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It is an honor to be here. Thank you for inviting me. I am not certain about my qualifications for discussing IT and the virtual university, but let me say that this must be a very good conference because I agree with most of what has been said or asked.



Surely that has to be the criterion!

For my own remarks, I would like to start with several of the points that have been made and more or less develop them using my own language and my own words. But I will put those points into the context of my own thinking as an historian of universities.

I will ask the question that has been asked by my colleague, Aya Yoshida a little earlier in our meeting. What is the purpose, what is the reason why a technological innovation occurs? We have plentiful examples of technical innovation from around the world, and I will merely give a few hints as to the reason for the appearance of new manipulative processes.

The first reason for innovation is that a new machine or product achieves something that is otherwise impossible. The airplane for example.

The second reason is that a new technology may in fact achieve the same ends as the older form, but it does so better, faster, more efficiently or more cheaply. An example would be the railroad.

A third reason is that in the long run substantial cost savings will result. It is not at all clear at the moment that IT in education will in fact lead to lower costs. Certainly the start-up costs are substantial, but that may be true of other innovations. So we need to observe more or less at the outset that any university adopting IT has a formidable investment to make in the skills and specialized knowledge needed to make new teaching technologies effective. The difference depends upon the kind of education we hope to achieve, and its multiple uses in free, open and dynamic societies. This leads to yet another question about whether the investment in IT is worth the effort, since so much of its use and effectiveness are as yet unproven. Possibly for some institutions the money might be best spent on other aspects of the educational program.

A fourth reason for a technical innovation is that there is a labor shortage as existed

in Britain during the world's first industrialization process. If insufficient labor resources are available, capital is substituted, and that means a new technology. If we ask ourselves whether a labor shortage exists with respect to IT, the answer is clear enough. At the moment we possibly have a surplus amount of academic labor, but that formulation is spurious. In high quality education, for example, of the kind that research universities and leading technical institutions and liberal arts colleges typically offer, a high staffing ratio is regarded as essential.

And I would offer a fifth reason, namely, that some forms of innovation are driven by powerful economic interests for their own purposes, those that have been mentioned. Another is simply profit and domination of a particular market. IT is in some countries backed by strong businesses. We heard earlier that corporations in Mexico are donating free computer equipment, and of course we understand that they do so not merely out of motives of altruism.

I would now like to return to the question of technological innovations in education and offer some broad observations on the past. Professor Tanaka mentioned the invention of moveable type, printing. Now historians have studied printing and its revolutionary consequences, and they have found that Gutenberg's invention had a profound impact upon the development of the Protestant religion in Europe in the 16th and 17th centuries. But what effect did print culture have upon the structure of university instruction? You would think that the answer would be obvious, or would be taken up by historians of universities. Yet I am not aware of a significant body of knowledge on precisely that subject.

When we observe teaching and learning within universities in the centuries following Gutenberg, we find that little has changed. The availability of cheap books may have aided students, but the system of instruction remained essentially the same. Lectures were the premium form, and examinations did not usually provide opportunities for students to display the learning that they may have acquired from accessible printed books. In some areas of the curriculum the tutorial form of instruction was important, but that did not depend upon Gutenberg. So Professor Ramirez is correct in explaining how in his experience colleagues in Mexico have not learned how to use IT differently from lecturing.

Another educational innovation that should have affected the structure of teaching and learning was the scientific revolution of the seventeenth century with its emphasis upon experimental science and new technologies such as the microscope and the telescope. Experimental science is one of the cornerstones of the modern university. There were influences depending upon country, but essentially the scientific revolution was not welcomed in what we term the undergraduate curriculum. The experimental laboratory as

used in teaching (as opposed to private research) is an early nineteenth-century introduction. The great explosion in scientific knowledge in the 17th century found a home mainly in scientific and royal academies, which were not teaching institutions by mission.

Two other great changes in the structure of teaching had nothing to do with the use of new technologies. One of them was the Scottish university in the period of the Scottish Enlightenment in the 18th century. Conceptual history, modern economics, city planning, medicine and the medical and engineering sciences made great strides forward in Scotland, so much so that a recent author has claimed that the Scots "invented" the modern world.

The second great change in the structure of teaching also did not depend upon new technologies. I refer to the foundation of the University of Berlin in 1809-1810, the world's first modern research university. It was inspired by the thought of the philosopher Schleiermacher and was put into play by the great Prussian statesman, Wilhelm von Humboldt, aided by his brother Alexander. The principal methods of educational delivery (so to speak) were the hallowed lecture form, now given over even more to specialism, and the German "seminar," which was also a lecture. (Americans changed the form to make it more of a discussion and exchange of views among a small number of students. The German "seminar" could consist of very large numbers of specialized students without all that much discussion.)

These, reflections bring me to a general observation that has been made in the papers formally presented today, namely that we must be extremely careful in evaluating IT and in offering either praise or blame. We stand only at the beginning of the University Virtual. We are not certain about what is actually occurring. There are isolated classroom instances that are hugely successful. They have been mentioned. But technical problems abound, and we can understand the hesitation in compiling a list of failures.

But in assessing IT, let us remember a fundamental fact about the institutions to which we belong. They are enormously varied as to type. They range from wholly teaching institutions to research institutions. Some emphasize applied instruction much more than others. Some are heavily committed to professional education. Many, possibly most, are hybrids, combining different modes and missions. Our national systems of higher education are differentiated, and each institution (or government) will make the determination of how IT is to be used within them, if by nothing more than controlling the flow of financing. And not only are there different types of institutions. There are also innumerable differences within a single institution, customarily divided into departments, colleges, schools, institutes, faculties ? the language varies by country. Each one of these constituent units may well make different use of the virtual university's technology. Each specialty will adopt different facets of the existing technology, and some specialties will in

fact ignore IT altogether.

The subject of the virtual university, its costs and its users bring us back to Professor Kempner's remarks about the search for revenue. Many universities in the world are experiencing a drying up of resources channeled to them by the state. There is a worldwide search to develop additional and new sources of support. Indeed, as we heard, universities are heavily involved in developing new lines of support in the market. This is an old story in the US, although possibly more intense at the moment (but I am not sure), but it is a relatively new area of outreach for university systems in other countries. However, once again we note that each different type of institution establishes its own connections to the market, and, following the principle just enunciated, each type of internal unit or organization also determines how it will relate to outside influences. The resulting "contractual" connections have to be carefully considered to ensure that academic inquiry is not compromised. The internal complexity of the university makes supervision of outside arrangements quite difficult. The pressures for revenue enhancement are presently very great. They cannot be avoided, and I doubt that most of them ought to be avoided. They are an integral part of the world in which we live, but we do require very good and wise campus leadership to deal with them. Professor Ramirez noted the need for institutional flexibility, both within and outside the university itself, and for strong internal coordination of effort. I agree with that.

Professor Kempner rightly observes that many institutions will put their virtual component into a special organization or division in order to "protect the core" of what is regarded as the true or the traditional or the desirable university education. One place for virtual teaching has been in extramural (called "Extension" in the US) organizations which have a long history of providing educational services to a broad public.



These outreach programs are successful, I suggest, because the extramural divisions know their audiences and operate under severe fiscal constraints. They need to be efficient, and I think that they are. They are also going after new audiences, and in so doing they compete with for-profit entities. How their own income is distributed within the larger university, how much they can keep for themselves and how much they are expected to contribute to the general operating expenses of their host institution (or to other programs) is a question of that institution's policy.

I have a final major point to make and then I will stop so that time is available for questions and discussions. We are as yet somewhat uncertain as to how undergraduates are using the new technologies, apart from classroom use itself. In particular we are

uncertain as to how much outright educational use is being made of the internet. There are a few studies. One made at Lancaster University in Britain several years ago found that some 80% of the students reporting to a survey used internet time to play games, download CD's, burn CD's, or enter into chat rooms on subjects that were not apparently part of their formal curriculum. The chatting had more to do with socializing. The remainder, some 20%, were probably using the internet to obtain information relevant to instruction or to learning.

Obtaining information is the great boast of the internet, but that boast only betrays the commercial character of so much virtual education. Information, we often say, is not the same thing as knowledge itself. Knowledge is information that has been processed into some cerebral understanding of important educational issues and connected widely to other nodes of specialized knowledge. The education that everyone in this room is concerned about is how to teach students to take information and turn it into understanding, judgment, expression and creativity. Does the University Virtual teach that? The question was asked earlier in our day.

Can the University Virtual produce a Nobel Prize winner, for example? The answer for me at this moment is "no," and one of us earlier made a similar point. Nobel prizes, indeed, the higher professional training, is not (yet) a function of virtual learning. Its use in elite instruction may well be limited. But for mass instruction it has decided uses, and that is the arena in which the for-profit companies in the US operate. The Virtual University in the form known as the Open University, first created in Britain, is hugely successful in reaching out beyond campus walls. But let us note that a considerable part of that success lies in a feature borrowed from the traditional British elite system of higher education, the tutorial. The Israeli scholar from Tel Aviv University, Sarah Guri-Rosenblit, has concluded that the tutorial drop-in feature is what students in open universities most want. Face-to-face contact is desired. This ties up with what we heard earlier today, namely, that virtual universities experience a high dropout rate since students feel isolated and without infrastructure support.

Question and Discussion

(Audience)

Thank you very much. I have one question for Prof. Wilkinson. My university is in Kyushu, 600 kilometers southwest from Kyoto. My university, Saga University, and Saga Medical University will join to become one university in the near future. So today's topic of the virtual university is in some senses very interesting to us. In my opinion, face-to-face teaching is still very important for our university. Saga Medical University and my university are about 16 kilometers distant, but we still would like to provide some lectures to the students of both universities. If possible, I would like to have your remarks concerning some virtual or internet lectures for them.



(Wilkinson)

I will try to give you a practical answer. First you need to have enrichment for the students in each university. As I understand your situation, in one university they are receiving a lecture by electronic transmission that is simultaneously being given live to the students in a nearby university. Is that correct?

(Audience)

Yes.

(Wilkinson)

So one professor will be teaching students at both universities. At the first university, the students will be directly in the classroom and at the other university they will be listening, watching the screen to see the electronically transmitted lecture. I think it is important for the students who are watching the professor at a distance to be able to ask questions or to have some kind of supplemental work that will give them a chance to be actively involved in the class. The kind of teaching you are talking about is a more traditional kind. And in fact, as I indicated in my talk, this traditional lecture approach is better suited to the instructional technology than the kind of teaching where medical

students would have to, let us say, dissect a cadaver or solve a problem of diagnosis by looking at a real patient in a hospital setting and deciding what the patient's disease might be.

We do not have time to go into this now, but I would be happy to talk with you afterwards about the innovations at the Harvard Medical School, where we are moving away from the lecture as the main vehicle for instruction. But the problem you face is how to make the best use of lectures at these two universities. My suggestion is that there has to be a kind of question that the students can ask the teacher even when they are not present in the same classroom. Perhaps they can query the professor by e-mail once the lecture is over. And there should also be some kind of supplement, some sort of enrichment or discussion—something apart from the lecture—to help students better understand the material they are learning at a distance. You cannot rely on lectures alone to teach your students.

(Yoshida)

I have another question. I would like to pose one more question to you all. In the case of Saga University or in the case of Mexico, e-Learning is a very useful part of distance education. But if we keep the face-to-face situation in the classroom, do we need e-Learning or virtual learning? What do you think?

(Wilkinson)

Could you elaborate on the question a little bit, please? I am not sure if I understand what you are asking.

(Yoshida)

If we keep the face-to-face situation in the classroom, do we need e-Learning or the virtual university?

(Wilkinson)

I will give you a quick answer, though this is a complex topic. We may use e-Learning as a supplement for feedback. If you give a lecture, how can you tell if the students have understood what you say? Often faculty do not understand how much their students have themselves understood about a certain topic. You might want to wait until the examination, but then, if they did not understand, it is too late to correct their gaps in knowledge or mistaken ideas. You can use e-Learning to address this problem, or you could simply ask a question at the end of the lecture that the students have to answer, and they can send you their answers. Ask them about some topic you raised in that lecture. The answers serve as a diagnosis of student understanding. From them you can

determine what you need to focus on, what needs to be clarified or what kind of lesson needs to be reinforced in the next lecture you give.

In addition— and this is something that we try to do at Harvard— you could ask the students to answer two questions, either using paper and pencil or using e-Learning. The first question would be: “What is the most important thing you learning today?” The second would be: “What is the thing that most confuses you about what was just said in lecture?” Professors are very good at predicting answers to the first question; they know what their lecture is about. But they have a very hard time predicting answers to the second, since they often have no idea of what confuses the students. Of course everything seems clear to them! So the students simply tell them what is not so clear.

That kind of feedback seems to me enhanced by e-Learning. But notice that e-Learning is not replacing the face-to-face classroom. It is supplementing it in an important way, but not substituting for it.

(Ramirez)

I can also give you another example. Several years ago we had an undergraduate class for moral development. As the number of students in the class was very big, we used e-Learning by posing moral dilemmas for them to solve after the class. And they also exchanged their answers by e-mail whenever they wanted to do it. It was synchronous exchange. After they did that, in the next class we discussed some of the conclusions.

To a certain extent this was very good, let us say, a support for the class. And people had the opportunity to exchange their views that they could not have in the classroom because of the time limit and because of the size of the group. That is another example.

(Rothblatt)

May I just add a footnote to what has been said? I would particularly like to underline Jim Wilkinson's point about the use of this kind of technology as supplementary. I believe that no one here today said that IT was a replacement for any kind of standard teaching, including the old pedestrian-style lecture for which I still retain a sneaking fondness. And that is very nice because no kind of teaching that has ever existed in the 800-year history of universities has ever disappeared. We just keep adding new forms.

Recently at Berkeley a very interesting experiment was run regarding the teaching of undergraduate chemistry under the direction of Diane Harley of the Center for Studies in Higher Education. The results are now widely available for anyone wishing to see the report. One section of basic chemistry was taught more or less traditionally via lectures and discussion sections and labs, and then another cohort of students received similar instruction through interactive teaching technology. The comparative results are

inconclusive. There are some benefits to the virtual phase, but no evidence that the outcomes were different as measured by conventional marking. Students like gadgets and impersonal chatting, so there is some social benefit there.

I do not know whether I should end my observations on a positive or negative note, but the negative one is forcing its way out I am afraid. It is a different point altogether from those made today. One feature of computer-intensive education that is definitely worse is the ease with which plagiarism occurs, students obtaining essay papers, for example, from somewhere in cyberspace. Cheating has increased worldwide in general according to some scholars. The stakes of success are apparently very high.

(Kempner)

Specifically what I wanted to talk about is that one of the big concerns for me, both the faculty part of me as well as the administrator part of me, is that as expenses go up and we put money in, online and e-learning, when do the curves cross. And this is the idea that the learning curve should be crossing the expense curve sometime in here. As faculty members come to me and say, we need to spend more money and my response is why? Show me when I can quit spending money as an administrator and when it will pay off in learning increases. So the issue is of expense and outcomes, the idea that when will expenses and outcomes cross each other. We really do not know that very well. I think that the California experiment that I have been reading recently was, as I did mention in my presentation, is that no significant differences are a problem.

So from an administrator's perspective why should I spend money if there is no significant difference? Or, I will spend money up to a certain point, to be competitive, to use the technology, but I will not spend anymore money because I am not getting any more outcomes of student learning. And that is a question I need to ask the individuals who are asking for money because, money is a scarce resource.

But what is this going to do for student learning? And of course then, there is the issue of the market, again, are we doing this because we are increasing tuition, are we getting more students, so is it an economic question or is it an educational question? Obviously it is both.