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New Catalysts for Change

THE FUTURE MIND – INTERDISCIPLINARY EDUCATION TO COMPETE

Panel

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10:00–11:15, Pavilion 8, Conference Hall 8.2

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Moderator:

Anton Khrekov, Managing Partner, Finjecto

Panellists:

Andrey Fursenko, Aide to the President of the Russian Federation

Sir Paul Judge, Founder, Judge Business School; President, Association of MBAs

Daphne Koller, Professor, Stanford University

Sunil Kumar, Dean and George Pratt Shultz Professor of Operations Management, The University of Chicago Booth School of Business

Vladimir Mau, Rector, Russian Presidential Academy of National Economy and Public Administration

Brent Wilton, Secretary General, International Organization of Employers

Front row participants:

Laura Ipsen, Corporate Vice President, Microsoft Corporation

Evgeny Kuznetsov, Director of Department of Strategic Communications, RVC

Dmitry Peskov, Director of Young Professionals Stream, Agency for Strategic Initiatives

Evgeny Yasin, Academic Supervisor, Higher School of Economics at the National Research University

A. Khrekov:

Good morning, ladies and gentlemen and distinguished colleagues! Let us get started. It is lovely to see so many people here after a White Night. There was a very interesting discussion yesterday about public–private partnership in education. If you were there, then you know it took place in the café. Today, I tried to convince the organizers to hold this session in the bar, but they have not yet agreed, so we will start here.

By the way, yesterday's session was the basis for today's conversation. We were talking about how to bring business into education, how to get business interested and involved in designing the educational system. Today, I would like to begin talking about this topic a little differently. What do you do when business is already involved in education? I am referring to corporate universities in companies (which frequently compete with business schools), business accelerators, business incubators, various forms of distance learning and modules. Are there conflicts between these formats? Should we expect conflict? Is there competition between classical and interdisciplinary education? Yesterday, Mr. Livanov, the Minister of Education, mentioned the digital revolution. Some even call what is happening now 'digital communism'. Meaning that knowledge is available to everyone, anywhere in the world. The question of whether this new situation will overturn traditional, classical education or whether it will continue to exist is similar to the debate when radio appeared, followed by television, and people wondered whether theatre would survive. So in this regard, is there nothing to fear? I would like to start with Professor Vladimir Mau. The question for him is this: technology, as I have mentioned, is emerging rapidly and ubiquitously. While new technologies can be implemented within a few months in the IT sphere, they may take years to be incorporated into traditional education (until it all becomes part of the curriculum). What about classical education now? Should it be taught at university as before, or should it be delivered via a matrix format? That is, you get some basic knowledge and then you build your own learning trajectory as you work and grow in your career.

V. Mau:

Thank you very much. That is a really good question. It seems to me that currently, education is becoming universal, and in that sense, I think that the idea of universal higher education is justified and inevitable. It is something else entirely to say that universal education cannot be good. As always, there will be good and bad segments of education. My first point, which I repeat like a mantra, is that bad education is better than no education. Secondly, education is largely returning (through a new revolution of course) to a pre-industrial form. Industrial education is the mass education of large segments of the population using standard programmes. Pre-industrial education is the education of individuals on an individual trajectory in a universal language. There is a Russian song *Vspominayte inogda vashego studenta (Remember your student sometimes)*, and it talks about going to France to learn, unless 'the professors [there] torture me to death'. Except in those times, everything was taught in a universal language: Latin. In that sense, education is becoming universal. After all, the purpose of the Bologna Process was not to split five years into two plus four years. It was meant to make education fragmented and comparable across countries.

Fragmentation is the next important principle in education. If education is personalized in the sense of needing to adapt to new challenges that appear in the market, that means that education should truly be fragmented. You should not study for six to eight years to become a specialist for life. You should study periodically, preferably with intervals between different educational programmes. Here I cannot help but note that, in my opinion, universal military conscription, as a phenomenon of agro-industrial society, is in absolute contradiction to the trends of continuity and simultaneous fragmentation in education.

The next point is that education is divided into general and specific. If we jump to the topic of university education, it must be as universal as possible. I am more and more convinced that university is not the place to teach a trade. It is a place where those who want to think learn how to think. I am firmly convinced of this, and at yesterday's breakfast I said that the main objective of institutes of higher

learning is to attract good students. After that, they themselves will work out what to do with their professors. Bring together a large number of good students. A modern rector's task, in my opinion, is to ensure there is a critical mass of researchers and professors at an institution who will not simply do what they are told, but will pursue their own interest, regardless of whether it is relevant to the real world or not. Vocational schools are relevant to the real world. If you want to become an accountant, then you do not need to go to university. If you go to university, you should want to learn how to think. That is the main role of a good university. In order to learn how to think (it is impossible to teach how to think), you need to talk with those who already know how to think, and that is that critical mass of people I mentioned.

Finally, I have the following point to make: I think that modern education is competitive on a global scale. It is not so much about competition for professors, who can be bought when all is said and done, as about competition for students. That is why there needs to be a critical mass of international students. But in order to that, you need teaching to be in a universal language. A critical mass of international students is very important in terms of rating the quality of an institution. This means that the role of private money will grow and is growing. We should not argue that education should only seek to be free of charge.

My penultimate point is that I think that those of us in modern education should forget about the issue of how many people we have working in the field in which they studied. Graduates of vocational schools work in their fields. University graduates should work, earn a lot of money, and thus pay a lot of tax. It is much more appropriate to rate university graduates by the amount of tax they pay than by whether they are working in their field or not.

My last point (which is a separate topic that I will not elaborate on, but it is one that we are working on at the Academy) is that all this is wrapped up in modern education technology, but it is not about selling diplomas over the Internet. Modern technology is digital technology, not 'distance' technology. It is something completely different. Digital technology is what allows you to play in virtual international championships and games. Thank you.

A. Khrekov:

Here is another question for you, and then I will address our foreign guests. A person goes to university when he or she is 16–17 years old. Often at this point in their lives (at least in our country), young people do not know what they want to do in life, and sometimes life itself can change so much in two or three years that they do not know exactly where they are going. When should you have to start thinking about forming your own learning trajectory? Could it not turn out that forcing them to make a decision may turn out to be a wrong choice later?

V. Mau:

You know, I think that Andrey Fursenko's most important accomplishment, and he has had many of them, was bringing in the bachelor's and master's system, because a bachelor's is really a continuation of one's secondary education with more focused study, and you can still try other things at this stage. After that, you start to work in a specific field, but a bachelor's degree gives you the opportunity to continue adapting somewhat.

The number of undergraduate degrees that, in my opinion, should not be part of a bachelor's programme, are another matter. I have no idea what a bachelor's in education is. I cannot believe that someone who is 17 would want to be a teacher. Undoubtedly, education should be a master's programme. You should study a grassroots subject like history or mathematics during your bachelor's. Later, if you want to be a scientist, you can get a master's degree. If you want to be a teacher, you can get a master's degree in education. If you want to become a manager, you get a master's degree in management. By the way, very good managers can come from the humanities. There are many subjects that should not be part of an undergraduate programme. Singling them out is the next step, I think.

Now let me talk about specific young people. Our rectors are not now guilty of corruption. When parents say, "My child wants to study here", I say, "Great, bring me the Unified State Exam results." They ask me, "That's it?" And that is it. The only influence I can have is in advising where a young person should apply, taking into account their aptitudes. Next comes the fork in the road which you

spoke about. Half of parents say that their children will come and talk about it themselves. This is also about individual choice and individual maturity.

A. Khrekov

Thank you. Professor Sunil Kumar, how would you answer that question? When should someone start to design their own learning trajectory, and do we force them to do it too soon?

S. Kumar:

I do not want to be prescriptive and say that there is a certain age, that you are too young at 17 and too old at 19 to make choices. I think, in a good society, in a good educational system, the goal is to continue to offer choices so that people can revise their trajectories as their life experience evolves. I am not saying that you should commit at graduate school. I think you should have choices as much as possible as late as possible.

I will give you a personal example. I went through the Indian education system before I went to America, and in the Indian education system, simply because of necessity, because of the number of people who apply to university, the system requires you to make a fairly irreversible commitment when you are 18. As Rector Mau pointed out earlier, that may be too early; at 18, maybe what you need to invest in is learning what it is that you want to do. Maybe you want to learn about how to learn and what you want to learn, and you may want to make the decision about committing to a particular course much later in your life. And so a better-designed system offers you choice to the point where it is still beneficial to society for people to have these choices. So, rather than answering your question directly, I would say that the goal of the university administrator is to not overly constrain the students early and to provide them as much choice as possible until they really do need to commit.

A. Khrekov:

Thank you. You know, when I chose a university and department, my choice was predestined. My parents told me that there were lots of books about China, and

that I did not have to invent anything new, I just had to go and study Chinese history and the Chinese language. I would like to address the following question to Professor Daphne Koller. In our company, we are grateful listeners and viewers of Coursera. Thank you for creating that system. My question is this: can short-term modular courses replace university education? Is there competition between these types of courses and university education? If so, what might be the consequences?

D. Koller:

I think many people perceive there to be a competition between what we offer in free online education and the university education, but I actually view them to be complementary in several fundamental ways. First and foremost, I think that, as we teach our students in current universities, we teach them the same way that we have been teaching for 500, 600, even 900 years. It is the sage on the stage, the professor standing and lecturing to a room of 100 people, and there has not yet been any fundamental shift in pedagogy for hundreds of years, and certainly no way to leverage technology. What we are looking to do in the context of university education is to enhance the way that we teach.

My initial entry into this whole area came in my role as a professor at Stanford, when I went and told President Hennessy of Stanford that it just did not make sense that the only time that I spent with my students was to stand in front of them giving the same lecture that I gave last year and the year before and the year before that, and not really have a chance to get to know them and to engage with them. What would happen if we took the content that they need to have and put it in some really high-quality interactive format online, so that I would have time in the classroom to actually engage with them, teach them critical thinking skills, teach them how to take an ill-defined problem and figure out how to make it into a formal problem to which one could apply the techniques that we learned in class? Identify topics that the students are struggling with and really help them to overcome those barriers so that they have a better basis for the next topic down the line?

The whole goal of this for me initially was really what is called flipping the classroom, where the students get the basic learning and the basic practice outside the classroom, and they come into class for much more meaningful engagement with the instructor. In this case, what we are doing is not replacing universities, but rather moving the role of the professor higher up the value chain, not as a one-direction communicator but really somebody who is in a dialogue with his or her students and really can help them learn as opposed to just being a disseminator of information.

That having been said, I would like to point out that there are certain contexts where, I think, this inevitably has to be a replacement for what are currently non-existent universities, and that is especially so in the developing world. In the developing world, we have serious capacity issues, so it is not a question for your average student of whether they go to a good university or a bad university; it is whether you can find any university at all that has space to take you.

As a case in point, Sunil was talking about India. In India, they want to increase their post-secondary college completion rate from 13% to 30%, 30% being about what is normal in the developed world. In order to achieve that goal, they would have to build no fewer than 1,500 academic institutions in order to manage that capacity. Now, aside from the logistical nightmare of building 1,500 new campuses, even if you look at today's educational system in India, the existing universities other than the top few are at about 25% staffing levels. That is, they do not have enough qualified instructors to staff the existing universities. So if you build another 1,500, where are you going to find instructors to keep that going? And this is India, which is relatively advanced from an educational perspective. What about Nigeria, or Ghana, or Bangladesh, where there are a lot fewer resources to build on from an educational perspective? The only way for us to provide education to the people in these countries within this generation, or even maybe the next one, after that is to leapfrog the traditional brick-and-mortar education in the same way that they leapfrogged land lines or even ATMs and went directly to the digital solution. In this case, this will be in some sense a replacement for universities that do not currently exist, and likely will never exist.

A. Khrekov:

Let me ask you another question, and then I will ask Mr. Fursenko to answer it as well. It often happens that when a classical, traditional university or even business school comes in contact with innovative forms of distance learning, the academic staff panic that this new thing will make them irrelevant. Sometimes they explicitly say that all these modular courses are great, but if we are going to offer them to our students, then the professors will lose teaching hours and money. What do you think? Can these two formats somehow get along now, or should they not exist 'under one roof' at all?

D. Koller:

I think that there is a certain fraction of the population, 15% would be one guess, maybe 20% if you want to be generous, that can take a massive open online course without any kind of human guidance or facilitation, stick with it beginning to end, and complete it successfully and get an education that way. I think for those people who are autodidacts, who are sufficiently self-motivated for this kind of course of study, more power to them. I think it is great that they are able to do that, and we should support them in getting an education in this way if that is what they want.

But I think other people do need more scaffolding and more support. Those people who do not emerge from high school with an intrinsic level of motivation and who were struggling in high school, are struggling in college. They benefit from having access to a real-life teacher who looks them in the eye and says, "Did you do your homework?" and "What exactly are you struggling with? Let me try to help you". And so I think that the role of the teacher is not going to be eliminated; it is just going to be transformed into something that is more like Socratic teaching, more like a dialogue, rather than the dissemination of information.

To be honest, I think that computers are actually better at disseminating information than people are. They disseminate it consistently; you can have really high production values, and you can allow the student the flexibility to pause and think, to rewind and listen again, watch at their own pace, learn as

they need, at the time that is useful for them as opposed to whenever class happens to be. I think, for the dissemination of information, this is a place where computers may actually dominate human instruction.

But when it comes to really getting into in-depth instruction and understanding what the student does not get and helping him or her along, we do not currently have technology that can achieve what a smart person can do. Now I can tell you that there are a lot of people who are worried; there are quotes in the media that say, "Well, that just turns the work of the professor into that of a teaching assistant, so I am no longer doing the job I was hired to do". I have been doing this for five years in my class, and I can tell you that, if anything, this is considerably more challenging, to come into class not knowing what to expect, not knowing what questions are going to come at you. Knowing that you are going to have to lead a discussion that can go in any direction is a lot more challenging, a lot more interesting to an instructor, than just coming and lecturing from last year's notes. I think that what we are going to see is a transformation of the role of the teacher into something that is actually more challenging and higher up the value chain.

A Khrekov:

Thank you very much. Mr. Fursenko, would you mind commenting on this point: the conflict that is taking place in our educational institutions and business schools?

A. Fursenko:

If I can, I would like to start with the issue we talked about earlier, about how soon or how late someone should choose their trajectory. I do not think that this is exactly the problem. We should teach people to choose, starting in nursery school, and to take responsibility for that choice. If we give this enough serious attention, then by the age of 16, a person should know exactly where they need to go to learn. He or she will not try to get out of making this decision or choice, and will not procrastinate. This choice should not lead an individual onto a narrow path that will map out the rest of their life; that is separate matter. But the

direction should be specified. I do not think that this contradicts what Mr. Mau said because at every stage you make your own choice that may be refined later or perhaps changed. There is nothing wrong with that. That is life. You only have one life, but many opportunities. A person just has to be responsible for the decisions that he or she makes.

As for the question about whether there is conflict, I will say that this really echoes another problem: who should be at the centre of the learning process? I want to support Mr. Mau's comments. The centre of learning is always whoever is being taught. The most important person in a school is the pupil. The most important person in a university is the student. That does not mean that there is no reciprocation. The teacher selects his or her students and the students choose their teachers and their university. But if the most important person is the student, then the professor should think about what is best for the student and not what is best for himself or herself. What are professors afraid of? They are not afraid because they think that using new technology will lead to worse teaching, but because they think that it will be less comfortable for them. They are afraid that they will have to stop doing what they have been used to doing for many years and change and do something new. I have already talked about this and I want to repeat it. What was the point of introducing the bachelor's to Russia? I talked about this with Mr. Mau, and I will say it again. The main goal was not to break up a five-year span into four years and two years, and not even to create a more flexible trajectory for students. In my opinion, the main challenge was to ensure that teachers reassess their courses, so that they would be forced to take a new approach towards teaching. So that they would be placed in an environment where they would need to take another look at what they were doing and understand that just adapting what they have to the new programme will not work. They have to have a new understanding about how they are going to pass on knowledge within the framework of the new programme. Good teachers have done this, but unfortunately, there are many teachers that are fighting tooth and nail to somehow turn their five-year courses into four-year ones, or to spread them out into two stages, one of four years and one of two years. There are some universities that, under the new standards,

quietly return to their traditional courses, whereas others understand that there are no other options and they need to adjust and create a new approach. Of course, a real teacher with a capital 'T' is much more interested in being a person who discusses new issues with students as an equal than in being a repetitive lecturer or a walking encyclopaedia. Issues which the teacher should lead, and should have a better grasp of, though this takes a great deal of effort. But students must also be willing to converse, to really converse. I agree with Ms. Koller. I think that this is the whole point. It is a challenge. It is very interesting and absolutely feasible. But you have to work at it a bit.

A. Khrekov:

Thank you. In my opinion, the key point is the issue of who is most important in education. Really, education also needs to be client-orientated.

I would like to turn now to Sir Paul Judge. For quite some time, I worked in journalism. Interestingly, Russia has good journalists, but there are practically no good broadcast journalism schools. They are all pretty bad because the people who work directly in the field or in the studio have no time to teach. Schools are always trying to invite working professionals to teach, but they say, "Sorry, we are working and have no time to teach." Perhaps this applies to business too, and not just to journalism. In addition, duties like writing lesson plans and all kinds of university bureaucratic tasks are heaped on managers or owners. This is a problem. What do you think? How can we make it easy for business to share knowledge?

P. Judge:

Well, thank you. If I can first suggest to any budding journalists in the audience, we have an excellent school of journalism in the city of London at City University London, and I am sure they would love to have you there.

In terms of business education, I always see it as having three levels. Most business schools around the world are increasingly covering all three. The first one is the functional skills. We need people in businesses to understand the language of business: what is depreciation, what is market share, why are they

important. We need grounding in those things. And in that area, you do not so much need the business expert; you can, in fact, do quite a lot of it through distance learning, through the computer, areas that we were just talking about. And for years, in fact, in Britain, certainly accounting, many people have studied accounting through correspondence courses. So, in fact, having computer-related courses on functional skills is entirely reasonable and can be very efficient.

I am currently an adviser to the Chinese government. They want to have more entrepreneurialism in China, so they have decided that, because of the scale of what they want, they want to do this through the Web. We are designing a series of programs to do this, and their target audience is 30 million people by 2020, again, something that could not be done by individuals.

But the second level of business education, once you have got the functional skills, is actually making it work, and that is the human interaction. That is much more difficult to do through computers. You can get some human interaction through computers, because nowadays you can have a lecture and 20 or so students on the same screen with Skype taking pictures of the people; the instructor can see all the students, the students can see all the other students, and the instructor can ask questions and the students can ask questions. So it is almost like a virtual classroom. In that sense, it can work.

But in the end, if you are going to manage, you have got to manage through people, and there is no substitute for face-to-face interaction. After a while, we all hear, "Why don't they just video me and everybody else, and then you can all look at it on the Web if you are so inclined?". But there is something special about coming to a conference where you actually meet the people, look them in the eyes, and talk to them. That is a really important second level of business education.

The third level, though, is that when you actually talk to senior people like those in this room and ask them what they did last week, they did not actually spend a lot of time on their functional skills, and they probably did not spend a lot of time actually leading their team. Hopefully, they got their team organized. What they spent most of their time with was in dealing with the outside world, the world

outside the organization, whether it was the government, the media, the customers, the suppliers, the employees, or the local community. And so that third level, in answer to your question, is where businessmen and businesswomen can really play a part, because that is where you need experience. Some of it can be taught, but much of it is experience and listening to people who have been through the experience.

As some of you may know, I founded the Judge Business School at Cambridge, and I know there are a number of other eminent business schools represented here. We do not find difficulty in getting businesspeople; they are rather fascinated by coming to talk to the students and talking about their careers, what they do, how they interact, how they dealt with something. Because the students really want to know, what is important to government ministers? What is an important story for the media? What do customers and suppliers really think about the companies they deal with? How do you get local communities on your side with what you want to do?

All of those things are very practical, experiential things, and I have found that businesspeople are very happy to come and just talk about those, and it is a vital part. It is particularly vital for business schools, because in business schools, normally the teaching is by the faculty, which is not surprising, but the faculty does not have so much experience with the outside world. Actually dealing with the stakeholders of an organization is something where you really do need to bring in outside people in order to get that across, because really business management, in the end, is both a science and an art. The science part you can teach through computers, you can watch videos, and you can watch computer programs. But the art side is all about people, and it is essential that there is human interaction to make that work.

A Khrekov:

Thank you very much for such a well-thought-out answer. It helps to structure our thoughts. Laura Ipsen, I would like to ask you a question. Microsoft has a wealth of experience working with universities and has its own programme where the latest technologies in education are applied. I wonder, what do you think about

infrastructure? What kind of infrastructure does interdisciplinary education require? Should there be classrooms, projectors, and other tangible items like there were before? Or should the infrastructure be created in the cloud and access be given through any mobile device?

L. Ipsen:

First of all, when we look at the future of education, there seems to be a lot of conflict around the brick-and-mortar and virtual. I do think it is blended, or the flipped model that Daphne talked about, where we view technology as a tool to deliver what is important in education, which is engaging students, because I agree with Mr. Fursenko that it is about the students at the end of the day. Every university wants to build the best institution with the best teachers to produce the output of students, and universities think about the cost of the degree. Students think about whether they are going to get the skill sets to land jobs. And the jobs that we have been talking about, two thirds of the new jobs being created do not even exist today. You know, we have got to fill 600 million jobs that we have already lost, and so for us, technology is the tool that you use.

It was interesting, because I visited a primary school two days ago, School 550 in St. Petersburg, and they are very proud and they are doing quite a bit. The children are doing quite a bit using technology; they have projectors in the classroom, they all have computers, and they were showing how they use that for languages, for music, and how it becomes more integrated. They do not have a cloud yet, and hopefully that is something we will do, but I think it will be a blended model where there is a certain classroom that is on the premises, like a cloud or a service can be on the premises or in the cloud, and I think that is going to be blended as well, where there are physical devices that are still used that are mobile. There are cloud services for education that open up new opportunities with apps, whether that is the Khan Academy or digital content, because I think we have to say the demand of students in the future for the best education is going to be that they are prepared coming in. They are going to ask the professors the toughest questions, and it is not going to be a standard lecture, or they will have already taken something on Khan Academy, and I think

universities are struggling with how to get the traditional model with the future model. For us, technology is an enabler to do that. It is how we do it; it is not what we do. The universities have to figure that out; the deans have to figure that out as well.

I spent some time at UC Davis with Chancellor Katehi, and she is looking at her model, because they want to expand the school. They have 70,000 in the workforce, and she has to think about whether to put her investments in bricks and mortar or virtual, and how she can extend the opportunities for all students and use technology to do that. They are the number one school in the world for energy efficiency, and they want to keep their carbon footprint low. So schools also have the question of, how do I build my infrastructure in the best ways to attract students? And green is one of those things that attracts students and makes it more valuable.

So those are many things that we are doing. I think the best example is engaging students, empowering teachers, and the collaborative learning that is happening online is so amazing. Probably the best example we have for teachers and students is our Partners in Learning, which has been running over the past 10 years. In the next five years, we will have invested over USD 750 million. It is a learning space for teachers to learn how to use 21st-century skills in teaching and for students to collaborate from Brazil to Bulgaria to Russia to South Africa. So teachers are connected that way. I think what we have to understand is, how will teachers use technologies in the future to give a level of accreditation? It is something that Russia is working on and made a commitment for 50,000 teachers to have credentials around using technology. We partner with Intel and Cisco to build that certification model that will be part of PISA in the future. Understanding how teachers are going to be certified using technology as an enabler to meet the demands of students, because I agree, at the end of the day, you are competing for the best students in the world, and the best professors or teachers. That is how we view it.

A Khrekov:

Thank you. Digital content is certainly one of those categories that is applied in areas other than education. Digital content is something that always competes with normal content. I have noticed that, even at conferences, if for some reason a speaker is not very dynamic then the participants in the audience immediately start to look at their portable devices because there seems to be something more interesting there.

Mr. Kuznetsov, this question is for you. Is it fair to say that the quality of interdisciplinary education and business education in business incubators and accelerators for start-up platforms is already better (if talking about Russia) than in business schools because there they ensure hands-on education? Knowledge is acquired faster and is more relevant? This is not a statement, but a question. Is it fair to say that?

E. Kuznetsov:

Here you need to define why and what people are learning, using different education models. As Mr. Mau said at the very beginning of the discussion, the structure of education is adapted to serve the societies or economies around it. Now, a post-industrial economy is feverishly being created. Of course, different people play different roles in it. First of all, there is a need for many professional, successful entrepreneurs, especially those who not only have a deep background in technology and can create and develop a successful company, but those who can do that repeatedly, and are able to change industry, change platforms, acquire new knowledge, and adapt their experience to a fairly rapidly developing industry. Of course, a traditional education cannot give such unique skills. Traditional education was created in another era and has somewhat different goals. Entrepreneurs cannot learn technological skills as part of an academic education. It is only possible through special training using the special tools offered by these new formats: accelerators, incubators etc. I think that there is not really any real opposition to this. The fact of the matter is that entrepreneurship is not a replacement for any other activity. It is the most important catalyst, and that is why the most successful incubators and accelerators exist as part of major centres of higher education. They interact with

them, exchange skills, and provide 'fertilizer' in the form of students and teachers who have accumulated knowledge and experience. That needs to be converted into new businesses. There is no doubt that such centres are being created in Russia. An example of this is the Novosibirsk Academpark, where technology parks are becoming the catalysts behind new forms of education. Curricula based on business requirements are created significantly faster than in an academic environment. So, I hope that this new format and these tools will, in a sense, help those technology institutes of higher learning and technology city clusters, which need a healthy dose of catalysts to make the system work.

A Khrekov:

You are right. Traditional universities will strive to catch up and speed up if they make the effort. But not everyone is ready for that.

Mr. Peskov, I want to ask you about the interesting experiment you are currently carrying out at the Agency for Strategic Initiatives. I am referring to sandwich degrees. My question is slightly related to this issue and is as follows: how do you assess students and trainees in interdisciplinary education? It is probably impossible to have a five-point grading system, which is essentially a three-point Soviet system. Is there any other form of grading at all?

D. Peskov:

Thank you. I will answer the question, but first I want to mention a couple of points.

If we are talking about a mindset for the future (a post-industrial economic mindset), then it is characterized by a number of different features. One of these features is a completely new language that allows you to comprehend and operate in the future. I feel that about 10–15% of modern institutes of higher learning and the speakers here today are fluent in this language and understand it. An example of a key skill in the post-industrial future is controlled schizophrenia. If you cannot control the schizophrenia, then you cannot succeed because the ability to make decisions fast and to be involved in a number of different areas at once is one of the key skills of our time. This is easily

demonstrated. For example, if you are offended that someone is poking their finger at their tablet, that means that you are still in the industrial age. You have not made the transition. In fact, that person has already described your report on Facebook and is talking to other participants and assessing how well you did your previous job. That is a fact. That means that when you are preparing and appraising modern managers, and even modern employees, you are required to rely on completely different methods, including grading. You have to understand that education of the future is not just for universities and schools. Any young parent knows that we are raising a lot of children who are called 'new Mowglis': the first generation of children growing up who have been raised on computers. These children are the iPad generation.

I will answer the question properly: grades do not interest anyone directly. We are interested in three things. The first is something similar to what Ms. Koller, and no one else, is doing: cognitive style. I mean the value is in how you understand the cognitive style of your students, secure it, and sell it to future employers. A student's final grade is not important. What is important is how the student handles deadlines and how well the student is able to learn from mistakes. Ten years ago, all this was only available offline and only by using expensive methods. Today, it can be done on a large scale by analysing patterns of students en masse.

The second thing is what is called 'culture of achievement'. If a person is given a task, that person does it, and it is recorded and easily evaluated. Achievements should have a value, like different currencies, and an exchange that they can be traded in, and from which a final portfolio can be made. That is exactly what an employer needs. Next it turns out that even if you are training employees (as we are doing now with sandwich degrees), then the requirements for an employee's cognitive style are much more substantial than the requirements for preparing a graduate from a regular university.

A Khrekov:

You know, 'cognitive style' is a perfect definition. I think that a rough analogy is studying consumer behaviour with mobile devices. For example, if a device is

charging, then that means that advertisers should not send advertisements to the user because he does not have the phone with him. It is charging. They also determine whether a person is sleeping or not and so on. It is amazing.

This question is for Brent Wilton. I think it is a classic question and you have been asked it several times before. How is knowledge transferred now? What is the optimal way to transfer knowledge? At one time, the concept of 'best practice' was popular in Russia. Entrepreneurs and company owners shared their experience with beginners. At first, it was all the rage, but then it turned into something like a television interview where a person would sit on his high horse and talk in a professorial tone about what you need to do business well. What do you think? What are the requirements in this area now?

B. Wilton:

Good morning, everybody, and thank you for the question. I am not an academic; I do not come from a university. Through my network, I represent 143 countries around the world with their employer community, so I am basically an end user of what you produce. So in terms of the issue of how to transfer knowledge, I think we have some major issues to deal with, because of course there is no one-size-fits-all to this. There is such a range of diversity around the world. Mention was made of the challenges and problems that we face in Nigeria, Africa, and Southeast Asia. But for me, what we need to be thinking about in terms of the education process that we use—whatever one is used, be it technology, classrooms, bricks or bits—is whether that person is equipped for work in some form going forward.

Going forward, we have to provide something like 220 million jobs at the moment for the unemployed as a result of the crisis. The on-going expectation of jobs is some 600 million, and Laura already mentioned that. That is a lot of jobs that have to be found, which means that the knowledge transfer that we are looking for in particular with regards to education is to enable people—and Paul mentioned this—to be able to be starters of businesses, to be the entrepreneur that can be out there taking the risk and therefore creating the jobs. The other challenge that we have with our education system is that, around the world,

people enter the workforce at different ages due to circumstances and history. So we need to make sure that these skills are being embedded early in a person's education. Not everyone gets the opportunity to go to university, not everyone gets the opportunity to complete primary education. So the challenges that we have moving forward as a society with regards to equipping people to be able to earn a living and support their family are huge, but entrepreneurship is important.

Now, business has long played a part in education. In the US, most of the universities were founded by philanthropy from businesspeople, and that is not uncommon in other parts of the world. And I think some of the issues that Laura and also Professor Koller have raised about technology are opportunities for businesses to get in behind these technological shifts and see if we cannot leapfrog certain technologies to get to people on the ground faster and better.

There is also a need, though, for educators to know business better. And that means that we need to get educators out to see how business works. It is more than having business come in and talk to students; that is done in a number of instances. But getting the actual teachers to go out and understand what a business is, how a business works, what the expectations are of a person going into work. It is very, very important, in our view, to encourage the classroom teacher to focus on those cognitive skills that you were mentioning before, the disciplines you need to be able to come to work. I mean, we are still shocked to find the high levels of illiteracy that persist in Europe. The fact that people do not know that they have to turn up on time, that they do not know how to actually meet deadlines, how to solve problems. I mean, the level of education, even in developed countries, is of course of concern to employers.

The other issue we have, too, of course, is labour mobility within Europe but also globally. People are travelling more. So we need to be able to have a better system of skills recognition, where there is competency-based training so that people are able to move very, very quickly. I come from Switzerland, and Switzerland is a very small country. There is education in Switzerland that is not recognized from one canton to the other. It is bizarre. And that is a major barrier in terms of employment opportunities for people going forward.

For me, the other good thing about linking business with education better means that, in time, we can ensure that those jobs are created in a way which is going to be fulfilling for society and for the person. And that is very important. We have talked about how this is about the student, and that is true. I do not think business is looking to destroy classical education, where everyone comes out as a robot for business. Not at all. But I think, by coming closer to business and thinking about how we can transfer that knowledge in a way which is actually mutually beneficial to both sides of the equation is very, very helpful. We have too much bad education output.

India is a case in point. We have a lot of very well educated, unemployed people, sometimes because the jobs are not out there, but sometimes because the quality of their education is not up to standard. So again, I think by working together and thinking about how we can improve the competency of the people that we are producing through education, the better we will be able to ensure that those people can move into employment and that we can make sure that this unemployment crisis and job problem we currently have can be met going forward. To me, the knowledge transfer issue is a two-way approach. There is no one-size-fits-all; there is no perfect model. But we need to have a better conversation between the end users of education and the education facilities themselves. Thank you.

A Khrekov:

Thank you. Professor Yasin, this question is for you. I have asked several people this, and have never received the same answer. I am interested in your opinion. If you take interdisciplinary education, short-term courses, and modules (but not classical higher education), is it appropriate to have professors teach these courses? Or do you only need people with practical experience? For example, many explicitly say that even a distinguished professor, who teaches some discipline in a business school, does not have the moral right to do so if he himself has never undertaken a business project. Many ask him how many businesses he has started himself. Is it legitimate to ask such questions and have discussions about it?

E. Yasin

That is a fairly difficult question because everything different people say is correct. Each approach has its own application and field, and the problems that we face today are not new. But the magnitude of the problems we face is totally different. I probably agree more with the approach of making people who teach practical issues have practical experience. On the other hand, I also think that theoretical and academic education that does not teach specific techniques, but rather pushes the boundaries of our understanding, is much more important at the present time. Why? We are entering a new era. There are various names for it like the 'knowledge society' and so forth, but the educational component or commodity of education has a far higher value. Earlier, we valued tangible assets, but now we are increasingly valuing assets that are connected with knowledge and skills, and we value the ability to invent and find solutions even more than that. In my opinion, this is what is typical. We should understand the changes that are happening. I personally feel that we used to try to increase the flow of knowledge, and now the moment has come that Mr. Fursenko talked about: the choice. This is a much more difficult problem for the individual because individuals are faced with a large amount of knowledge that they must choose to learn and understand why they need it. It is relatively easy to do something. But the ability to come up with something and increase creativity is essential. That is why the challenge a pupil or a student faces is so important. Today, it is essential to instil in people a taste for the work ethic so that they realize the pleasure a person feels when he or she works something out and finds a solution. It might not always be an individual act. Sometimes it is related to teamwork. Our institute is a 'research' institute. We have a very literal interpretation of this concept. We need our students to work in creative teams, so they understand the task at hand, solve it, and move forward. If we have the whole range of educational services in mind and focus increasingly on creative beginnings, we have a chance of success.

A Khrekov:

Thank you. Professor Kumar, I want to ask you another question about what is justifiable and what is not. I have asked many people this question and started fierce debate. Is it justifiable to put those who plan to have careers as managers in a company with those who want to start their own business – managers and owners – in the same group in a business school?

S. Kumar:

I not only think it is right, I think it is desirable. I would like to go back to Professor Yasin's point. The ideal for university is not to prepare somebody for their first job, not to get them a job in the first two days after they graduate. Most people, all of us included, go to university once, maybe twice; some people like me are lucky enough to stay in the university for the rest of their lives. But the vast majority of people will leave and not go back. And so, the goal of a university education is not to say, "I will prepare you for the next six months of your life". It is to prepare you for the rest of it, 40 or 50 years. We can remember things today that did not exist 10 years ago. The jobs did not exist, the technologies did not exist. And so it is actually important for us to provide several things. Let me list three things.

First, fundamentals, as Professor Yasin pointed out. It is essential to teach people what is not transient, what does not go away tomorrow but will be with them for the rest of their lives. That is true regardless of whether you are going to be a banker or an entrepreneur.

The second thing is to show them that not everybody thinks like they do, that others have very different, innovative ideas, and putting people from very different backgrounds, interests, and aspirations together actually makes everybody better off.

And the third, and this is the most important thing, is universities. I would like to disagree a little bit with some of the answers earlier, which seemed to imply that the new cannot come out of the university. We are in the new business. We call it research. For us, and I share Professor Yasin's point, we share the central idea

that we should discover the distinct pleasure of having understood something new, or created something new. This is not new for a university; it is what we have been doing for literally hundreds of years. What it is that we should do is change, and we do take a little bit of blame for not changing fast enough. But the idea of changing—not just us, but society as a whole—has always been our responsibility. And so whether we are creating entrepreneurs or technologists or people whose jobs are not even imaginable today, we see that as our responsibility. It is not a question of new versus old; it is a question of how adaptable are the lasting institutions of the world? And, as Professor Yasin pointed out, every generation goes back and says, "Shouldn't we be doing something different?" It is important for us to ask the question, but the answer is not always, "Let us ignore what has happened in the past and start something completely new". Rather, we should adapt our institutions.

A Khrekov:

Thank you for your answer. You have touched on a very delicate subject. Indeed, if university education were to submit itself only to what the market dictates, then universities would become hopelessly outdated. They are already outdated. But if there are 'other things in the world', as in the lyrics of a song, then it is possible to have an entirely modern academic environment. Then the universities have nothing to fear.

We will now take your questions. Yes.

V. Panin:

Victor Panin, Deputy Chairman of the All-Russia Society for Protecting the Rights of Consumers of Educational Services. You referred to a competence-based approach for interdisciplinary education, and this is good. But we should not forget that there are many businesses and many directions to take, and they are often very different from each other. They have their own specifications. In my opinion, it would be appropriate to talk about seeking to develop an adequate system for evaluating education in general as well as interdisciplinary education in particular. Unfortunately, I am firmly convinced that while a school can

evaluate its own performance, nothing good will come of it. A school must learn to ask society how well it is teaching. Mr. Fursenko and all of us in Russia know how hard it is for Russian society to get used to the Unified State Exam which virtually split society into several factions when it was introduced. I would like to say that perhaps it is important to find an adequate evaluation system. For that to happen, we need to think about bringing in institutionalized and personalized representatives from civil society, including the business community, public institutions, and expert organizations. No one has talked about that today, for some reason.

A Khrekov:

Thank you. We should talk more about that afterwards. Your question, please.

From the audience:

I do not have a question, but a comment. I liked the panel very much. There were wonderful presentations and distinguished specialists. I am worried that the practical challenges that we are faced with in high-tech corporations require significant differentiation in solving the issues that you have described today.

Let me give you an example. When Mr. Fursenko first came to St. Petersburg, he was Mr. Klebanov's Deputy Minister of Industry. He came to me at the engineering centre and saw how we were training thousands of young engineers to use the latest design methods and he said something that I have never forgotten. He said that our biggest problem was that we were not preparing the qualified workers who would use these systems. And he was absolutely right. If you look at a large corporation, there may be 100,000 people working in an engineering company. Let us say that they are all engineers or scientists. But only 7% are managers. Those people should also have some sort of skill and be qualified workers. But only 0.6% of those are leaders with a capital 'L', the technological or managerial leaders of the company. I want to say that what Ms. Koller is working on and what Professor Yasin talked about should be combined because we cannot assume that thousands of people are inventors. We need to find the 1% of those who are able to find solutions, but not forget about the 99%

of qualified workers that Mr. Fursenko, as Deputy Minister of Industry, talked about 12 years ago.

A Khrekov:
Thank you. Are there any other questions? Yes.

E. Bogdanova:
Elena Bogdanova, International Business and Law Institute, National Research University of Information Technologies, Mechanics and Optics. I have two quick mental images that relate to one question for Ms. Koller and Mr. Fursenko. First: a small six-month-old boy has trouble sitting. In order not to fall, he holds an iPad on his knees and easily uses the touch screen. Second: a teacher reading a lecture to a class uses an average of 20–25 pages of accumulated knowledge. My question: can we, given digital education and its possibilities, move from a 'four-plus–two' model to a 'three-plus-one' model?

D. Koller:
Sorry, I do not understand what you mean by 'four-plus-two' and 'three-plus-one' models.

E. Bogdanova:
I mean the time it takes in the education system now to earn a bachelor's and master's. If our nine-month-olds can easily use a tablet and can spend five or seven minutes getting acquainted with text that a teacher can read in an auditorium, saving time, do we need to spend so much time on the transfer of knowledge and experience?

D. Koller:
Thank you for clarifying. Yes, I completely agree that because of the way in which we have had to pick a one-size-fits-all model of education, it almost ends up being a one-size-fits-none. And for some students, for many students, it is too slow. It is too slow in some topics; maybe it is too fast in others, and if it is too

fast for them, it ends up being too slow, because they get bored and they drop out, and then they need to go back to the beginning. I think that the personalization of education, which we can only do at scale using technology, is going to allow us to significantly both shorten the amount of time that people need to spend in school, but also, I think, equally importantly, give us much better learning outcomes, because we all hear about kids in middle school who are reading at second-grade level, third-grade level, and in many cases it is because they have been pushed forward regardless of whether they have got good fundamentals and have continued, and now they are incapable of moving on to the next stage effectively. I think, by personalizing the experience, we are going to get much better and more effective learning outcomes, and also in a much shorter time. And there are studies that demonstrate that this kind of blended learning format allows people to achieve as good or better learning outcomes at considerably shorter time investment on both the student and the instructor side.

A. Khrekov:

Thank you. Mr. Mau, you also wanted to answer.

V. Mau:

We all still have an industrial paradigm of education. Three-plus-one, four-plus-two... or do not even learn at all if all you need is to get out of serving in the army and do not need a diploma. If you are ready to master a course in a month, master it. If you want to master it in six months, take your exams, and get the relevant certificates, then please do so. How much you need or do not need to learn is an issue of fragmentation. Let us return to Mr. Khrekov's question. Should a business professor be a businessperson? That was the question I asked when I became a rector. We have a large business school, half of which is taken up by the MBA programme. I have been asked, "Should a bird watcher be able to fly?" He should be able to feed birds, but does not need to be able to fly. If there is real demand for that professor from the business people who come to study with us (these are not 15 year-old children going wherever their mothers

tell them), and if they pay money for the programme and want to listen to that professor, then who cares about whether the professor has created a start-up or not? If they do not want to go to start-ups, they do not go. We need to trust the students. Moreover, there are different kinds of student. There are younger ones who are starting out in business and interested in theory. Their main goal in business programmes is to learn how to speak the language of business. Then there are those that need to network more. It is important for them to form groups. There are different goals and different clients.

A. Khrekov:

Thank you very much. Mr. Fursenko?

A. Fursenko:

I asked Mr. Mau to start first because I agree. I want to say two things. First, we have to teach people to be responsible from an early age. We have to show them from an early age that learning is interesting and fun. Next, if people understand this, then they will be able to choose programmes for themselves, whether these programmes are 'four-plus-two', 'three-plus-two', or something that people study little by little their whole life. Secondly, we do not need to strive for speed. Training and education is the transfer of a cultural code. You cannot transfer a cultural code by clicking a mouse. Perhaps the time period is not the defining factor here, because some people master topics faster than others. It is more complicated than the transfer of knowledge. It is a mental issue, and we cannot strictly define a specific period of time at present. It is like going through a minefield with a walking stick, and at any moment something might explode. That is why using harsh industrial methods, when you are given six months to master a subject, is a dangerous thing. We have talked little about this, and we need to talk more about it.

A. Khrekov:

Thank you. Of course, one objection to that may be that cultural codes are passed down not only and not so much at universities, but you are right in your own way. Yes, we have time for one more quick question.

L. Gozman:

I have a question for Mr. Fursenko. How do you, personally, explain the high level of resistance, in my opinion, to any sort of changes from the teaching staff at our universities. It is unlikely that it can be explained, as some of your co-workers in your former ministry do, by saying that all of them are lazy, conservative, dumb, and so on. That explanation makes it impossible to implement change because it naturally causes even more resistance. I know that there is an opinion among professors (which is unjustified in your case) that they are under-appreciated, and that people do not understand that it is impossible to move from point A to point B in a flash, that it is like agriculture. Meaning, there is some ground you have to consider, and changes must be gradual. Perhaps there are other reasons? What is the resistance related to?

A. Khrekov:

Thank you, your question is clear. Mr. Fursenko.

A. Fursenko:

You know, the resistance you talk about is over-exaggerated. Many things are exaggerated. There are always specific people. There are people who support change, and there are those who do not support it. There are people who resist. That is not just true for university professors. It is true for all of us. It is related to the logic of introducing any change. There is an interesting book called *Le bonheur* by Philippe Delerm. In it, he talks about how humanity's goal is not material wellbeing, but happiness. And when a person walks on the path towards happiness, the risk of loss is significantly greater than the possibility of gaining something new. So when we are in a situation of change, everyone always assesses the possibility of loss. Those possibilities always exist during change. They are not ghosts. They are real situations. These losses exist for real people:

professors, parents, children etc. Whenever there is any sort of reform, there are people who lose something. If no one loses anything, then that is not reform or change. Significant gains can often be outweighed by just a small number of people or areas which have suffered a loss. But that is another question for another round table.

A. Khrekov:

I absolutely agree. Thank you very much. I think that if expertise could be measured in units, it would have gone off the scale today. Enjoy the last day of the Forum!