

# KEYNOTE ADDRESS

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# TALEPAPIR

## DET TALTE ORD GÆLDER

<b>Anledning</b>	Man er inviteret som hovedtaler ved åbningen af International Conference on Engineering Education and Research – ICEER
<b>Titel</b>	Remedy of Crisis – the Role of Innovation and Creativity in Education
<b>Målgruppe</b>	Forskere, undervisere og ledere ved tekniske universiteter og uddannelsesinstitutioner
<b>Arrangør</b>	KSEE (Korean Society for Engineering Education) Hanyang University Korea University of Technology and Education
<b>Taletid</b>	20 minutter
<b>Tid og sted</b>	Den 24. august 2009 – kl.: 10:30 – 11:30 Grand International Hotel, Seoul

## Disposition

1. **Introduction**
2. **The Economic and Financial Crisis**
3. **The Role of Innovation and Creativity**
4. **Education for Innovation – Innovation in Education**
5. **Internationalisation**
6. **Flexication**
7. **Creating synergy, relevance and quality**
8. **Natural sciences vs. Humanism**
9. **Conclusion**

### 1. Introduction

- First of all I would like to thank the organisers for inviting me to speak at this highly interesting, timely and relevant conference.
- It is always inspiring and encouraging being together with people whose approach to the world is based on curiosity and experiments. This approach often goes hand in hand with optimism and joy. Let me however begin my intervention in a more serious perspective.

### 2. The Economic and Financial Crisis

- We are in the middle of a global economic and financial crisis. There is no reason to look past the fact that this crisis will have a long lasting impact. Even though some parameters show slight improvements it would be naïve to think that this will be all over by Xmas.
- The global financial crisis has already turned over in the national labour markets. Widespread unemployment, exclusion, disparity and increased social tension are threatening but likely scenarios.
- Just two weeks ago it was announced that the biggest Danish ship yard renowned for its production of Ultra Large Crude Carriers (ULCCs) and the world's largest Container Carriers will be closed and the company will have to let 2000 workers go.
- Other branches of business and industry have similar difficulties. But there has always been a way out of the darkness and this crisis will be no exception from that.

- Recovery of the labour market will be propelled by innovation in production, transport and trade - capitalising technologies, design and new efficient logistics.
- The process will close down traditional job slots and subsequently open new ones. But redundant workers cannot be reallocated to new job slots without the acquisition of the skills needed in the new scheme for production, transport and trade.
- In response to the changes nations must develop and maintain systems efficiently fostering work placed learning and lifelong learning opportunities. Those who manage this will pave their way more smoothly through the crisis and recover more rapidly than those who do not.
- This is the time for re-education and re-training systems to prove what they can accomplish.

### 3. The Role Innovation and Creativity

- But first we need to think up, develop and implement the new schemes for business and industry that will eventually help us out. And this is where you come into the picture.
- Research within the natural sciences conveyed through technical education and engineering will be the source for the new ideas that will shape the new ways in which we will produce, distribute and trade in the world of tomorrow.
- The old saying ‘necessity is the mother of invention’ is more true today than ever and we have a lot that needs to be done. I hardly need to mention the need for sustainable sources of energy. The need to reduce carbon dioxide emission to prevent further damage to the global climate. The need to find ways to meet the challenge of urbanisation. That is to live, commute and communicate in a less stressful manner in a world where more and more people live in densely populated areas.
- The scope of the challenges is paramount. But it is indeed encouraging to witness how researchers, teachers and students undaunted and undismayed are dealing with the issues and enthusiastically bring forward ideas, projects and sometimes astounding new combinations of already existing technologies.
- During a climate symposium for young people in Copenhagen earlier this month. A young upper secondary student suggested that the speed bumps that we have installed in the streets of most cities are attached to shock absorbers that turn the impact of a crossing car into energy. Why not?

- This is a brilliant example of the type of ‘thinking out of the box’ that will be essential for business and industry, for medicine, for societies at large and for education and research in it self.
- It might be a modest example and we do not know what will come out of it. But the history of natural sciences holds many examples on how what at first seemed to be a curiosity by the end of the day revolutionised our lives.
- Let me just mention the Danish scientist H.C. Ørsted. By chance he discovered electromagnetism when he was dealing with something entirely different namely trying to improve the capacity of liquid batteries.
- What the world would be like without this groundbreaking finding is hardly imaginable. So some times the smallest things have the most profound impact.

#### 4. Education for Innovation - Innovation in Education

- Most educationalists tend to agree that the changes we were talking about just a minute ago are needed. But when it comes to changes in their own backyard – the organisation of education and research - many of them are more reluctant.
- However it is obvious that the new demanding challenges that we have to cope with will also initiate dramatic changes in education. And we certainly need innovation in the way we develop and implement policy for education and research and in the way we organise education and research.
- Change in education and research will be needed to the same extent as the changes we expect to happen outside our institutions.

#### 5. Internationalisation

- First of all we must acknowledge that the world is a unit. The borders that man has created are in many ways artificial and many of the issues that we are dealing with do not respect man made borderlines. That goes for climate change. That goes for economic up and down turns. That goes for electronic communication and the organisation of cross border production. And education must take a point of departure in these facts.
- When it comes to the response to the economic crisis I cannot think of anything worse than protectionism. Hiding behind national borderlines in the attempt to protect the national economy will only deepen the devastating effects of the crisis and postpone recovery.

- The same applies to innovation in education and the renewal of educational organisations. The way forward is the way out in the wide world.
- In our national education policies we must reach out to a global education community.
- We must encourage our young people as well as their teachers to go abroad and gain inspiration, knowledge and understanding of the contemporary global situation.
- We must be open and invite talented young people from other countries and other regions to come to us. We must offer them a chance to share ideas and develop mutual projects with the domestic students.
- Education is probably the single most important driver for progress and prosperity. That goes for individuals and that goes for societies. And education is also a solid platform for the meeting of young people and for cross cultural understanding and friendship.
- Therefore each country must be an active player in international cooperation. And of course recognition of qualifications and common standards are topics for further discussions.
- As an example quality assurance in cross-border higher education as proposed by the OECD and UNESCO are preconditions for a vibrant and diverse international education sector. It is a precondition for a responsible, accountable and sustainable market for education.
- We need to further develop this tool. This will be for the benefit of the students – first and foremost – but certainly also for the business and industries that ultimately employ them.
- Another way of enhancing international cooperation in education and to further innovation in education as well as education for innovation is of course to have conferences like the ICEER on a regular basis.
- I have also noted the stimulating effect of thematic international competitions to talented young people. I have had the chance to meet the Danish participants in quite a few of them like for instance ‘Science on Stage’. After a few minutes of interaction with young people filled with enthusiasm, energy, imagination and eagerness to know more and to show the world what they can do - then very little scope for pessimism is left.

## 6. Flexication

- At national level we also need to make some thinking out of the box. In particular regarding the food chain of talent and the way our students are able to commute in our systems.
- Denmark is renowned for its flexible and dynamic labour market. Employers can easily hire and fire staff because we have a well developed scheme of social security combined with easy access to re-education and re-training. We call it 'flexicurity'.
- The 'flexicurity' model has before helped us through major programmes of automation and outsourcing in business and industry without any serious impact on the unemployment rate. That has remained very low. As I mentioned earlier - in the current crisis it is the time for this system to really show what it manages.
- And I believe that it is time for us to apply a similar flexible approach to our education. I will call this 'flexication'.
- First of all we will have to think new about our vocational education and training sector. Vocational education and training is undervalued and the potentials in developing dynamic and responsive VET-systems are not appreciated.
- Only a responsive and dynamic VET system can allocate workforce to the skill demanding job slots in a modern society and by doing so build bridges between social and individual needs. Let us keep in mind that long lasting unemployment has devastating consequences for individuals as well as for society.
- VET can be integrated in mainstream education and at the same time respond to changing needs in the labour market. It can provide opportunities for young people with little or no academic aspirations and it can at the same time be a platform for the most talented.
- Let me remind us all, that some of the most talented innovators that the world has known had no academic background. One of the most successful and productive innovators – Thomas Alva Edison – had no academic degree at all. He was a telegrapher.
- It should also be noted that the workplace is possibly the most powerful arena for social integration and mediation of conflicts – people with different backgrounds working together on a daily basis get chances to develop mutual

respect and understanding without giving up their cultural, religious and personal integrity.

- In modern societies the labour markets are rapidly changing and people as well as educational systems must accommodate to the changes. Few people keep the same job throughout their career. Even fewer maintain the same working procedures year in and year out – that is why flexibility and dynamism must be built into the system and a strategy for accessibility must be carefully considered.
- VET systems and lifelong learning opportunities must be seen as two sides of the same coin.
- Integrating VET in the mainstream education system demands an elimination of all dead end streets in the system. It should be an option to leave the system at various stages with certification.
- And it should be possible to re-enter education and even in an entirely different branch without having to move back to square one. The door to knowledge must always be open.
- The challenge will be to develop a system for identification and accreditation of prior learning that be formal, informal or non-formal learning.

## 7. Creating synergy, relevance and quality.

- Involving business and industry in education is an obvious step to take. In our country we have a long standing tradition for tri-partite involvement in the governance of our vocational education and training sector.
- This contributes to a dynamic and flexible relation between our education and the needs of the labour market. In short it helps us to run a system characterised by relevance, synergy and quality.
- Cooperation between universities and business and industry is highly relevant in order to ensure research that in turn can contribute to innovation and utilisation of new technical knowledge.
- But a lot more can be achieved in cooperation between private enterprise and education. Inspiration from the organisation of a cross-border organised industrial company can help us to decompose the obsolete ivory towers of educational institutions and turn them into dynamic and responsive learning organisations.



- And in turn business and industry might learn what a rich variety of competence education really has to offer.

## 8. Natural sciences vs. Humanism.

- The final topic I would like to touch upon is the traditional distinction between humanistic and technical disciplines which I find obsolete as well as inexpedient.
- Before the 1950'es borderlines between natural sciences and humanistic studies were far more blurred than today. Natural scientists often produced philosophical works and some even became artists.
- The Dane Piet Hein is probably first and foremost known as a poet with his famous 'grooks'. He was educated as in philosophy as well as physics. But he was also a talented industrial designer and an outstanding mathematician. He was in his early years an assistant to the father of quantum physics Niels Bohr.
- During the 1950'es and onwards natural sciences were more and more aligned with phenomena like the nuclear weapons, arms race, pollution and inhumane production schemes in the factories. The esteem of natural sciences suffered. And technicians were seen as nerds without imagination and sensibility.
- I believe that natural sciences as well as humanistic studies must be reissued in a more unified shape. And the tough division of labour between the disciplines must be softened.
- By the example of Piet Hein we can learn how humanism and technology can mix up and enrich us all. In this sense one plus one can be far more than two.

## 9. Conclusion.

- Let me finish by once again thanking the organisers of the ICEER 2009 for giving me this opportunity to speak to you.
- I would also like to thank all the participants in the conference and the contributors in particular for their inspiring work.
- Now I am looking forward to visit some of the workshops to learn about your ideas and your progress and get inspiration for my work at home.
- It is my modest hope that my speech will encourage us all to go home in our communities and demonstrate that technicians are not nerds at all. Technicians

contribute to the development of our societies and our lives in a broad holistic manner. Communication, design, architecture etc. would not have reached the level of functionality and aesthetic value of today without sophisticated technology.

- So let us reach out to a more open and interdisciplinary interaction between natural sciences and humanism, between technicians, designers and artists and let us integrate research, education and work placed learning in a dynamic and responsive system.
- Thank you for your kind attention.