Thank you. Good afternoon, ladies and gentlemen. Thank you and thank you to the organizers of this meeting and the leadership of NIAD for this invitation. I’m very pleased to be here again in Tokyo. I’m not going to talk to you about the Japanese situation. As you know, the structure of American universities and Japanese universities are very different. I am going to talk to you, as was mentioned, about the American context for higher education, which is changing rapidly. In fact, it’s changing as we’re speaking about it today. The newspapers are filled with changes that are taking place in American universities. And if you have questions about some of those changes, I’d be happy to address those as the presentation goes forward. But mainly what I wanted to do today is to have a conversation with you about the context of higher education in the US. And I realize it’s difficult for us to have a conversation with simultaneous translators, but let us try to do that.

Totoya-san reminds me, has reminded me several times already this week that I need to bring my remarks back to the issue of assessment and student needs. And I promise to do that, but even that is changing. So let me jump into what I think is the major issue facing higher education in the US today. I’ve chosen as title for this talk the title of my recent book: *Abelard to Apple*. So let me begin by explaining to you the title of the book.

Abelard and Apple: who is Abelard? Peter Abelard was an 11th century French monk. He was one of a handful of people in Western Europe who helped define higher education. Many people consider him to be the first true university professor, and it’s interesting to me, and it was one of the reasons that I chose his name for the title of the book, that he did it without a university. Peter Abelard influenced the course of Western higher education independent of the value of any particular institution. He’s known mainly today for a disastrous love affair he had with a woman named Heloise. Those of you who have read western philosophy may know something about that story. Peter Abelard is my model of a true, pure university professor.

What does Apple mean in the title of the book? Apple means Apple Computer and, in particular, it refers to Apple’s online catalog of university courses called Apple’s iTunesU. Now, what is the relationship between Peter Abelard and
iTunesU? Peter Abelard could address a few thousand students at any one time. The best professors who put their lectures on Apple iTunesU can address tens of thousands, sometimes hundreds of thousands of students at any one time. And, of course, they do it without an institution. So we come to an essential question that Kawaguchi-san mentioned in his opening remarks. How do you talk about the value of your institution? What unique value do you provide? Now, the reason that I bring this up is that throughout the history of western universities, disruptions have taken place. And those disruptions do not favor the current leaders. They do not favor the current way things operate. I think that in that transition from a traditional institution to some kind of disrupted institution, there are lessons for all of us.

I want to begin by pointing out to you some things that are in the news. We see, for example, every day in the US, newspaper accounts of rising tuition costs. At some institutions, tuition has doubled in the last ten years. This is an example of a New York Times article that talked about the unexpected and massive increase in tuition at the University of California at Berkley. I'll draw your attention to the red portion of this article, which says, “Among students and faculty alike, there is a pervasive sense that the tuition increases and the deep budget cuts are pushing the university into decline.” So this is one of the themes that I have for you today. Even though US research universities seem to be doing fine, the undergraduate mission, the educational mission of those universities is under severe assault. Why is that?

Higher education is suddenly a rapidly growing marketplace with many alternatives. And in the US, that means that there are thousands more universities than can be supported by the current business model. That doesn’t mean that the capacity should decrease. It means that the current way of doing business does not favor those institutions. Many of those institutions will not be able to compete. Many will disappear. Many have disappeared already. And that’s the warning that’s contained in the book.

One way to think about this and one way to think about disruption is that American universities became great at a time when they could be gatekeepers. Those of us who were in universities could decide who got in and who didn’t. We could control access to courses. We could control access to information. We could, in every sense, be gatekeepers. That is no longer true. And if you want to know what the big difference is between American universities today and American universities a generation ago is, this is it. There are many reasons for this that we will talk about later. In many respects, it has been part of the American educational
experience since the 18th century to allow its citizens access to the materials of higher education. But university education was special. University education was something that was reserved for those institutions that would say who was going to enter and who wasn’t. Until the year 2000, when Charles Vest, then president of MIT, visited me when I was at Hewlett Packard and said, “I want to put every course at MIT online for free, all of the lectures, all of the homework, all of the course materials online for free, so that anyone in the world can access it.” And I was one of those people in 2000 that didn’t understand the import of that. But it turned out to be the beginning of a revolution. And, of course, what it meant was that institutions could no longer count on being gatekeepers because they now had access to every lecture, every homework assignment, and every exam at MIT.

Secondly, we see the rapid growth in for-profit universities, what I call proprietary universities. They are under severe pressure in the US, but they are still growing. They are growing in many respects faster than public universities are growing, which makes the public universities not gatekeepers. You see in India a promise to open 27,000 new universities, because today India sends only 12% of its high school students to university. In order to be globally competitive, it has to send 50% or more, and that translates to somewhere between 25,000 and 35,000 new universities. And, of course, all of those universities are experiments that make it increasingly difficult for American universities to maintain that they are gatekeepers.

And then, finally, in the last year, Harvard and MIT formed a consortium called EdX. And what is the goal of EdX? It is exactly Chuck Vest’s goal, to put Harvard and MIT courses, homework, exams online, freely downloadable for anyone in the world to access, and to provide a certificate to students who successfully complete those courses. We see in Silicon Valley $300 million in new investment funds flowing into startup companies just within the last six months – Coursera, and Georgia Tech just announced a relationship with Coursera; Udacity, founded by Sebastian Thrun; Minerva, which aims to be an Ivy League online university in which you can get a degree for $10,000 or less.

In summary, traditional universities in my country are the incumbents. Traditional universities in the United States represent an order which tries to preserve its current mode of operation. And I’ve just made for you a list of incumbents. I’ll add universities to that list. Of course, it never turns out well for incumbents. If you try to preserve the old order, you eventually lose. And the fact that we now have technology, the fact that we have a changing economic climate,
the fact that we have the massive motion of elite universities in the United States towards a new model, I think, is significant and makes it a completely different kind of environment than we’ve seen in the past. I will just point out that you have before you here today two institutions that have decided to move in this direction – mine, Georgia Tech, Staci’s, University of Illinois, are two of the institutions, top rated, that have decided to move to this new world.

So what do we know? We know that, in the United States, there was, for a long period of time, a feeling that universities were reserved for the elite few. If your parents came from university educated families, you went to university. If you had money, you came from a wealthy family, you went to university. And that was when the structure of American universities was decided. It was decided back here. And you can see what’s happened. Since 1949, since the end of the Second World War, you can see the growth in enrollments in American universities. And, yet, we decided how universities would look at the turn of the last century. We decided how universities would look in 1900. And that says a lot about how we manage our institutions. And it says a lot about what assumptions we’ve built in.

We will talk later on in my presentation about accreditation. But let me just say a few words about accreditation and assessment at this point. The reason that accreditation and assessment in the United States looks the way it does is that back on the left hand side of that chart, before 1929, there were no rules for American universities. It didn’t take much to start a university. And the philanthropists, the industrialists like John Rockefeller and Andrew Carnegie, who wanted to see American universities grow, noticed this. They wanted to contribute money to this growing enterprise, but they noticed that it was chaotic. The universities couldn’t keep track of their own finances. There was no agreement as to what constituted a college credit. And so they said, “Well, in order to get our money, you have to conform to a set of standards, a set of rules.” Now, what kinds of rules would Andrew Carnegie choose to impose on universities? He would choose to impose the rules of the factory floor because that’s what he knew. And that single fact has driven America’s approach to accreditation and assessment for the last hundred years. And that was all decided when very few students attended university.

Another one of the ways that American institutions, I believe, got to be great was by relying on experimentation. So let me just spend a few minutes talking about experimentation. We, in the United States, have not added capacity to our higher education system for at least the last 50 years. What do I mean when I say we have not added capacity? That means we have not built substantially new kinds
of institutions. We haven’t conducted experiments in how a university should work. Now you may ask yourself, “So what?” But experimentation is how American universities got to be great. There have been lots of past experiments and, in fact, if you look at the history of Western Europe, higher education in Western Europe and the Americas, you can find it filled with experiments. In the Middle Ages, we had people like Peter Abelard, who taught without a university and shortly after that, dozens of universities appeared in Europe. When they became not very effective, the Jesuits created a network of a hundred universities, an experiment, and in the north of Europe, the Academies. Hundreds of universities, new experiments.

In colonial America, hundreds of universities were invented. Some of them, like the University of Virginia, founded by Thomas Jefferson, were great. Some, like Williams College, survived to the 21st century to be among the best universities in the world. But many of them were not destined to be great institutions. Some were founded by religious sects. Many were founded by people who wanted to experiment with what a university was. Most of those universities didn’t survive, but in that group of universities, you find Johns Hopkins University, you find the hundreds of universities that today survive to be great institutions. After the American Civil War, thousands of universities appeared in the US, again, experimentation. What happened post-Civil War? Harvard, for example, got rid of all of its core requirements. No required courses at Harvard, except one. Rhetoric was their one required course. And so on through history. Today, we have tens of thousands of experiments taking place around the world and in the US, until very recently, almost no experimentation.

So what are the implications of this? The implications for institutions in my country are that a few universities, the elite universities, get to hand pick their students. They remain gatekeepers. A few less selective institutions get very large and, because they get very large, they get very difficult to administer and, therefore, very costly. And everyone else gets to fight over the remaining students. The result is that the costs go up for everyone. The costs go up for universities. The costs go up for students. The costs go up for society.

I want to make three definitions for you, three tiers in American higher education. I want to point out to you that there are 70 to 100 elite universities. There is no precise definition for what constitutes an elite university, but I think you know by name some of them. It turns out that there is a very good way to identify a university as being elite. You know, in the US, we have this ability to have private individuals give money to a university to an endowment for the
university. Virtually all of the elite universities have an endowment of a billion dollars or more, which means that they can do what they want to do. At the other extreme, you have the experiments, proprietary universities, online universities, universities like Coursera. In the middle, you have thousands of universities. These are the universities that educate 80% of American students and they are the ones that are under the most severe pressure from these forces.

So where does the pressure come from? I want to point out to you three economic realities. And this is always a difficult conversation for me to have with my academic colleagues because, in the US, professors don’t like to think of themselves as being involved in a business. But we are, nevertheless, under the thumb of economists. We are subject to the same forces as any other human endeavor. Economic reality matters to us. The first reality is that higher education is a multi-sided market. What does that mean?

Let’s take the idea of a single-sided market. A single-sided market is something that, I think, everyone can recognize. It involves a customer who is willing to pay for value. It involves a business that is a producer of goods and services, whose costs can be controlled. And, most importantly, it involves an optimal price that is set by the marketplace that depends on the marginal cost of production. That’s what a single-sided market is. Sony participates in a single-sided market. Most of the businesses that you know about participate in a single-sided market.

In a multi-sided market, there are many stakeholders, not just a single customer. There are many stakeholders and they all have different interests. They, oftentimes, have competing interests. The organization may provide not a single product, but a portfolio of goods and services with connected costs and cross-subsidies. And, therefore, no easy way to talk about what the optimal price is for the services. A multi-sided market is also a platform in which people can access those goods and services. And the platforms that are efficient, the platforms that are open, the platforms that add the most value to customers are the ones that succeed.

So, what’s an example of a multi-sided market? Well, international currency exchange, for example, is a multi-sided market. That’s an exotic one. The newspaper business is a multi-sided market, at least in the United States. You have advertisers. You have people who pay for classified ads. You have people who pay for subscriptions. And you have, in the case of public companies, shareholders who participate in this market. Online dating services are multi-sided markets. And
universities are multi-sided markets. So that’s the first economic reality.

The second economic reality is that when incumbents, when traditional entities become unable to provide services to their customers, markets find a bypass. And when they find a bypass, when a bypass economy emerges, boundaries are destroyed. Traditional organizational boundaries are destroyed. If your services are desired by many but affordable by few, for example, it’s a sure sign that your boundaries are being destroyed. The last bullet is the one that is most significant to me. Stakeholders have needs that we haven’t yet imagined. And furthermore, we have no way of finding out what those needs are going to be. It’s a sure sign that a bypass economy is going to emerge. And these new experiments in the US that you see forming right now are exactly that. They are new bypass economies that are being experimented with and some of them will be successful.

The third economic reality is that in this marketplace with many alternatives, we know that there are only three ways to survive. You have to have an unassailable brand. You have to have the best price. Or you have to have this unique value that you give, the best value proposition. And universities in the middle, those thousands of universities in the middle, don’t have the brand. The brand is held by elite institutions. They don’t have the best price. As a matter of fact, they waste money in unbelievable quantities. And each of those institutions has misjudged its value. Each of those institutions has forgotten about what we heard about in the introductory remarks: you have to have a way of explaining why you exist, what your value is to your students. I’ll give you a precise example of that shortly.

When I talk about brand, here is one way to understand what’s happened in the United States. The first column represents the first ranking of American universities in 1910. And you can see the universities in that list, some of them not very surprising. In 1925, there was a ranking of research universities, and you can see that in the middle column. In 2008, there was a ranking by US News and World report of American universities, and that’s the third column. The yellow boxes in those diagrams are public universities. As you can see, in 1910, public universities in the United States were elite institutions. They were wealthy. They were selective. They were among the best universities in the country. They were on the level of Harvard, Princeton and Yale. A hundred years later, not one public university is ranked in the top 20. It’s a dramatic erosion of brand. Public universities went from being the best, the most elite, the wealthiest, to not being in the top 20.

Here is another way of thinking about brand. This is a recent poll that talks
about internal and external perceptions of value. So as tuitions go up, we want to know what the United States public thinks about this. The public perception of value is that the majority of Americans think that universities offer a fair or poor value for tuition dollars that are spent. The American public is not happy. The right hand pie chart represents the presidents of those universities, how they perceive their value. 70% of them think that they’re doing a great job. They misperceive their brand.

Price: here is the cost of higher education in the United States. And you can see the blue line going up at about twice the rate of medical costs, of health care costs, four times the rate of the consumer price index, a little more than twice the rate of inflation. Where do those price increases go? This is what I meant about wasting money. Very little of that tuition increase ends up in the classroom. It goes to things that you can read about in the newspaper – new dormitories, performance halls, rock climbing walls to attract students to your institutions. It doesn’t end up in the classroom. And it doesn’t end up in the value represented by diplomas.

Now why is that? Are we all just stupid? No. There has been what we call Mission Creep in American universities. Over the last generation, the number of things that a university has been asked to undertake has grown. One way to measure that is to see where professors spend their time. The blue bars are the number of classes taught per semester by faculty members in 1988, the red bar in 2004. And across all institutions, the number of classes taught by professors is going down. Now one interpretation of that is professors are being less productive, but that’s not the correct interpretation. The correct interpretation is that they are being asked to do things that are unrelated to education. They are being asked to support sponsored research that they have no desire to support. They’re being asked to participate in economic development activities that have no relationship to the undergraduate mission of the university. The list goes on and on.

Value: and I want to come back to this discussion of outcomes that we started out with because, in my book, I talk about value. To me, value is the essence of outcomes. We may not be able to easily measure it, but the marketplace finds it. So let’s talk about value. Over the last 20 years, grades in American universities have become essentially meaningless. Now that’s a dramatic statement, but it’s supported by data. Two-thirds of the students in American universities get As and Bs. You know, there’s a radio program in the US called Prairie Home Companion that takes place in a fictional town in Minnesota and one of the hallmarks of this fictional town is that all the children are above average. So we live in a town in
which all the children are above average. This makes it very difficult for employers, and I know we’re going to hear later this afternoon the idea that employers are finding it hard to figure out what they’re getting when they get a graduate from a Japanese institution. It makes it hard for employers to figure out what an A really means from the University of Illinois or from the University of California because everyone gets them. You can also talk about the value of a degree. What’s it worth? What is being taught? What do you learn?

This is a chart that comes from a study conducted by a friend of mine, a former Dean at Harvard University, who looked at the relationship between what was taught in the classroom and what the course catalog said should be taught. And he assigned grades to universities depending on how closely they kept to their course catalog descriptions. I’ll draw your attention to the right hand side of the chart, the Over 40K bars. Those are institutions that charge over $40,000 a year in tuition. Most of those institutions get Cs, Ds and Fs. That is, if you go to one of those institutions and take the introductory math course, which says that there is going to be some calculus in that course, chances are there is no calculus in that course. If you take a course in English literature, chances are you’re not going to be required to read any substantial amount of English literature. The Ivy League schools are not much better. Interestingly enough, most institutions in the state of Georgia, my state, which is not known as a center of higher education, get As and Bs. So you can’t always know what you’re getting by way of value.

Let me come back to what I promised to talk to you about, the idea of accreditation. I’ve already mentioned something about the historical roots of accreditation. We have a difficult time in the US with, I think, some of the same problems that you’re wrestling with here. The fact that we’ve turned universities or tried to turn universities into factories in which students come in the front end and we try to do something to them and then we measure what we’ve done to them and at the other end they leave the factory with a degree. It’s not a good model. It’s not a particularly effective model for my country. It’s a model that’s under much discussion, especially with the appearance of the new set of online courses, which are much different in their orientation than the factory model.

Secondly, as we look for alternatives, scalability is a big issue. How can you provide an assessment tool that scales to the number and kinds of students that are going to be pouring into higher education over the next generation? There are a billion new students, more or less, that have come of age in the last ten years. And those are all new students that we haven’t seen before. Many of them are in Africa.
Many of them are in Asian countries that have newly joined the free market economies. Many of them have to do with changing demographics within countries like the US. How do you scale accreditation to those new students? How do you apply science to learn something about what students are learning? It’s not as if we haven’t studied these questions. The famous paper by Benjamin Bloom, the 1984 paper that compares learning styles of students in classrooms, tells us exactly what to do. The Bloom paper points out that if you want to achieve a repeatable result with students, give each of them an individual tutor. You will move every student in your population to the 98th percentile. So we’ve known this since 1984. Why haven’t we done anything about it?: Because in 1984 the technology didn’t permit it. So rather than concentrating on entrance exams, rather than concentrating on process-centered metrics, rather than concentrating on money spent per student, how much better off would we be if we figured out a way to realize Benjamin Bloom’s vision of providing every student a tutor or the effect of a tutor?

And finally, the issue of cost: cost in accreditation, cost in assessment is a major, major factor in American universities. There are 80, more or less, accrediting agencies. Universities like ours may be subject to 40 different accrediting agencies, 40. That means that I, as a Dean, am constantly being assessed. What is the cost of that? It’s been reported that the cost of accreditation to Stanford students is eight cents out of every tuition dollar. Think about that. One of the top three universities in the world spends eight cents of every accrediting dollar convincing an accrediting bureaucracy that it’s doing a good job. You can understand that presidents of universities that already know they’re doing a good job would be resentful of this. And if it had some effect on the value of the degree, I think they would say okay we can do that, but it’s not true. It’s not true.

We don’t have time to talk about this in detail, but I wanted to let you know that some of these ideas that we’re talking about today have been the subject of experiments. In my own institution, when I joined Georgia Tech as Dean in 2002, part of the job that I was given by my Provost was to redesign the undergraduate computer science curriculum, which had become, I think, out of date. It had become inflexible, and had become exceedingly process centered. Students cheated regularly, which wound up in newspapers. It was not a good situation.

And so, what we did was to conduct an experiment. The assumption was things couldn’t get any worse than they were. So we got rid of the old degree completely and replaced it with not one degree, but 36 new degrees under one umbrella. How did we do that? Well, we started out with some of the ideas that
we’re talking about here today. We didn’t let process, we didn’t let accreditation drive our strategic decision making. We had a sense of what kind of value we could add to employers. And we used technology. The results were immediate. The results were positive. And it turns out, that the accrediting agencies weren’t crazy. They looked at what they did and they approved immediately the new THREADS curriculum at Georgia Tech. What we’d like to see are thousands of experiments like that. What we’d like to see is, as a result of some of these new online courses, the massively open online courses, we’d like to see many, many more institutions experimenting with what it means to be a course, what it means to be a credit, what it means to be a curriculum, what it means to be a degree.

Let me finish by talking about what it means to be successful in the 21st century. And I’m going to concentrate on just one aspect of this. In the US and, to some extent, in Japan, what I call Institutional Envy is what passes for strategy. If you’re a public university in the United States, you envy the University of Michigan. If you’re a private university, you envy Harvard or, I guess, if you’re a small one, you envy Williams College. The president of a very small public university in northern New England was asked, “Who is your biggest competitor?” He said, “Stanford.” Stanford is not his biggest competitor. He has no chance of competing with Stanford and any money that he spends on trying to become like Stanford is taking money away from what his institution is really good at. That’s what Institutional Envy is. So what do we do? Universities that want to look up, that want to chase the people above them, look at what those universities do. If they’re very selective, then I want to be more selective. If they spend a lot of money per student, then I want to spend a lot of money per student. If the other places can predict their outcomes, then I want to be able to predict my outcome. It’s not going to happen.

So as we look at institutions in the 21st century, who’s going to succeed over the next hundred years? I’ve divided my recommendations into really two categories of recommendations. One is to define your value. There’s a phrase in the US called “me too” and I’m not sure what the Japanese version of this is, but I think you understand that I just want to do it because you’re doing it. Me too-ism does not constitute a strategy. So defining your value means that you have to know what it is that you’re providing your students that make you distinctive. Focus on that.

Establish your brand. Recognize your weaknesses and, above all, embrace openness because, in this new world, openness is the critical thing. And then once you do that, you have to act on it. You have to be willing to re-architect your
university. My friend, Michael Crowe, the president of Arizona State University, says that his job title is not president. His job is Chief Architect. And he has, for the last 12 years, been systematically re-architecting Arizona State University into his vision of what it means to be a public university in the United States. And he's abandoning Institutional Envy. He's abandoning selectivity as a strategy. He's abandoning measuring inputs and measuring outputs.

So I think this is a good point to leave you with. These are not rules that I'm handing down. They are suggestions for what might be successful over the next 100 years. But as we look at the changes taking place and the speed with which those changes are taking place, the conclusion that I come to is that the successful universities are going to be the universities that behave like this. The others will disappear and they will be replaced by new experiments because there are thousands of experiments being conducted.

Thank you very much ladies and gentlemen.

Questions

Q:
So Harvard, another very famous university, they have everything, information open on the Internet, so all these references are being open and disclosed. And how are they running their universities from an economic point of view?

Dr. DeMillo:
Thank you for the question. Those happen to be the universities that have the largest endowments. So they happen to be the universities that are in the most demand. They’re under no particular threat from these changes. I think every one of us who is involved in this experiment realize that we will have to figure out what it is about open courses that makes us a better university. When we came to the conclusion at Georgia Tech, for example, that we would participate in these massive open online courses, it was because we thought we could make a more perfect curriculum. We thought we could do a better job for our current students. We thought that we could gather data that would allow us to have data driven approaches to learning that would be impossible to have otherwise. And universities that are not participating, I think, in these early experiments are going to have a much more difficult time with this question. But thank you, it’s a wonderful question.
Q:
I used to work for the Tokyo Agricultural and Technology University. Professor DeMillo, thank you very much for your presentation, but there was one point that was very shocking because the American universities credit their grades as either A or B and there is an inflation of grades. I didn’t think in my dreams that the US would have such a grade inflation. I thought that you were very stringent and strict in giving grades out in the United States. I got the feeling that the US universities are becoming similar to Japanese students in being so generous in giving good grades. And I couldn’t catch the reason for this, but maybe there are so many large universities and they are going after the same student targets and, by doing so, the quality of education is deteriorating. Is that the case? And if that’s the case, that’s exactly the same situation for us here in Japan, so I’d like to know the reason behind this.

Dr. DeMillo:
I think the reasons are very similar. I can think of three reasons why it’s become a problem in the last generation in the US. The first is that students know that in order to get a good job, they need to have good grades. So they put extreme pressure on not only teachers, but on deans and provosts and university presidents. And there are just many stories of students who are in tears begging to have a grade moved by simply a couple of points because it means that they will get into the graduate school that they want or they’ll get the job that they want.

The second is that administrators know that moving students through the factory is a big part of their evaluation. And it’s hard to move lots of people through the factory if you’re giving them Ds and Fs. So there’s pressure to move students into a passing range where they can move through the program.

The third is, and I think this is an object lesson for Japan, the public has been unaware that this has happened. So the public has not really helped put pressure on universities to make things like they were 25 years ago. And, in fact, just the opposite – parents provide pressure to professors to give good grades. The philanthropists who give money to universities aren’t really interested in providing that level of stringency. So this is the essence of what it means to be a multi-sided market. All of these stakeholders have competing goals in mind and they all lead to an outcome that’s not desirable.
So one of the things that we see is that employers, particularly in technology fields, simply don’t trust the grades. If you want a job in the US at Google, for example, you show up for an interview and the first day, maybe the first two days, you’re going to be taking a battery of tests because Google simply doesn’t care what grades you got. They want to know what you know. And that’s sweeping through American industry. I think, if there’s a positive side to this sad story, it’s that things like Coursera and Udacity offer the ability for skills based assessment, so you don’t have to rely on grades. If you get a certification from Sebastian Thrun’s *How to build a robot* course, for example, what you get is a certification that you have conducted these exercises and scored in the 98th percentile and that’s independent of, you know, the human subjective judgment. So maybe something in the technology will be able to help us there. But it’s a great question and it’s a question that we all ask ourselves.

Q:
Thank you very much. My name is Tadaaki. And the last slide that you showed in your lecture; in that last slide, in the handouts that we got, it says “replacing accreditation with” and you said that there were many accreditations, there were 10 or 20, and that eight cents out of one dollar goes to accreditation. So such evaluation, maybe we are over-evaluating or evaluating too much that the evaluation itself is becoming meaningless. So the role of evaluation, in the beginning, it was to ensure the quality of education provided at the university, to show what kind of skills and education you can get if you attend this university. Now the evaluation is not really showing that in the end. So I am wondering where evaluation is going from now on, which way it’s headed toward, so if you have any insight on where evaluation and accreditation is heading towards?

Dr. DeMillo:
Well, it’s the critical question, isn’t it? Let me just say a couple of words about this. There is a set of regional accreditors that are necessary to distribute federal assistance to students. You can only get federal assistance if you belong to an institution that is accredited by one of the regional accrediting agencies. Above that, there are just dozens of reasons to accredit programs. Engineering, for example, programs are accredited by an organization called ABET. It turns out that some of the best programs in the country, in the US are not accredited by ABET. And it’s not because they’re not good. It’s because they believe that ABET accreditation adds no
value. My own field, for example, computer science, the best programs in the country, in fact, the best programs in the world are not accredited by ABET because 25 years ago, those institutions said, “We don’t want a bureaucracy dictating the content of our programs.” And so Stanford, MIT, University of California at Berkeley, are not accredited. It turns out that Georgia Tech is accredited and it’s accredited because the former chair of our department was the head of the committee that developed the accreditation requirements. And we all know that phenomenon. Accrediting for professional schools is very much under discussion and very much under assault. The top professional schools, the top business schools, the top law schools systematically disregard the accreditors. The bottom tier of institutions systematically, routinely get by accreditors with programs for which there are no jobs. And as you go through the professional schools, you’ll find deans, people that were in my situation talking very openly about this.

The other thing that I want to point out, and this gets back to the idea of a multi-sided market, there is a market in the US for helping universities be accredited. Consulting companies make a great deal of money advising universities on how to become accredited. And I’m not speaking for my own institution: I’m not speaking for any organization in the US, but every time I have looked at this, it has appeared to me to be a parasitic industry. It’s an industry that exists only because accreditation exists. It adds no value to anyone other than the companies that provide the services. So I think all of these things come together. The disruption, of course, is the technology. What will happen to all of these accrediting regimes when we can directly observe student performance? You know, if we had online instruction for a third of our undergraduate program, we would be able to observe learning activity and learning outcomes and not have to guess what mattered. We could apply modern analytical tools to do that. How close are we to that? I think we’re just months away from having the first of those tools available in the marketplace. When I started writing my book in 2008, I made a lot of predictions that I thought were ten years away or 15 years away, and here we are in 2012 and I’m looking at all of those predictions coming true and wondering what did I forget? What is the next step? And when I think about data driven approaches to assessment, that’s one of the things that I think is the most important.

**Panel discussion**

Prof. Tutiya:
Thank you Professor Yamada. As I said in the onset, we looked at the Japanese situation, maybe the micro and the macro. And we’ve had a presentation of both of them. Professor DeMillo and, I think you referred to the two presentations of our American colleagues, but if you could give us a comment. So first of all, Professor DeMillo, could I have your comment, please?

Dr. DeMillo:

Yes, thank you. It’s actually a comment and a question for both of my Japanese colleagues. First of all, with regard to the ABET accreditation. The figure that I used was for the computer science portion of the accreditation, but it does bring up an issue that I think is difficult for us to deal with. The more inter-disciplinary courses that we have, the more inter-disciplinary programs that we have, the more difficult assessment becomes. So in my college at Georgia Tech, for example, we have one accredited computer science degree. In addition to that, we have a degree in human-centered computing, a degree in human computer interaction, a degree in robotics, a degree in computational science and engineering, a degree in humanitarian computing, a degree in software engineering, none of which are covered by accreditation, ABET or otherwise. So this issue of assessment at the program level, I think, is going to be a serious issue for us and for institutions like Georgia Tech which are actively pursuing inter-disciplinary programs and inter-disciplinary degrees. So that’s by way of comment.

Let me ask a question to both of you. There is a movement, I would say, almost a social movement in the US that is based on the perceived irrelevance of the classroom. Some of this is due to the appearance of Khan Academy and high quality educational videos, but as you move towards the flipped classroom: I’m not sure what the Japanese term for that is, but the flipped classroom is where homework and lectures are inverted, so classroom time is used for interaction between the professor and students. Students are expected to attend lectures online at home. So it really reverses the role of homework and lecture. What are the assessment challenges for that? We see open courseware. We see massive open online courses. Surely those will have an impact on the Japanese classroom and Japanese programs as well. What are the special challenges that you see for that?

Prof. Tutiya:

So I think for the purpose of discussion should come later on. I just wanted to give the two Japanese colleagues some time to think.
Prof. Kunugi:
Well, Professor DeMillo, you mentioned at the very end, you were saying that the classes and actual, I think there was a slide pertaining to that point, that it's all inverted, and it's exactly that. It's quite interesting for us because I don't know what and how they were doing it. So that was actually my question.

Prof. Tutiya:
Yes, the outcome, the learning outcome and assessment is difficult.

Prof. Kunugi:
I was trying to ask you, you know, how do you do that in the first place, inverting the roles of class and homework?

Prof. Tutiya:
Can you talk about it a little bit more, Professor?

Dr. DeMillo:
Yes, so I can give you one example. In our Aerospace Engineering program, there has been an active movement to move classroom time to something that's more quantitatively productive. Rather than measure time spent in the class listening passively to a lecture, time spent interacting with the professor. Aerospace Engineering happens to be one of those disciplines where there's a wealth of online materials available. So the professors in Aerospace are assigning as outside of class exercises covering a body of material from the textbook from online resources and then when they arrive in the classroom, they have to engage. So they can't sit passively in a classroom seat just taking notes and absorbing the lecture. They have to engage with the professor. They have to be prepared to answer the questions that the professor asks. It's a very different model. Some of this is motivated by data that we've been gathering over the last several years that shows that, during a 45-minute lecture, students are maybe engaged five minutes of the time. So in a passive classroom environment, five minutes of a 45-minute lecture really constitutes the engagement that the students have.

Well, it's a waste of 40 minutes of classroom time. But it does, I think, present special problems. If you want to say, “Well, so what am I doing with my programs?” Because all of our metrics have to do with these time in seat metrics, how much time to students spend on homework? We saw, I think, in some of the materials the idea that office hours
are an important measure. Well, how do you measure that? We have some institutions which give cell phones to professors and the professors have to be available seven days a week, essentially 24 hours a day to their students. Well that’s not anticipated by the measures either, so the more you, I think, move from this idea that the classroom is somehow sacred, that the lecture is somehow sacred, to the idea that there’s more, Professor Yamada talked about active learning, there’s more active learning taking place throughout the curriculum, the more difficult I think it gets for the kinds of assessments that we have.

Prof. Tutiya:
Well, that’s where we are now. So I will give you some time to think about it. And also, if I could get a comment from Professor Provezis?

Dr. Provezis:
Sure. This is all fascinating, first off. Thank you for your presentations. I’m struck by how similar the struggles that you’re having here are similar to what we’re having in the United States. And specifically, that shift from students being these passive learners to more active learners and the shift that we all have to make in order to make sure that it’s not just imparting knowledge on students, but making sure that they’ve received the skills, the dispositions of mind, the attributes and knowledge that we would hope from them. And so, when you talk about computers and rethinking pedagogy, I think one of the things that I find most fascinating that’s going on in the United States is Carnegie Mellon’s open classroom. It’s a little like what Dr. DeMillo is talking about, but also blended classrooms where they’re blending technology in with the traditional lecture. I think that’s all really useful and it’s going to be exciting to see how it takes off in the United States and I’d be interested to know if that sort of development is happening here. One of the things that I think, one of the reasons that we didn’t list, I think, for grade inflation, is the perception of what a college degree really is for some people. I think it’s often looked at as not a time where you can really learn and explore, but instead it’s something that you buy in order to get you a job. And I think if you’re buying this product of higher education, which makes me cringe in some ways, but I think that’s how students sometimes perceive it, then they’re not going to put as much into it: they’ve paid for it. And I don’t know if in Japan if that’s a similar problem than, say, in the United States where students almost feel obligated, they deserve a grade because they paid for this class and that it’s not about the work. And so that brings to mind, how do we then engage that student? How do we bring them in and
do these other pedagogies and blended learning and active learning and things that will speak to this generation of students and the students who are coming back to increase their knowledge over the time of their career, how they’re working. So, I don’t know what kind of question that is...

Prof. Tutiya:
I think you have a very similar problem and I would like to have the two representatives of Japan to give a response to that.

Prof. Yamada:
Well, if I can try to talk about the whole thing, the classroom activity, well, how it is changing structurally. That is one issue. And Professor Kunugi’s area is in the engineering field, so the curriculum is quite clear. So how do you engage with the students in the classroom? That may be a bit difficult. But in our case, I am in an inter-disciplinary area, probably in the social science field, but, well, we aren’t using such high-tech things like the online teaching, etc. PBL-type classes, so it’s Problem Based Learning, or Project Based Learning, so in that area we would ask the students to engage and including the preparation for that will happen outside of the classroom. Well then, how can we check the learning part of the students? Well, it might be that we have to be in contact through email, etc. and we try to do that to be available to the students, even outside of the classroom. I just forgot, but I think it was e-learning based, no, well, it’s an e-learning based system of some sort where the students can always contact the professors to have a discussion with the professors. And that, in combination with what happens in the classroom, is what we are trying to do. But still it depends on the discipline. And through engagement, getting a higher impact: there are areas where you can do that and there are areas where it’s quite difficult to do that, for in the science field you have a systematic curriculum. Maybe you can still use these kinds of things in this area as well, but there are a lot of things you need to learn before you have this engagement. So is it going to be efficient in these areas? I’m really not sure.
And also about the grading: because we are a local university, we have introduced the GPA from an early time and we don’t have an inflated grading. And that’s because we have introduced the GPA quite late. So we are still strictly grading our students right now. So far it doesn’t seem it’s affecting any students landing a job in any way so far, but for students who are thinking of studying overseas, comparing their grades with the grades in the United States where the grades could be inflated, sometimes it does
become a hurdle for them to go overseas. Korea and China are trying to deal with that, so for the students in Japan, it may be a disadvantage at this point.

Prof. Kunugi:
Well, in the science field, well for example, in the area of chemistry, sometimes you might get the same thing wherever you go. You will be learning the same thing wherever you go. Usually we will use a text that was translated from English so it could be just taught in Japanese. You might be using the English text. Maybe the language is just different. And also, but chemistry is chemistry wherever you go. So at the basics, you have to learn the language before you start studying literature. That kind of basis has to be learned in the classroom, but it seems that, maybe this is a difference in generation or maybe this is just typical here in Japan, but the students are taught that you have to strive until you get into the university or get a job, just study until you get there. Maybe we are better than Korea in that sense, but I think this could be a characteristic of the Asian region, where you just strive until you get into the university or into a certain job. And people or students lose their way. They forget what they are studying for. So maybe going away from the classroom and finding issues on their own and struggling on their own may lead the students to understand what they lack in their knowledge. But creating a program like that is not really consistent, but it seems that that is the only way we can go if we want the students to come along with us, at least the students in our university seem uninterested unless we guide them in that way. So even if they don’t understand, maybe we just want them to get some hands-on thing in the classroom just to get their interest.

And I have had the opportunity to discuss with some students who already got an unofficial offer of a job. The first thing the companies do is look at their grade, their GPA, how many Fs they have or how many Ss they have. That’s the first thing it seems the companies are looking at. So I said that companies don’t believe in the grading from the universities, but it seems that the companies are actually interested in how we grade our students. Of course, that’s not the only thing that determines the students getting their job, but we have to make sure that the companies can trust what we say. Now the graduation research, some teachers would say “Do it this way”, but I try to make this an active experience. But when the students are trying to study for just an examination to get into the university, how do you try to get them more interested in study that is not just for exam’s sake? Maybe we have to get a mixture of the two inside the classroom and also take some part outside of the classroom. Well, of course, it depends on the size of the class whether or not you can do that.
Prof. Tutiya:
Well, thank you very much from Professor DeMillo and Dr. Provezis. You have talked about using new technology in education and also changing the way the universities are using these new technologies, and what kind of learning outcomes assessment would be possible. So you asked that question, so what kind of answers do you have to the question that you posed?

Dr. DeMillo:
I was hoping to learn. I think the conclusion that some of us are coming to is that the idea, and both of you mentioned it, the idea that students have an expectation of making forward progress through a program, independent of any external validation, that progress is warranted, is up for discussion in the US. So if you look at the online courses at Coursera, at Udacity, at EdX, they have a very different structure than a typical class does. There's a small segment of explanation, five minutes, ten minutes, followed by a test, followed by an exercise. And you can't imagine making it beyond that first gate unless you've mastered that material. This is Benjamin Bloom's Mastery Classroom. You repeat the material until you master it before you can move on. And it's very interesting, even in the first sets of enrollments in these online courses that some students will register multiple times for the same course. And some people think that's a bad thing. I happen to think it's a good thing. If it takes a student four, five or six times to be able to master the material, but there's a mastery step that takes place before they move on to the next step, that's a definite measurement of forward progress. It's very interesting to compare the completion rate data that you have versus the US. Some of you may know that the four-year completion rate data for American universities is ranked 16th or 17th in the OECD. I think we're almost at the bottom. Only Italy is worse than the United States. Six-year completion rates are only marginally better. And there's been a lot of analysis as to why this is so. My favorite is a large book that William Bowen, the former president of Princeton, wrote two years ago a book called Crossing the Finish Line and there's a lot of data that he presented behind it. One of the things that I take away from this book is that we essentially know how to predict nothing about what students are going to do once they enter our universities. Our SAT is called, well, we have several entrance exams; our entrance exams predict only three things. Our entrance exams predict first-year performance. It predicts family income. And it predicts zip code, postal code. It essentially predicts nothing else, which is, I think, the key problem. We know nothing, if you think about my slide about bypass
economies and what we know about our customers, we essentially know nothing about the students that are entering. We know even less about the students who are going to be entering five years from now. So it all comes back to the question of what does that have to do with the technology. We think the technology mediates a lot of that. And we're hopeful that as these new methodologies come online, we'll be able to measure some of the results.

Dr. Provezis:
Yes, I agree. I think we'll be able to collect a lot more information on our students and that we'll be able to use that in productive ways. In particular, I think it’s useful to almost think about learning objectives, what you want students to learn, and then having those as a measure and, ideally, if I can dream for a moment, we could actually give a transcript that actually listed these skills and attributes and moved away a little bit from the A because what does that mean, really? What does it mean across cultural boundaries? What does it mean across even institutional types? But knowing that students have completed their college experience, be it a course, a program or the entire institutional level, and they have certain skills, I think that would be worthwhile because I think there is a lot of learning that takes place in the classroom, but there is quite a bit more that takes place outside of the classroom. So being able to use CIRP data, NSSE data, some of these other factors and really be able to say what our students are doing and what’s effective and how we can give them more effective experience based on what we actually know about a student. So I still, even though I said in my presentation that we've collected a lot of data and we don’t know what to do with it, it sounds like I’m saying we need to collect more data. And we probably do, but we need to think strategically about what data we collect and then how we are going to tal k about that and how we are going to use that in effective ways.

Dr. DeMillo:
And I’d like to add just one more thing to that. The idea of peer learning and peer mentoring figures into this in very interesting ways once the technology is available. And it’s one of those subjects that, I think, has the most impact in Humanities, has the most impact in the Liberal Arts where we have a tradition of writers’ workshops, for example. So we already have a tradition of having students critique each other’s work and learn from each other. Again, those are very difficult things to fit into your standard model of a classroom.

Prof. Tutiya:
Thank you. It seems like the two professors from the United States agreed on this issue with each other. Maybe our last Japanese professors, anything to say?

Prof. Yamada:
Well, the last thing that you mentioned just now, which is about the peer learning, it’s very interesting. Three days ago I came back from a conference that was held in Vancouver. It was about the education for the freshmen. Many presentations or workshops were there and the peer learning workshop was the one that attracted the largest number of people. Some institutions are doing this in combination with online learning. Australia, the United States, Canada, I think, had the most interesting case studies or presentations, something called learning commons. They showed the data that indicates peer learning is very effective. And I found out that this was one of the issues actively debated in those countries. But in Japan, for the first year education, for instance, peer learning can be combined with other types of learning and teaching. But other than that, I don’t know peer learning, how it can be used to create accomplishments that we expect. We need to have good preparation and, I believe, we need to have a clear understanding of what needs to be learned by the students. But talking about the tradition in Japan, something similar has been taking place in circles. For instance, in the Law School’s, department of law, the students created a circle of peer learning. And it has been their tradition to form such study groups amongst students and this applies to political science, and accounting discipline, and so on. I know that they have had, developed the know-how in those areas, in these disciplinary areas. So how we can combine this tradition in other disciplinary areas, that’s the next question we need to address.

Prof. Tutiya:
Professor Kunugi?

Prof. Kunugi:
Well, experimentation, experiments, for instance, that can be done as a sort of project, peer learning is something that you copy a report when you are given a very difficult challenge. I guess students can gather together and think about it together. But in our university, for instance, peer learning is something like you copy somebody else’s report and, therefore, I can’t really think about the peer learning conducted at my university. I don’t know if that is a good comment or not, anyhow.
Prof. Tutiya:
So it seems like we are talking about the improvement of the methods to be used. But anyhow, we would like to entertain questions from the floor. If you have any questions, please raise your hand. And also, you can address your question to certain panelists or Professor Kawaguchi, who is not on the stage yet, but you can ask a question freely, either to a certain person, panelist, or to everybody, I guess, on the panel.

Q:
Hi. My name is Aoshima from JABEE. I have noticed some misleading explanation, which was not incorrect information, but it is a little bit misleading, so I want to share with you the real information. In the response of Professor DeMillo to the last question raised by, from the audience concerning ABET. ABET was established in 1932, 80 years ago, before the World War II. They started from the accrediting of engineering programs and today they accredit more than 1,800 programs. And later they expanded the category of accreditation to computing science and also engineering technologist. And what Professor DeMillo stated that, he stated that none of the programs of the top universities were accredited by ABET. It was wrong. It is true in the computing science category, but for engineering, top university, the programs are accredited by ABET. For instance, today 18 engineering programs of MIT are accredited by ABET and five engineering programs of Stanford are accredited by ABET. Thank you.

Q:
Thank you very much to all the professors for a very meaningful presentation. Professor Kunugi, excuse me, my name is Matsuyama. Professor Kunugi said that there was a student who said that you have allowed me to enter this university so you are responsible for graduating, but we are currently doing assessment of students, but how much, or how many of your students are like this? And if there are so many students like this, wouldn’t it undermine the credibility of the faculty? And in order to entice more eagerness for learning, there are more and more students to attend. There are teachers who become too generous or over-generous in giving As and Bs. Are there any specific measures to tackle this problem? This is not limited to Professor Kunugi, but if you have any good tactics, I would love to know.

Prof. Kunugi
So I will be the first to answer. I’m not saying there are many or it’s prevalent. I’m just saying there was such a student. And I said, “Well, you have the obligation that you’ve entered, so you have to study.” And then I said that we will give support so that you can
graduate, but you have to be the one who studies. But you have to be that explicit or else
they would not understand. But this is a topic I mentioned that there were students
with such a mindset that held the faculty and university responsible for graduating.
And I think they are making the efforts, the students, and we have to give the support.
And education is about fostering. It's not about condemning people if they don't abide by
the rules. And we talked about the inflation of GP grades. And a professor from the
United States I know said this. In the case of Japan, I don't know this was good or bad,
but he said that, you know, you're not as, you don't have universities in Japan, even
private schools who say, well you are always giving bad grades to your students so you
should be leaving at 55. But over 90% of our faculty, well my European friends say that
they are tenured so we are lucky. So S or A, the special grades or high grades are not
being given generously just to get the good student evaluation for the faculty. But then
there are some teachers who have very many and very few. And usually the Dean would
say, well that's the uniqueness of each teacher. But that's not necessarily the case. And
in order to stop this inflation of the grades, I believe that, well, when we were having a
smoke, we were discussing this during the break, but in the case of the University of
Tokyo, they put a cap onto how many As could be given and this is going to be done
systematically as a whole institution. But in the case of the research I did in Japan, it's
not necessarily the same, but usually standard is 55, so there are some standards that
are being set and people allocate according to that standard. But if I imagine each of the
faculty, there are many who would not follow this regulation or rules.

Prof. Tutiya
Any other people who would like to add on about the inflation of grades? I don't know if
we need to prevent it, but any preventive measures, countermeasures, ideas, insights?

Dr. DeMillo
Well, this idea that student evaluations count in promotion and retention and contract
renewal, I think, is a really important one. And we've been able to document that, in
general education courses, it's interesting that it doesn't apply to specialized courses in
majors. In general education courses, there's a correlation between teacher popularity
and grades given. And the thing that complicates it is that there are control studies of
student self-assessments that indicate what the underlying problem is. So, for example,
student self-assessments assess high levels of competence in areas in which the
students are demonstrably incompetent. So students will say that they are able to
critically read text when, in fact, they can read only rudimentary text, that they are
skilled writers when, in fact, they can only write in relatively unskilled ways. So I think this idea of student self-assessment itself presents some difficulties for us.

Q:
My name is Igarashi from Toto Medical School. I'm an English teacher, but we are specialized in medicine and I'm involved in the medical field. So I'd like to ask Professor Yamada this question. The satisfaction of students and, especially, the medical field learning outcome is directly linked with the license as well as the skills that are acquired. So even if the satisfaction level is high, if they have a mock exam for the national license test and if they don't fail that, that will become problematic and I'm sure you are aware of this. But overall, how would you perceive the correlation of the satisfaction and license and actual skill sets and SAs? Well, I am teaching English and we divide the class by levels and there will be a problem because if you belong to the lowest class and if we give the same proportion of As, those who are in the lower class might get a good grade, but at the very top level class, I am asked to give the top ranks A and to make a lower proportion to lower grades. So such an instruction and standard is given and especially in courses such as English, we divide the classes so it might work well by allocating how many Ss and As you can give to the level of classes. And what I made as a curriculum was the biology as well as chemistry related nursing classes and we have conducted unified tests for different levels of classes and so at the very end they have the same exam so we could assess the outcome. So without reflecting each professor's opinion, we could have an objective measurement and we could look at the outcomes of students. So if we start to look at the outcomes of students, I think we could see a great improvement by having such unified tests for different levels of classes.

And e-learning is being implemented as a revision of what they have learned in the classrooms, but the effectiveness, if students who are not getting good grades, they cannot make full use of this e-learning mechanism. Those who are competent and getting good grades are making full use of this e-learning system, but those who have a bad grade, they kind of run away from using that. And our university is not within the elite echelon, but that's what occurs. So e-learning is not being used or the students are not responding in the same way, depending on which category of grades they get. So that's the kind of learning I have so far, but if I could hear some input from Professor DeMillo. The e-learning situation is different in the qualitative context because the starting line is different among the competence of students.

Prof. Tutiya:
So the first question was to Professor Yamada and the second question was to Professor DeMillo. And we are running out of time, so let’s keep it concise.

Prof. Yamada:
Alright, what I showed you was about satisfaction only. But it is true, especially for the medicine and the outcome is quite clear-cut because, you know, you either pass or you fail. And the curriculum is already fixed and the learning hours are very long and the learning outcome in medicine is quite clear. And no matter what discipline you are in in the medical field, I think it would be very similar. But what I showed you here is satisfaction. And within this, there were several medical schools that I have conducted surveys on. And I went in to look into them, and the students in the medical schools, there is usually the general education classes that are being incorporated. And that has become a major challenge because, of course, you have a clear, distinct learning outcome in the medical field, but you are a teacher of English, as you mentioned, and also other disciplines of general education. You know, you want to have a broader perspective for these future doctors or co-medicals, and within the limited time of course offering, how do you incorporate that element? And the students are, of course, within this very compact and concentrated work, they have to also go into actual active learning and training as well. But they want to also have some of that general education aspect. And that’s related to the satisfaction level of medical students. So out of classroom high-impact practice, for example, and how could that come hand in hand with such general education and how can you reflect that into the satisfaction? Maybe that might be the next step that we need to address.

Dr. DeMillo:
Regarding the e-learning, I think the quality of the e-learning materials and the e-learning platforms is improving so dramatically that the situation that you described will change. Stanford reports that Stanford students, when given a choice between attending an in-person lecture or taking the same material online, choose the online. And it seems to be across all skill levels, all subjects. So I would say that the quality of the distribution technology is dramatically improving, quickly improving. The quality of personalization technology so that you can deliver material that the student expects and can respond to is increasing dramatically. And then I made the point earlier that the role of learning analytics and being able to adapt the way that you present to student needs is increasing. So I really think that we’re seeing a legacy problem. We’re seeing a problem of old-fashioned distance-learning technology, which was not received
well by most students, being replaced by very sophisticated and increasingly high-quality materials.

Prof. Tutiya:
Well, thank you very much. And I am very sorry, but it's now time to close this session. So I'd like to now finish this panel discussion. I'm very sorry that I'm cutting off in the middle of the discussion. And I was supposed to summarize the discussion here, but, as I said at the outset, this moderator doesn't have the capability to probably summarize. So as I said, I will not attempt to do that. Well, maybe I should say just one word.
Well, we have heard about the situation here in Japan and also in the United States. Although the, well whether the context was the same or not, we also tried to look at the activities that are taking place. And my personal impression is that, well I have to really think about it to thoroughly understand. Well the difference of context will have to be understood well before we really digest what we've heard today. But, still, it seems that, as we've heard in the presentations, the data that was presented was really interesting. And as we get more data like this in Japan and also in the United States, I believe we will be able to better the higher education that is provided to the students. And, as Professor DeMillo said, what will be valued in the future? I think each institution has to think on its own. The Ministry of Education here in Japan is also saying that they cannot really foresee and try to assume what will happen, but, of course, we have to make some projections toward the future as we try to step forward. And there is no conclusion to this discussion today, but I hope that you were able to pick up some food for thought, something to take back to your universities as you carry out your activities. And with that, I would like to end this panel discussion part. Thank you very much.