time in getting enough access, especially graduation, to several ethnic minorities, primarily blacks and Latinos. Our class bias is really just shooting through the roof, where the wealthier you are, the likelier you are to go to college, graduate from college, have a successful degree, and the reverse is true. Those are 2 enormous, enormous trends that are very, very powerful.

Under those, I would add a few more, if I could. We're seeing the rethinking of the LMS. In some ways, the LMS is kind of a mature product. We've got a majority, a supermajority, of institutions standardized on 1 LMS. We have products that are longstanding. All but one are longstanding, so Blackboard, Sakai, Moodle. The new one, Canvas, is just rocking and rolling. It's very successful. Most of these do very much similar functions. Their leading use is sharing documents from instructor to students. They're a repository for individual classes, and after a class is done, they become a kind of dark archive.

There's a lot of discussion now in how we can redefine the LMS moving forward. We're thinking about things like, what if you rethink the LMS with a mobile first strategy rather than a desktop strategy? What if we built into the LMS new functions that we're excited about in technology, including data analytics, adaptive learning? What happens if we were able to include artificial intelligence within an LMS? We have something new as a result. EDUCAUSE ELI has been shepherding the Next Generation Learning Environment project, which is terrific, so there's a lot of interest in this.

We've already seen some signs this past month when Blackboard has bought 2 very interesting companies. They bought one ... I'm sorry. They bought 1 company and partnered with another one. The one they purchased gives them the power to do more payments on campus. By payments, I don't mean necessarily late fees. I mean tuition payments. That makes Blackboard potentially much more central to a campus. The second is their partnership with IBM, so they can deploy Watson with Blackboard learning analytics, so you can really try and combine artificial intelligence with the LMS which is a pretty interesting move. Looking out 5 to 10 years, we have to imagine seeing these kind of developments happen when we have a new wave of LMSes. Let's say Moodle gets redesigned by its community-sourced developers to meet these needs. Perhaps Canvas takes the lead. Perhaps Blackboard regains its lead. That's 1 particular technology trend.

Another to look at is the maker movement. The maker movement is fascinating from all kinds of levels. I don't have to explain it, do I?

Maria Erb: No.

Bryan Alexander: Should I assume you ...

Maria Erb: No, I think we're good.

Bryan Alexander: Okay, good.

Maria Erb: Yeah.

Bryan Alexander: The maker movement does a few things really well. One is that it has a kind of horizontal pedagogy. When we talk about shifting teaching from the sage on the stage to the guy on the side, maker spaces actually work that way, where people learn either on their own or with people helping them.

Second is that maker spaces are great community places. Because they're not tied to a particular academic discipline and because they're open to the world, they let people come in from outside the university or campus or library or museum. Think for example about Rust Belt communities, the Midwest and the Northeast, where we can have people who are skilled in manufacturing technologies that aren't being used so often or at all, but they can really help younger people or people their same age who just don't have the skills with, say, welding or with woodwork or with tinsmithing. Those 2 I think are very, very exciting.

The other is that, and this really points the way forward, I think, for a lot of ways we think about technology, maker spaces aren't anti-digital. Some people approach them thinking that, "Oh, good, we can work with wood or macrame or yarn or plastic or wood," but they actually are intertwined with technology. You can see someone working on a diesel motor from 30 years ago, and next to them is a laptop with a YouTube video explaining how diesel engines work.

I think that in many ways is a signal for how we're doing learning, where we're closely imbricating the digital and the non-digital. We talk about the hybrid classroom. We talk about the flipped classroom. I think we'll stop using these terms pretty soon, and we'll just assume that teaching is like that. If a class is not like that, if a class does not involve digital technology, we'll have to come up with a name for it. Call it the Faraday cage class or the retro class, because it's very hard to do that.

One more trend, and let me just stop ranting, because I have so much to think about, is we're in an age where we're shifting from mobile to artificial intelligence. By AI, I'm not talking about something like the HAL 9000 or the operating system from the movie, Her. What I mean is that we're getting better and better at technologies that help tutoring. Have either of you used Duolingo, for example?

Maria Erb: Yeah.

Ben Kahn: Yeah, not very successfully, but ...

Bryan Alexander: What languages were you trying?

Ben Kahn: I was trying Spanish.

Maria Erb: Yeah, me too.

Bryan Alexander: Me three, me three. I have a blog post on this coming up, but I'm brand new at Spanish. I tested Duolingo in a language that I know better, which is Russian, and I was impressed. Then I decided to start learning Spanish, and I have Duolingo as my guide. I know it's uneven, but if you look at how it functions, it's way beyond the tutoring webpages we used to have. You think about the way that it remembers your weaker vocabulary, the way that it smoothly does interactive multimedia, and for real. It constantly tests me on my pronunciation, which is awful, and on my listening, which is worse. It's gamified in really effective ways, and it pays attention to you. If I don't use it for a couple of days, they send me nasty, not nasty, but they send me grumpy emails saying, "Hey, where have you been?" The more work I do, it rewards me.

Let's think 5 years out. Duolingo is established. It's not cutting edge anymore. Let's think 5 years out. Think about the developments. We've seen artificial intelligence from the Google AI that was able to beat a human at Go, which is truly extraordinary. When I think about that Georgia Tech prof who was able to convince his students that one of their TAs was actually an AI, it actually was. He was able to convince the students that it was human. Think about how we can expect having tutors in the quantitatively intensive fields. I don't think we'll see them in the qualitative fields, so we're more likely to see artificial tutors pop up in STEM fields, for example, and in the quantitatively intensive social sciences, like, say, economics. Let's put that on 1 part of the table.

The other part of the table is the mobile world. Mobile swept the whole planet except for America until about 2007. Then when the iPhone appeared, we were, "Oh, yeah, mobile phones," and we got into them. In some ways, we're a very mobile-first country. Web design has changed to be more mobile-friendly. Lots and lots of companies are moving towards mobile. Mobile has already started changing aspects of public and private life that we could talk about if you like. In education, we're slower to do this.

A clear majority of campuses that I talk to do not have a BYOD policy. They'll support the devices they support, and if you bring something else, God help you. We still haven't really changed classrooms to account for that. We really haven't built up pedagogies or curricula based on what happens when a student leaves a classroom and goes somewhere else on a mobile device. You think about, say, study abroad or people doing urban studies or architecture, or on performance art. We're still trying to grab on to the mobile thing, and we're also kind of hoping that mobile passes us by. Those 2 trends are live and transformative, mobile and AI,

right now. For the next 5 years, we better hang on to them tight.

Maria Erb: In terms of higher ed though and how these things might impact higher ed, we've made many efforts here to try to incorporate multimedia into assignments with our faculty. Some faculty grab on to that right away and want to push their students towards making infographics and short videos and different things like that for assignments, but overall, the faculty feel that these types of shifts in teaching require, first of all, a lot of startup time, a lot of work. They take a lot of in-class time away from traditional material delivery. I'm just wondering, now if you throw 3D printing assignments in there and these other types of things, actually when it comes down to putting this into practice with faculty, how does that work? You're talking about major shifts in changing the dynamic of the classroom.

Bryan Alexander: Oh, and I've held back. I haven't mentioned VR, which is very large. It's a little overstated right now, but VR makes things even more complicated. We have the real possibility though in the next year, we'll start seeing the combination of VR and AR with schools like Magic Leap and Microsoft HoloLens. It's even more challenging.

How do we get faculty to work with this? A couple answers. First, it depends on which faculty we're talking about. The leading population of faculty in the United States is adjunct, people who are non-tenure tracked, are hired and fired at will, are part-time and badly compensated. That is the most populous faculty population in the United States. Most campuses don't work closely with them on matters of technology, and I think that's a mistake. We know from Ithaka S+R research that adjunct faculty, at least at public universities, are more likely to be innovative in their use of technology in teaching than tenure track faculty are. That's in part because adjuncts are competing every month to keep and get jobs, and also because technology actually makes their lives easier.

Think about if you're a freeway flier teaching at 3, 4, 5, 6 different institutions. Putting yourself on the cloud, for example, maintaining your own blog, simplifies life. It makes things a lot easier. If you're a tenured faculty member, you have all kinds of other incentives to do other things, especially publishing, especially professional development outside of technology. You may have conservative tenure promotion, hiring committees to deal with, and you also have a longer timeline. Your time frame is maybe 2, 3, 6, 10 years. The urgency isn't quite there.

I would recommend first working with adjuncts. Adjuncts are much more flexible and will do more. That's 1 thing. A second is to realize that the tools that are already established are getting easier and easier. Editing video, for example, and shooting video, it was a big breakthrough when we had simple cameras that could shoot video. Now they're built into phones, which the majority of your faculty have. We have editing tools that are easier and easier. You can use a browser-based tool, like WeVideo, or you can use Penn State's One Button Studio. They're just going to keep getting simpler and simpler as we go on. That's 1 thing to think of.

Another thing to keep in mind is demographics. As faculty age, tenured and non-tenured, we're seeing more and more of them having spent more and more of their lives in the digital world. We're seeing digital native faculty. We're seeing also my generation, Generation X, which grew into the technology, and the generations before that, the generations that are older, are aging out of the profession. Time is on our side.

The other thing to think about ... I mean, this is a big question you've raised, right? The other thing to think about is that we have so many ... So many faculty are committed to teaching and learning. Not all, famously. We have faculty who see themselves as researchers entirely. We have faculty who hate teaching. We have faculty who love it and are terrible at it. If you look across the United States, on every campus I work with, I'm struck by the passion of instructors, be they an emeritus professor or a brand new PhD just out of grad school. They're engaged in this. They want to teach. They want to do so successfully.

The technology just keeps emerging as a more and more effective way of reaching students. I think, as online learning continues to grow, we'll see more and more people learning online, and we'll see more and more people comfortable teaching online and willing to use the technology to make that work. I'm sorry to go on at such length. That was a very rich question.

Ben Kahn: Absolutely, and an eloquent and nuanced answer as well.

Maria Erb: [crosstalk 00:16:40]. Yeah. I just made a little note here. I'm wondering, if we did a faculty survey, if faculty would view technology as a more effective way, or an effective way, to reach students or more students or students that they can't currently reach. I'm just wondering if oftentimes they feel it's a barrier to doing that.

Bryan Alexander: It's a barrier psychologically. It's a barrier because faculty are hired because they're experts in their content area. That's the sole reason to hire faculty members. You have an archaeologist because they're a brilliant archaeologist. You don't hire them because they're good at technology. You hire someone in IT for that role, or as with me, when I got my first faculty job, one of the reasons for being hired, one of the ways I stood out from the crowd, was my fluency with technology, but the main reason is to be a content expert.

You have your historian. They're in front of the class, and they could talk about British history or whatever. With the technology, now they're not the expert. They're off to 1 side. They're not so good at that. For some of us, that's a liberating moment. That's really exciting. That's fun. We also think this is pedagogically good to have students see us as co-learners. That's great. For a lot of people, that's psychologically disorienting. They don't want that to happen. They don't want to see that. They don't like being knocked off their perch of competency. That's 1 issue.

The other, I think, has to do with the training of how people are trained to teach in higher education. Peer teaching, student to student, is so powerful, especially done well. We've seen it for decades in the teaching of writing. We're seeing it now in teaching of math. I think when it comes to technology, it's a great way to identify students who have strengths in technology to help them become classroom resources. A lot of faculty are not trained in how to teach that way. If you don't know how to, it can be a bit daunting, and there are a lot of ways you can do it incorrectly. I think that's another issue that really needs to be corrected. Again, I'm on the side of time here. I think, like I said before, every year this gets easier for multiple reasons. I think we can really count on that.

Maria Erb: I'm just wondering, and I just made another note. Like you said, faculty are hired because they're content experts. I'm just wondering if the role of being a content expert is going to change. We've got other ways to amass expertise now. Expertise is a lot more common now, or it's easier to get than it used to be, I should say.

Bryan Alexander: Yes.

Maria Erb: I'm just wondering if faculty will be hired for different reasons in the near future.

Bryan Alexander: I used to think so. The model I have for this is the Math Emporium at Virginia Tech. Have either of you seen that or heard about this?

Ben Kahn: No.

Maria Erb: No.

Bryan Alexander: I strongly recommend visiting it the next time you're in the area, if not, just reading about it. It came about because of a problem. Virginia Tech, a tech school obviously, had an issue with math. They had a number of students who had to take remedial math, and everyone was unhappy with it. The students did not want to take remedial math. The faculty didn't like teaching it. The pass rates were terrible. It was a real disaster.

They came up with a new approach. The campus bought an old department store from across the street from campus. They cleared out the entire ground floor and filled it up with, at the time I think, more Mac computers than any lab in the world. It's just a tremendous sea of desktop computing. They crammed each Mac with math software, everything from tools like MATLAB to tutorials to programming, and lined this big space with teaching experts. They could be faculty. They could be grad students. They could be undergrads.

A student with a remedial math assignment would go into the Math Emporium, and they would start doing their work. The tables, if you're interested in learning space, the tables were pretty neat. They're kind of starfish-shaped, so they're really easy for you to be by yourself, but they also nicely facilitate small group work, groups of 2 and 3. Students would work by themselves, and then when they ran into a

problem that they couldn't solve, that the software in front of them couldn't help them with, they would send up a little flag. Traditionally, it was a red cup they would put on top of their monitor. One of those teaching experts from around the walls would see this and scurry up to them and help them out. This has been a huge hit. Morale is higher. Pass rates are higher. Other universities have copied this model.

Why am I talking about this? It's intrinsically interesting, I think, but the other thing is it's a metaphor for how we can teach if expertise can be found elsewhere. If we're doing a class, say, on the First World War, you don't need to have your First World War professor in the classroom in theory. You could cram a syllabus with wonderful material, great lectures, videos, maps, all kinds of goodies, and then have on staff instead someone who is a great history teacher. They're just really skilled at dealing with people who are afraid of history. That person could be an adjunct. That could be a grad student. It could be a retiree. It may actually be a full-time tenured professor, but this isn't their full-time class. This only is, say, half-time. You could really as a campus outsource the expertise, just as you said, Maria, and then have on campus the hands-on expertise.

Maria Erb: Yeah, the facilitator set. That's exactly what I was thinking when we brought up the subject. Yeah.

Bryan Alexander: This is what a good liberal arts professor could do, for example. However, however, that said, I think there's a countervailing force, which is that universities and campuses still have lots of interest in hiring experts. There is enormous cultural cache to having your World War I historian be a PhD from Harvard. Universities brag about their Nobel Laureates. They brag about the number of PhDs they have. That counts for an awful lot, and on top of that, on the research side, we haven't figured out a way to outsource researching yet. I think that's coming up down the road, 10 to 20 years from now, but right now, having that full-time faculty member on campus in their lab, in the library, in their office, writing books, writing articles, coming up with inventions, that matters a great deal. It depends on your university. It matters more for a Research I university than a community college, for example, but that still counts for a lot. I think in the next 5, 10 years, people will still be hiring for that.

Maria Erb: Yeah. I think you're right. If research is unbundled from the university, that's when the university becomes a learning center, and the research aspect goes elsewhere.

Ben Kahn: Yeah. That seems like that would be a greater separation in terms of prestige, like a 1% of universities, and then everyone else that's almost more like a community learning type of center.

Maria Erb: Yeah.

Bryan Alexander: You'd think it would be. I've seen some countries where there seems to be a widening split between faculty who are teaching-centered and faculty who are

research-centered. There's a lot to recommend to this. You think about ways in which doing research is actually kind of a clumsy tool for professional development. We believe in the integration, say, in liberal arts colleges of bringing research into the classroom. It doesn't always work. It can be a clumsy fit. If you want a professor to get up to speed on their field and current developments, in some ways, it's easier for them to do the reading and to go to conferences than to write a monograph work. That 1% ratio does sound like the way the University of Phoenix does things which makes sense and that works for some schools.

However, if you look at the American economy, and if you look at our political culture, we still have a lot of faith in universities doing technology transfer. We really, really want to see innovative startups come from universities. To do that, yeah, it's great to support the students who do this, absolutely, but we still need to have faculty who can file patents, faculty who will do groundbreaking research. I think as long as we have that need, as long as we still call ourselves an innovation economy, a knowledge economy, I think we're still going to need major amounts of researchers to do that.

Maria Erb: I'm really glad you brought up that topic, because that segues right into our next little note here, which is the near-term future under Hillary Clinton and the near-term future under Donald Trump. Just like you've mentioned, it sounds like the near-term future under Clinton would be the continuation of that funding, DARPA and universities for research, kind of putting the fire under budding entrepreneurs by, again, deferring their student loans for 3 years, and doing things like that to kind of continue that university knowledge base, research base, kind of model.

Bryan Alexander: I agree. It's still tricky, in part because the Clinton campaign is focusing on campaigning right now, as is the Trump campaign. This is when we float all kinds of policies, proposals, and plans that are aimed at eliciting donors, to a lesser extent, voters. This is still the summertime, so donations are really what it's about. If you took a look at the Clinton campaign's technology policy that I wrote about a couple days ago, you see, among other things, it's a massive love letter to Silicon Valley. Please give us your money. That's the way we do politics. I could make a parenthetical note here about being in the state of Bernie Sanders and being a Bernie supporter, but I won't. I'll just leave that off for now.

I think that said, those caveats in place, I think the Clinton proposals are very interesting. On the one hand, there's a strong emphasis on STEM and the sciences. Now that continues what we've seen under Obama and under Bush. In a sense, there's nothing new there. There's more of the same. I think that'll probably continue to happen. On the other hand, we did see her making comments about not being fond of testing, which, if she wins, and I think she's likely to win, and if she's able to put policies in place about education, I think she could help tamp down the testing regime, the one that started in Bush's second term and really took off through Obama's first term. This past year, it started to slow down a bit with the departure of Arne Duncan from the Department of Education, so it may be that we'll continue to accelerate past the age of overtesting. Along with this though,

there is still so many enormous problems in higher education that I don't see her talking about or addressing.

For example, she and Sanders had dueling proposals for taking care of tuition. Sanders's proposals were more radical, more extensive, Clinton's less so. It all depends, among other things, on A, will she win, B, if she wins, will she continue these policies but put them into action, and C, will she be able to? Will there be a Congress who will support this? Will there be a government apparatus that wants it to happen? If all those things come into place, she might be able to reform tuition to an extent. I'm very skeptical on that. I think we have so much invested, literally as well as figuratively, in our current horrible structure of higher education and financing that I don't really see much reform. Take for example your institution. Is it public or private?

Maria Erb: We're private. We're a private Catholic university.

Bryan Alexander: You think about how, at private institutions, the majority of them are tuition-dependent. That is to say, the majority of the revenue comes from tuition payments. The K-12 population in the United States is declining, especially in the Midwest and the Northeast. We're trying to make up the shortfall with international students, but it's still an issue. Meanwhile, campuses have sunk costs which continue to increase, costs like tenured faculty, senior administrators, the physical plants of a campus. They really can't afford to start cutting down what they charge. This is a real problem.

It's much stronger in the public university world, because they get in theory a lot of funding from the states, but the states have been reducing that funding. States don't seem to be turning that around very quickly because, among other things, they have other funding priorities to compete for. As our population ages, the stress on Medicare and Medicaid that's paid from states is just increasing, and our anxieties about crime also continue to increase. It's very hard to imagine reducing funding in those areas. This leaves correspondingly less for funding higher education. With all those in place, I would welcome a big drive to reform higher education financing. I'm not sure we'll see it.

I do think though, it's important to remember that the 2 Obama administration terms have been ones that have been very hostile to higher education. It's not quite a level of war, but the Obama team wanted to reform higher ed. Higher ed did not see it that way. Arne Duncan and Barack Obama have pressed very, very hard in everything from rating and ranking colleges, you remember that drive, to giving us advice, even the President dissing, was it anthropology or art history majors? We saw this a couple of months ago when the new Secretary of Education, John King Jr, addressing a group of college university presidents, told them they were making a caste system, and they were undoing the American dream. I don't know if a Hillary Clinton administration will be friendlier to higher ed than that. I really don't know.

Now, a Trump administration, setting aside the sheer lunacy of talking about a Trump administration, we really haven't gotten a lot of data about what that education policy would be like. It looks pretty clear that Trump ...

Maria Erb: We could speculate though.

Ben Kahn: I found a quote.

Bryan Alexander: Go ahead.

Ben Kahn: "I'm a tremendous believer in education."

Bryan Alexander: Yeah.

Maria Erb: Yeah, that's the quote.

Bryan Alexander: The same guy who said, "I'm a big fan of the poorly educated," right? This is a guy who just totally shoots from the hip, who doesn't believe in reading, who [crosstalk 00:31:18] ahead of time. Thinking about February, the beginning of a Trump administration, it's hard to believe I can even say that phrase, but I'm a futurist. I have to imagine everything, right? I don't think they've actually thought that far ahead. Most Republicans know that they don't have a lot of support among K-12 teachers. They have very little support in higher education. Like I said, this is the time where you battle for donations as well as votes. I don't see them lobbying hard for that right now. We're not seeing more than puffs of smoke yet.

Maria Erb: Okay. Yeah, I guess we really ... Yeah, we'll just have to wait and see on that one. I do want to talk a little bit about the job market in the near term. Again, how might the sort of hot fields that we're likely to see, data analytics for sure, health care, again, how might that impact higher ed?

Bryan Alexander: It's a great question. It's a sign of our American higher education culture that even discussing this is controversial, where you'll get ... For historical reason, there's a long sense that American higher ed is not about job preparation, but it's about places where 18 year olds go to discover themselves. It's a place where education and knowledge are sequestered away from the pressures of the market and a part of society. People can explore on their own, which is fantastic. Even discussing this is tricky.

One thing to remember is that whenever we decide to throw a lot of resources at a new arising field, we usually swamp it. These things go in cycles. Law, for example, was considered the great road to a professional career. It's dying horribly right now. Law schools are flailing all over the US. The number of law students has collapsed to 1970s levels, and arguably the standards for getting into law school have plummeted. Meanwhile, law debt is just ridiculously high, so we have to be careful about that. Data analytics right now, we could overdo it. We could overpopulate the world with too many data analytics grads, but we've got maybe a

5, 8 year window of opportunity to make good in the meantime.

I can recommend 2 long-term trends to think about, and one to perhaps be afraid of. The 1 long-term trend that I would mention first is health care, and the whole system, from medical technology to hospital administration to pre-med, surgery, the whole thing, including allied health. The reason this matters is because of our demographics. We're an aging society. We know statistically the older we are, the more health care we consume. We're not going to start consuming less. The demand will be there, so getting some part of the medical pie is still going to be a good move going forward for a long time, as in, I would say, 30 years.

The other thing is we haven't reformed medical finance. The Affordable Care Act did a lot of really good things, but we still pay ridiculous amounts of money for health care in the US, way more than any other society. We don't necessarily get more, especially if you think about how uneven coverage is, and we also have a labyrinthine bureaucracy for payment between insurance companies, state and federal mandates, hospitals themselves. I think that's not going to go away anytime soon. The good news is if you want to get into dentistry, radiology, nursing, you've got easily half a lifetime ahead, easily, of good work.

The second trend to keep in mind has to do with automation. I think it's possible to overstate how quickly we can automate jobs out of existence. There are some jobs that right now are easily automated, and perhaps should be, and it'd be progress for the human race if they were. That's great. Some, we see in process, so self-driving trucks, for example, self-driving taxis, we're making slow, uneven progress on, but we should be able to see that. On the other hand, AI is still tricky. There are problems. We're dealing this week with the first major accident, a fatality, caused by a self-driving car, apparently. We have a lot of cultural anxiety about robots. Especially the older you are, the more afraid you are of using robots or relying on them. AI, it's impressive, but it's still massively flawed and only partially successful.

One thing to keep in mind with all jobs is think of all possible jobs as being cyborg jobs. Everything you do will be deeply intertwined with the digital world. If you're going to be a historian, you have to know data analytics. You have to know the prospect of distant reading. That is to look a corpus of literature from afar to analyze major movements from it. You should know text mining. You should be able to run an AI that can do some document retrieval, document search for you, and so on. If you're going to be a dental hygienist, you should be used to thinking about robots and perhaps statistical analysis and so on. I think we have to reframe a lot of our curriculum and a lot of our pedagogy, in terms of having that kind of human-machine partnership.

The thing that is scary, or scarier, is the possibility of automating entire professions. We have right now in law the rising specter of being able to automate more and more legal functions. I know it's going to be impossible to ask the average listener to feel sympathy for lawyers, but it is true that law is a big field. It employs a lot of people. If it starts employing fewer, this could be an issue. We have to look at the

entire curriculum in American education, pre-K through grad school, and think about what happens if these positions, if these functions, are automated 10, 20 years from now. What should we focus on? What does it mean, for example, to focus our curriculum on what humans do best? That's a very provocative charge, and I think we need to take it up.

Maria Erb: What do humans do best these days?

Bryan Alexander: One thing that we used to say was driving, but that's not the case currently.

Maria Erb: When did we say that?

Bryan Alexander: It depends on who you talk to. If you ask people, "Would you get in a self-driving car," and they say, "No," they say, "Because I believe I can do a better job." It's 1 reason why we have terrible traffic regulations and we kill ... What's the current death toll? Is it 15, 20,000 a year [crosstalk 00:38:04]?

Ben Kahn: More than that.

Maria Erb: It's really, really high.

Bryan Alexander: It used to be 30. It dropped recently which was a good sign. We really have a lot of confidence in that. It was like after September 11th. There were all these people who said, "I'm not going to fly. I'm going to drive instead. It's safer." You'd say, "Well, technically, that's insane. You're completely wrong." "No, no, we really believe that."

There are some things that we do better. One is creativity. We're very bad at automating creativity right now. There are programs like Google's Deep Dream, which can do some riffing on creative work, but we're still not anywhere near that point yet. Creativity is one. A second is human interaction. We are still, generally speaking, better than the robots at human interaction. There are, however, things that we shouldn't be proud of when it comes to this. One reason is we have people who are terrible at human interaction, for whatever reason, if they're sociopathic, if they're on the autism spectrum, if they have personality issues, or whatever reason, that they just aren't very good at making small talk, getting to read people.

We all know people like this. Some listeners may be like this. I was like this when I was a kid. I was terrified of people, never talked to people. The technology is getting better at this. We have to imagine 10, 15 years down the road when we have systems that can recognize through pupil dilation, through the blood flow to the skin, through sound cues, through gait cues and visual cues, when we have a machine that can emotionally assess people better than the average human, that's going to be an interesting time. Then it will become unethical not to use that, right?

Ben Kahn: It's interesting too, because the way that AI has a pathway for learning is I learn by watching you, right?

Bryan Alexander: Mm-hmm (affirmative).

Ben Kahn: It learns by watching you and analyzing humans. Just like the Twitterbot that Microsoft created and put on Twitter, it was about a month ago, within 3 hours, it was spouting out strange neo-Nazi propaganda and horrible racist diatribes, just all sorts of utter nonsense. I just think it's a [crosstalk 00:40:05].

Bryan Alexander: Yeah, because a bunch of pranksters trained it basically. That's already 2016, right? Looking ahead, you have to wonder, but in the meantime, I think humans do human interaction better. That's not something that we have to refuse training people on. One of the purposes of school is socialization. That's one of the main functions of K-12. That's what traditionally the undergraduate education is. We do professionalization in grad schools, and that's designed to make people better suited to, among other things, the human interactions of their field. We still have all these stories about trying to train surgeons to be better at small talk and understanding humans. I think in many ways, for education, that's a big, big focus.

Beyond creativity and socialization, a third is pattern recognition. Our technology is getting better and better at it, but it's in a very, very narrow way. For us to cast our eyes over a landscape or a city or a book or a painting, and to interpret it, to grab a concept out of that, to suss out where it's going, the technology is lousy at that so far, but humans can do that really well.

Maria Erb: A couple of things I want to talk about from that, but one of them is this looking ahead at future trends and the rise of automation, and the possible ... I wrote down as a note a return to the cottage economy, right?

Bryan Alexander: Mm-hmm (affirmative).

Maria Erb: Where if we all have a 3D printer, and we can make whatever we need from just creating it and printing it and using it, that has incredible implications for freedom and just freeing up a lot of time and resources for creativity and to make beautiful things, and to really have an awesome life. We'll still need to eat. I don't think we're going to 3D print our food, so there will still be some need to earn income, but the question will be, from doing what? If everything's automated and robots are doing everything, and we can supply most of our own needs, what then for that small space where you still need to produce an income?

Bryan Alexander: This is a fabulous question, and one that reveals that you're looking hard at the future. There's 2 possible scenarios for this going forward. 1 scenario is you might call it the new gilded age or you might call it neo-feudalism, where we have a small proportion of the population, call them the 1% for lack of a better term, who are equipped with enormous amounts of resources, financial resources. Below that, we have a smaller and smaller middle class, a larger and larger working class, a larger and larger population who are in poverty. That population works, say, part-time, maybe not for years at a time. Perhaps they have well-defined goals that don't

involve making money, such as taking a few years off to care for children or a sick or elderly relative. Perhaps they spend more time in school. Perhaps they are devoting themselves to a project, art project or learning a foreign language. Perhaps they waste time in drugs. Perhaps they just travel the world. We don't know.

The reason this could be neo-feudalism or the gilded age is if they have no way of supporting themselves. If they don't have a social safety net, if they don't have a good income, then they have to scramble from job to job, from position to position, driving Uber or renting whatever they possibly can, including their house or their body. This is a nightmare scenario in a lot of ways, but it's one that's quite feasible, lots of reasons for that to happen.

The flip side is what some call the Star Trek economy, or what some Brits call, fully automated luxury communism, a phrase I just can't get enough of, which is if you assume that we can automate a lot of employment, if you could assume that we maintain our giant pile of wealth that we currently have and even grow it a little further, that is we don't have a major depression or war to lose that, if that happens, we could rebuild a society that would let you print whatever you needed and also pay you enough to live a comfortable life. You can imagine the subversion of, say, guaranteed minimum income. You could imagine a whole variety of craft industries, a shift in consumer taste where we start appreciating hand-created or individualistic things, as well as experiences. If we can have that, we can have a truly wonderful life. Those are the 2. That's the dystopia and utopia extremes. Because they're extremes, neither will happen, but some mixture is possible. I would recommend that we try and work really hard to mix it the best possible way.

Education obviously plays a huge role in this. Think, if you go to college, one of the functions is to have a career afterwards. What happens when the career doesn't involve employment for half of your life? What does that mean for gender, for example? We know from Russian and American culture that many, many men have their profession tied closely with their sense of selfhood. If that profession doesn't make money, what are you then? Are you emasculated? What does it mean to have lots of leisure time? Should we rethink education as preparing the mind for continuing to learn and grow in new and more powerful ways, because you will have that much more time?

I worked with a college in Florida that has a terrific project. It's a first year undergraduate liberal arts experience for retirees. It's a great idea. They have to take a first year seminar. They have to write papers. They can't teach enough of these classes. People line up for these. Every time, the seniors say the same things. "I would love to have taken these classes when I was 20, but I wouldn't have appreciated it. After that, for the next 40 years, I couldn't have taken the time. I was too busy with family and with my work." That's the 20th century. In the 21st, what if you only worked 20 hours a week? What if you only worked full-time every other year? How much more learning can we do?

Maria Erb: I've got to bring up the thing that I always bring up along these lines, which is, you remember the book The Third Wave, right? Alvin Toffler's?

Bryan Alexander: Of course. He just died this week.

Maria Erb: Oh, did he? Oh, wow, I did not know that. I kept waiting for the third wave to kick in, and it just never did. We never got this society where we had all this leisure, and it was this great time that we could explore things because we didn't have to work so much. That just didn't happen. We've got more work hours than ever in the US economy for most of us, or unemployment for a lot of us too.

Bryan Alexander: Mm-hmm (affirmative).

Maria Erb: Yeah.

Bryan Alexander: It hasn't happened for a lot of really good reasons. One is that there hasn't been a drive to do it. There has been no governmental policy that says this is a good thing to do, and there hasn't been a for-profit mechanism that supports it. We have seen nonprofit mechanisms to support this. You can think about Wikipedia, for example, and all kinds of what Yochai Benkler calls commons-based peer production projects, like LibriVox or the sheer amount of video that people produce without any need for money on YouTube. That gift economy is certainly alive and well online.

There are issues. I'm not trying to paint this with too rosy a brush. There are all kinds of problems with that, but we do have that. We don't have a real drive to produce this kind of world. Again, I think part of it has to do with our sense of identity. Remember America has strong Puritan roots. We believe in the Puritan work ethic, and so yeah, not working is seen as kind of obscene. In fact, this is a perpetual complaint against people on federal assistance of any kind. Why don't you get a job? What's wrong with you? We still really hate that, and we have to get past that and around it.

Something else happened along the way that Toffler did not anticipate and I don't mean this as a damning criticism. I mean, the guy gave a tremendous, tremendous invention. If I have time this weekend, I'm going to blog post. I'm going to write about how much he meant to me. One thing is, in the '90s, and for Toffler's story, back in the '80s, we thought we were moving to a knowledge economy. America was shifting from the country of Detroit to the country of Hollywood. We were moving from manufacturing to knowledge. That ended up being true, except for 1 flaw. It ended up being true in that the knowledge economy grew. It took up more and more dollars. We have more and more technology doing it, lots and lots of capital. It's fantastic, but it doesn't employ many people. What I think are examples is when Kodak went out of business, it idled, I think, something like 65,000 people, a huge number. At that time, Instagram, which is one of the things that killed Kodak, employed about 200 people.

Instead, the biggest sector of the American workforce is not manufacturing. It's not knowledge. It's service. Nobody in the '90s saw this coming or talked about it out loud or celebrated it. If you look to the US Department of Labor, when they talk about the jobs that are growing, they're talking about forklift driving. They're talking about retail, restaurant service. To an extent, they're talking about K-12, based on [inaudible 00:49:51]. They're talking about medical service.

That's the real face of the American economy. We can't get enough of it, and we haven't automated it yet. When we automate service, then I think we get to the third wave, but right now, we want to have ... Most of us want to get in the taxi or Uber, and have a driver driving it. We want to have a waiter bring us food. We want to have pilots and stewardesses in planes. We really love and want our yoga instructors to be flesh and blood, not plastic. It's going to take some time to get over that hump.

Maria Erb: The last segment here that I did want to talk about is you did talk about the purpose of education being this sort of time of exploration, or the way that it's perceived as it should be that. I feel it really hasn't been that for a long time, at least a couple of decades. I was in college post-Wall Street era, and it was all about making money. It was all about doing what you needed to do to get the right job or whatever. I feel like it's still kind of like that, but with an even added twist of, "Okay, now you can't afford to make too many mistakes. You've got to pick the right major so that you get a job," because it's not even a question of making a lot of money. It's a question of surviving.

I kind of feel like it's like that now, of the holdouts being the faculty though for wanting to, or not all faculty, but ... I mean, I want to hang on to the idealistic sense of it too, but I just feel like it just really doesn't exist, except for in our own abilities and our own lives to do that. We've got more learning resources than ever. We have access to more incredible learning opportunities than ever, but I feel like it's something we have to take upon ourselves to do.

Bryan Alexander: I think you're right. Because this is audio, you can't see me nodding at every sentence you just uttered. This has been a major cultural shift, and part of it is driven by a kind of bipartisan agreement in American politics that the market economy is the way forward. Part of it is driven by the post-2008 tightening of the economy. In many ways, we still haven't recovered from the recession.

On top of this, we've decided to privatize higher education, even when it's public. We load up students with enormous amounts of debt, generally speaking. Yeah, a 22 year old graduates from university, and 2/3 of them have got roughly $30,000 of debt attached to them. In many ways, I'm impressed by them. That's a generation that looks forward at a world that we're cooking pretty steadily with global warming. We have horrendous politics by every possible assessment. Seniors yell at them and tell them they're coddled and boring and stupid. These kids, these kids, they don't rise up in the street, nor do they turn into nihilists. They actually just work and make stuff. Honestly in my best days, I think that that's what keeps me

going, and on my worst days, I think we don't deserve that generation, but they're there.

Yet the idea of the mind of curiosity, my friend Gardner Campbell calls the real purpose of education awakening and nurturing curiosity. How does that work? How did that get there? What's going on in that picture? That beautiful, beautiful human desire, that's what education nurtures and that's what education supports. I think, as you said, outside of education, we now have this tremendous, tremendous opportunity for learning. You think about open education resources. You think about closed education resources. You think about some computer games that are rich learning opportunities. You think about what we can get through media. It's really extraordinary.

The problem is, as you said, this is great for people who want to learn things themselves. This is a great age to be an autodidact. Unfortunately, most people don't have that aptitude. It's not well-nurtured in K through 12. I don't think it's that well-nurtured in higher education. That's a major shortfall. In fact, we should stop worrying about autodidacts and say, "Wow, we need to work with people who need the help to go forward." That's what school should be about.

Maria Erb: Yeah. I feel like that's what school is about, but it's kind of bringing that to the surface and acknowledging that that's what it's about and being able to put some resources behind that.

Bryan Alexander: If you're in American K-12 right now, the function is doing well on tests. It's not curiosity at all. In fact, testing is kind of the opposite of curiosity, isn't it?

Maria Erb: Yeah, for sure.

Bryan Alexander: Higher education is different. We don't have that kind of ruthless emphasis on high stakes testing, but if you think about a traditional age undergraduate, they start their life being trained in that, so it's really hard to unlearn that.

Maria Erb: Yeah, but it does sound like, from both campaigns, that we might be seeing the end of that for a while anyway.

Bryan Alexander: Oh, I hope so. I really hope so. It's hard, because America, we're unusual in having such a decentralized primary ... Our entire education system is so decentralized. We don't have a ministry of education. We don't have a national policy that does really very much of anything. All of our funding is basically private or local, almost all of it, and so it's very hard to push the country in one way or another. It takes a lot of local agreements, and people can always break those agreements. We witnessed the rise and the sideways lurch of Common Core, for example. I think it's really a cultural transformation that we're looking for.

Maria Erb: Yeah, I think so too.

Ben Kahn: Kind of moving into wrap-up territory, and this is a perfect segue into that. Just taking some of the ideas from the end of that talk that you did, what are some of what you called the blindingly obvious solutions, like how do people shape our own ... We've been talking about education as a part of a society as a whole, and the pressures and forces that kind of shape higher education are the same pressures and forces that are shaping our society. What are the blindingly obvious solutions to improving it?

Bryan Alexander: At my talk, I was addressing individuals, because I didn't want to leave people behind. I wanted them to think about what they had, that they could do themselves. For individuals, I think the blindingly obvious are blindingly obvious. One of them is to embrace open education, to open as much of your stuff as possible, and to take advantage of open. Open is one of the great revolutions of our time. Have you heard about Z-degrees yet?

Maria Erb: No, what's that?

Ben Kahn: Mm-mm (negative).

Bryan Alexander: Z for zero, a zero cost degree. Tidewater Community College in Virginia has already structured several of these where you can set foot on campus and work your way through, and not pay a dime for textbooks or other learning materials. How fabulous is that? What a real boon, but also to use this stuff. If you saw my slides, I got I think every single one of them from Creative Commons licensed sites. When do we make Creative Commons mandatory for our students and faculty, for example? We have to really embrace open.

A second thing is education in the US is pretty dis-integrated. We really don't collaborate well. We compete well, but I think collaboration is going to get harder and harder as we get more and more competitive. We have to stop that. We have to compete like mad. We have to build giant hive minds in order to think about this. You have to get multiple perspectives. We can't have a book that's written about Yale being understood as discussing all of American higher education. A new book out about students is written by the dean of students at Stanford. We can't assume that equals all American students. We have to figure out a way to have as many different voices and eyes as possible involved. Collaboration, it's a no-brainer. We have a zillion technologies that can do it. We've got to just keep using it.

One of those technologies is social media. I know I'm talking to podcasters here, so this is a little bit of preaching to the converted, but we have to make more use of social media. It's still in many ways a kind of underground for higher education, but social media is a fabulous place to keep up, for professional development, for nurturing relationships, for becoming smarter. You can think out loud through podcasting, through YouTube, through Twitter, LinkedIn, Google+, Facebook, whatever you like. You can get reality check. You can get new ideas. It's a terrific way to advance. These are some of the, I think, real obvious ones.

Here's another one for entertainment. This seems, again, obvious, but I've got to tell it to people. Science fiction has been talking about this stuff forever. You're talking about Alvin Toffler. There's a great science fiction novel from 1975 called The Shockwave [Runner 00:59:42] by John Brunner. It's dedicated to Toffler. This 1975 novel has these crazy ideas. It said, "Okay, let's imagine a future world where computers talk to each other over phone lines. People teach each other over those. There are gambling that occurs 'on line.' Bad programmers called hackers write programs called worms that destroy things." I think that's pretty good for 1975.

Maria Erb: It is really good.

Bryan Alexander: Yeah.

Maria Erb: The worm, especially ...

Ben Kahn: It's prescient, yes.

Maria Erb: ... because that's exactly what happened.

Bryan Alexander: I know. There was a huge legal battle between Samsung and Apple about the iPad. One of the pieces of evidence in the trial was a clip from the movie, 2001: A Space Odyssey, because it has a tablet computer in it. It's the first representation of tablet computing that we know. Go back to the 1930s. One of the great foundational science fiction movies of all time, Metropolis, is the first one to show video conferencing. Go to the 1960s. Take a look at Captain Kirk with his flip phone. Oh, I'm sorry, communicator, right?

Maria Erb: That's right.

Bryan Alexander: Or Spock with his smartphone, I mean, tricorder.

Maria Erb: Or the body scan thing ...

Bryan Alexander: Yeah.

Maria Erb: ... that McCoy used.

Bryan Alexander: Absolutely. Absolutely. The movie Minority Report isn't a really good movie ...

Maria Erb: Oh, yeah.

Bryan Alexander: ... but we've been trying to do that ever since, right?

Maria Erb: That's right. Ever since we saw it in there, it's like yes.