



THE MINISTRY OF
CHILDREN
AND EDUCATION

PIONEERMAGAZINE

CREATIVITY, INNOVATION AND ENTREPRENEURSHIP IN **EDUCATION**

JUNE 2012



»BEING
INNOVATIVE IS
THE **ESSENCE**
OF BEING
EXPERIMENTAL«

– Hans Henrik Knoop, senior lecturer
in educational psychology
at Aarhus University

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experiences with innovative thinking

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Ten steps towards more innovation
in teaching and learning

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THE KIE MODEL: INNOVATION 'HANDS-ON'

Get a concrete tool to innovate your teaching



»WE WANT TO MAKE DENMARK'S YOUNG PEOPLE STRONGER«

The children and young people who are currently being educated will be the ones given the task to solve the future challenges of society. These challenges are as yet unknown. This task will require high academic and professional standards as well as the ability to perceive opportunities, think in new ways, and turn ideas into value.

In concrete terms, the Danish Ministry of Education's Pioneer Campaign is working to encourage youngsters to lead the way with their ideas and to dare to put them into practice through innovation and active entrepreneurship. We want to make Denmark's young people stronger so that they will be independent and have the courage for new projects.

Since the spring of 2007 and as part of the Pioneer Campaign, teachers and educators throughout the entire Danish educational system have been working on an academic programme to develop these skills. Those who have participated in or contributed to the Pioneer Campaign have gained important experience. We hope this experience will be brought into play in the future in order to enable this training to teach children and young people how to create value for others. The campaign has been a success, and the ideas and new ways of thinking encountered along the way have been rewarding. But it is in the very spirit of this subject area that the process is never fully completed.

Ideas are only improved when they are shared, tested, and placed in new frameworks that offer new challenges and opportunities. As a result, our hope with this English version of the Pioneer Magazine is to inspire and to share the experience we have had in the Pioneer Campaign. We also hope to gain inspiration and new perspectives on the ways in which entrepreneurship and innovation can be incorporated in day-to-day instruction – all the way from ABCs to PhDs.

We hope that individuals and educational institutions outside of Denmark will find our experience interesting and will help spreading the message of entrepreneurship in order to help each other to better equip children and young people to find the solutions to the challenges of tomorrow.

Danish Minister for Children and Education
Christine Antorini

PIONEERMAGAZINE

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HOW DO WE EDUCATE FOR AN UNKNOWN FUTURE?

● CHARLOTTE ROMLUND HANSEN,
SPECIAL ADVISER AND HEAD OF THE PIONEER CAMPAIGN,
THE DANISH MINISTRY OF CHILDREN AND EDUCATION

This was the starting point for the Pioneer Campaign, which was launched by the Danish Ministry of Children and Education and posed the question: "How can pupils and students learn to be more creative and innovative in the course of their education?"

Instructors and teachers were the target group for the campaign, as they need to do new and different things in their teaching rather than adding new subjects.

THE PIONEER CAMPAIGN: CONTINUING EDUCATION AND TRAINING, KNOWLEDGE-SHARING, AND A PIONEER PRIZE

The motivation offered for participating in the Pioneer Campaign was the awarding of an annual Pioneer Prize to those teacher(s) who dared to throw both their pupils and, not less importantly, themselves out into deeper waters, using conceptually novel and innovative teaching methods that test the boundaries of what is possible in education. The campaign has a website (www.pionerprisen.dk) and a yearly Pioneer Magazine, which is distributed to all educational institutions in Denmark, from primary and lower secondary schools to universities. Both the website and the magazine inspired the

teachers and provided role models, which gave the teachers the desire and inspiration to create their own innovation projects.

The KIE model (see page 19) was an important element in the campaign and a primary means of enabling an understanding of the innovation teaching approach promoted by the campaign.

At the start of the campaign, the teachers were invited to participate in inspirational seminars, where they were given concrete methods and tools that they could use in their teaching. During the campaign, an entirely new type of education, Pioneer Education, was born – a process of continuing education and training that equipped the teachers to plan their own innovation teaching.

PIONEER MAGAZINE - IN ENGLISH

In this special issue of the Pioneer Magazine, we have compiled a number of articles that collectively illustrate the key elements of the Pioneer Campaign and the impact the campaign has had on teachers and pupils.

It is our hope that these articles will inspire others outside of Denmark, just as we are delighted to draw inspiration ourselves from the many fine efforts being made in this field in the countries around us.

ENJOY!

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For the Swedish Circus Cirkör there is only one way to learn: With the whole body.

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A selection of innovative projects in Denmark – for your inspiration!

SCHOOLS MUST REWARD COURAGE AND INITIATIVE

By MARIANNE WITH
BINDSLEV //
Photograph: KÅRE VIEMOSE

People remember fun things better than boring ones. That is why the school system must dispense with 'empty rote learning' and instead reward student creativity and originality, according to a Danish educational researcher.

Innovative thinking promotes learning, and that is why there is every conceivable reason to teach students at every level of the Danish education system to be innovative. So suggests Hans Henrik Knoop, senior lecturer in educational psychology at Aarhus University. »One acquires a retentive memory from being creative because the brain is inclined to remember whatever it can use. And if one is creative, one knows instinctively what knowledge will be necessary for the project to succeed,« he says.

»It is also fun to come up with something yourself, and people generally remember fun things better than boring ones. Furthermore, children and young people want to be recognised as unique individuals, which they quite clearly will be if their individual, original, and innovative contributions are prioritised at school.«

NEW TERMS NEED TO BE INVENTED

A culture change is needed in the education system, according to Hans Henrik Knoop. He believes that the effects of innovative teaching are readily measurable.

»One of the issues generally associated with problem-solving is to identify and classify the relevant elements and the degree of originality (e.g. from 'pure imitation' to 'never seen before') and quality (from 'solves the problem to a large degree' to 'solves the problem to a small degree'),« says Hans Henrik Knoop. »If

the goals that are set are to pave the way for processes that could not have been foreseen, the most important thing is that they promote innovation.«

But we still have a ways to go, according to the lecturer. The industrial age-inspired education culture, which has held sway over the last 150 years, still involves far too much 'empty rote learning and a unilateral examination orientation', according to Hans Henrik Knoop. He points to strict teacher-centred education, where the content of the instruction is directed unilaterally toward the students having to learn something pre-existing, where meeting examination requirements leads to good marks.

OKAY TO EXPERIMENT

But Hans Henrik Knoop stresses that if Denmark is to live off knowledge, we will have to make it more attractive to work with knowledge.

»But we fail to retain knowledge and skills that we acquire solely in order to do well on exams. On the other hand, we remember the knowledge and skills that we acquire because we recognise that we have a use for them,« says Hans Henrik Knoop, who believes that the micromanagement that occurs at the primary and lower secondary school levels has been decidedly 'lethal to creativity'.

»Being innovative is the essence of being experimental and voluntary. This is not achieved as the result of requirements that seem neither well founded nor meaningful. We must have an educational culture in which it is okay to experiment and where independent initiative on the part of both teachers and students is rewarded,« says Hans Henrik Knoop, who points to more project-based teaching as a way to promote innovative thinking.

**»WE MUST HAVE
AN EDUCATIONAL
CULTURE IN
WHICH IT IS OKAY
TO EXPERIMENT«**

– Hans Henrik Knoop



Hans Henrik Knoop is recognised as a leading expert in learning and positive psychology - in Denmark and internationally.

🔊 HANS HENRIK KNOOP

Senior lecturer in educational psychology at the Danish School of Education, Aarhus University (DPU), and research director at Research Lab. Hans Henrik Knoop is the author of many books, including *Leg, læring og kreativitet – hvorfor glade børn lærer mere* [Play, learning and creativity – Why happy children are better learners] (Aschehoug, 2002). He has also contributed to numerous television programmes in the areas of talent development and the use of positive psychology and learning styles in school.

📌 FELDBORG SCHOOL



12-year-old Julie Rønning-Bæk learned how to say 'yes' to odd ideas when her class juggled with glue sticks, pipe cleaners, and Christmas snacks.

WHAT DID WE LEARN?

📍 By PETRINE ELGAARD // Photograph: KÅRE VIEMOSE

What happens when control and conventional thinking is replaced by creativity and daring to fail? Listen to a municipal primary and secondary school, a commercial upper secondary school, and a university college sharing their successful experiences in innovative teaching.

THE TEACHER: GET THE STUDENTS TO THINK FOR THEMSELVES

The pupils in 4th, 5th, and 6th form exchanged ideas, calculated the cost of materials, cut and pasted, took pictures, and organized evenings with parents. Their teachers, Sussie Sandfeld and Ulla Boe Nielsen, were in charge of making it all come together.

»Working together on the Christmas boxes was a great joint experience for the pupils,« says Sussie Sandfeld. »We saw the pupils flourish because the school day was turned into something other than sitting with a book.«

The project made the boys drop soccer game during breaks. They would rather keep on working. And many of the girls stayed after school to tidy up the piles of carton because they felt it was cosy.

Before the work started, the teachers set certain goals. For instance, the pupils should come up with ideas and turn them into reality, they could not say no, and they should use their school knowledge in the process. Inspiration was sought, for instance, from exercises on The Creative Platform, which is available free of charge online.

»SOMETIMES, IT WAS LIKE STEERING THROUGH CHAOS, BUT YOU GET THE HANG OF IT.«

– Teacher Ulla Boe Nielsen

The teachers also got ideas for their planning from the KIE model (please refer to the article on page 18.)

»There should be room for the pupils to think for themselves,« Ulla Boe Nielsen states. »Sometimes, it was like steering through chaos, but you get the hang of it. Now the pupils have learned to work towards a deadline and to have a plan for what they are doing. They know how to adapt and realize a concept – something that will be of use to them in many situations.«

The project was such a big success that the children still talk about it. »It appealed to everyone and was really exciting,« says Ulla Boe Nielsen. »Such a success gives great satisfaction.«

THE PUPIL: I AM NOT AFRAID TO SAY 'YES'

The month was September – that much the pupils knew. But every time they stepped into the big common room it was like being sent three months out into the future. Christmas hearts and paper garlands hung on the walls. The tables were strewn with Danish Christmas cookies and pipe cleaners, and the children wore elf hats and had brought Christmas snacks from home. In brief, Christmas had come to Feldborg somewhat earlier than usual. A host of yellow Post-it tags stuck on cupboard doors in the room gave inspiration to 12-year-old Julie Rønning-Bæk and the other pupils. And ideas popped up faster than normal because all the pupils shared their ideas via the cupboard doors.

»I never thought I could get so many ideas. But it happened because we were so many to get them together,« she tells. Together with a classmate, she created an elf that was included in the hobby company's Christmas box.

»It was so much more fun to go to school than usual because sometimes you get really tired from sitting and writing. And when you are making things for other people, you do your very best.«

The teachers put up hurdles on the way such as rules about only using two kinds of materials or a requirement to use a pair of scissors in the process.

»The fun thing was that we were all in it together – the hardest thing was not to think 'no' when you had a new idea. So I thought, 'We'll try it anyway'. I am also better at doing that now and at cooperating with others.«

THE COMPANY: CHILDREN ARE CREATIVE INNOVATORS

»Working with children of different ages is important to the hobby firm Creative Company,« says Annette Fuglsang, who edits the firm's catalogues and participates in the product development. This is why she accepted right away when contacted by Feldborg School.

»WHEN YOU GIVE CHILDREN A TASK, THEY COME UP WITH FAR MORE IDEAS THAN ADULTS«

– Annette Fuglsang, Creative Company

»We are really excited about projects like this because they are inspirational to both the children and to us. When you give children a task, they come up with far more ideas than adults. New things happen with children, and that is exciting,« says Annette Fuglsang, who found out that elf hats may quite well be blue when they are made by children. Creative Company continually collaborates with nursery schools and school-based leisure time facilities about the development of materials. Now on their second year, the Christmas boxes from Feldborg School are selling well. »The Pupils have made things that last. Frankly, they were the dream of any company,« Annette Fuglsang concludes.

WHAT?

In 2010, a good 40 pupils from 4th, 5th, and 6th form in Feldborg School developed two Christmas box kits marketed to peers and containing hobby materials for Christmas decorations.

HOW?

The project began with a visit to the company with which the teachers had made an agreement. Then two days were spent on getting ideas and making prototypes of Christmas decorations. The material prices were calculated, and subsequently parents, siblings, grandparents, and the hobby firm were invited to a 'mini trade fair'.

WHY?

It is the goal of Herning Municipality to introduce entrepreneurship into the teaching of all age groups. For this reason, pupils and teachers at Feldborg School do a similar project every year.

↙ CAMPUS VEJLE



It means everything to students Maria and Simone that someone can really use their invention: a waterproof cape for handlebar baskets, which is being tested here by their teacher, Ruben Krog.

»IT'S AMAZING THAT
WE'VE COME SO FAR«

By PETRINE ELGAARD //
Photograph: KÅRE VIEMOSE

**»MY AVERAGE
MARK USED TO BE
LOW, BUT NOW
IT HAS REALLY
SHOT UP«**

– Student
Simone Bering Würtz

The number of students who drop out of the innovation line is almost nil, because it's fun to invent something that others can use. China is the next target for Raiw, a company founded by four students from Campus Vejle

It was **Simone Bering Würtz, 18**, who came up with the idea. Her friend was tired of always ending up with a sopping wet handbag whenever she rode her bicycle in the rain. Simone set out to solve the problem along with Frederik Sort Hess Andersen, Morten Obel Utoft, and Maria Rosendal Sørensen from the innovation line at Campus Vejle. The group sought to create a product that would keep items in a handlebar basket dry, and that was marketable. The result was the Raiw waterproof cape for handlebar baskets. Made of recycled sailcloth, it has a handle that can transform the cape into a bag. It also has reflectors safe for traffic on the sides and an inner pocket for keys and coins.

The project also includes a well thought out business plan formulated by the students. Along with the waterproof cape, it has won the group an innovation prize internally at their school and a 13th place in the nationwide Danish innovation competition, which involved 4,000 students at various commercial upper secondary schools. The four members of the Raiw group also showed their waterproof cape to business leaders in the USA while on a study trip there.

They found themselves truly and properly challenged while working on the project. »It's amazing that we've come so far, that we've built up a business by ourselves,« says Simone Bering Würtz. »And it's brilliant to have a product that we made ourselves.«

ADDED VALUE IN THE INSTRUCTION

The maths sessions are used to work out budgets, while the English and German sessions are used to prepare presentations and write business letters.

»It used to be tedious to go to school. But here we have learned that the instruction is really something that can be used because we can see how it relates to our own business,« says 19-year-old Maria Rosendal Sørensen. The curriculum supervisor for the line, Ruben Krog, can document that the very act of creating a business has a hold on the students.

»They have something that brings them together and helps to give them an identity. If they drop out, they will lose that.«

The average dropout rate in each class at the commercial upper secondary school is five students per year. In the innovation line that number is down to one.

»My average mark used to be low, but now it has really shot up,« says Simone Bering Würtz.

»Maybe it's because I'm working on something I want to work on.«

That the students can take an interest in whatever they like also poses a challenge for the line's teachers. The students often know more about telephone apps and viral marketing on YouTube and Facebook than their teachers do. And that knowledge must be utilised, according to Ruben Krog.

»It's a different way of teaching. The teachers have to force themselves to let go because good ideas may be hiding in unexpected places. And sometimes the young people have to be allowed to take over the teaching entirely.«

FROM VEJLE TO CHINA AND BACK

Raiw has opened up new opportunities for the girls. A chain of bicycle shops has announced that it will carry the windproof capes, and the group already has takers for the first 700.

»When we first started out, we didn't think it could end up here. It was just a school project, but it has evolved,« says Würtz.

»It would be great to see your own product coming towards you on the cycle path,« adds Maria Rosendal Sørensen.

That is why the group is now following the business plan it formulated. According to the plan, the waterproof capes are to be manufactured in China. Various advisors have joined in because they feel that the project is exciting. And the team has found free office space in a cooperative for young entrepreneurs.

»We don't know how this will go, but no matter what happens, we've learned to put theory into practice. And that's something that we'll be able to apply later on as well,« asserts Simone Bering Würtz.

REAL BUSINESS

WHAT?

The students in the innovation line at the Campus Vejle commercial upper secondary school set up their own business as part of their education. Simone Bering Würtz and Maria Rosendal Sørensen are behind Raiw, a firm that has developed a waterproof cape for handlebar baskets.

HOW?

In the first year of the programme, the students start developing the product and formulate a business plan. In the second year, they enter the Young Enterprise competition, attend tradeshow, and present their products to international business leaders.

WHY?

The aims include teaching the students how to turn academic knowledge into concrete solutions and preparing the students to be entrepreneurs later in life.

HELLO, HELLO: A PIPELINE TO OTHER PROFESSIONAL GROUPS



By PETRINE ELGAARD //
Photographs: SISSE STROYER

When five Metropolitan University College students were challenged with an interdisciplinary degree project, a reduction in the time available for citizen contacts was resolved through the use of a mobile telephone.

»It was a really irritating assignment to start with,« confirms Christina Andersen. »But once we found out how the whole thing was connected, it became exciting.«

Christina Andersen, who is earning her BA in Nutrition and Health at Metropolitan University College, two other nursing students and two occupational therapy students were assigned to solve a problem at the Bispebjerg Rehabilitation Centre. New visitation rules could result in many citizens no longer being able to undergo rehabilitation and receive assistance from physiotherapists and occupational therapists. But the management and staff feared that fewer therapy sessions could hamper the interdisciplinary cooperation at the centre. The five students were consequently tasked with finding an alternative solution – one that could incorporate all the professional groups on site despite the cutbacks.

The result was a smartphone geared to the healthcare system. The smartphone can be fastened on the caregiver's lab coat, leaving their hands free while still documenting any exercises, sores or other details via the phone's video camera, thereby making it possible to bring another caregiver in for consultation by means of a video call.

»When we created the phone, we took things to another level,« says Heidi Klysner, one of the two occupational therapists in the group. »We could see that it could be used on site, and that was a form of liberation.«

BE CREATIVE – AND QUICKLY

The point of departure for the innovative effort was that anything was possible. The group were to come up with solutions that could be as wild as they liked. But most of all, they were to create something that could actually be used in hospitals.

»The hardest thing was meeting the department's needs. Incorporating all the elements,« says Heidi Klysner.

Working across disciplinary lines posed another challenge, according to Gunhildur Kristjansdottir, the group's other occupational therapy student.

»We had preconceived notions about one another, and everyone felt that their discipline's way of doing things was best. That's why it was brilliant to get to know these other professions. You discover that you can use one another's ideas and methods.«

According to the group's advisor, Lif Larsen, the five students got further into their assignment than did those students who had not been assigned the same sort of concrete problem.

»They got deeper in their discussions and consequently rose to an entirely new level in their exams. They derived additional benefits from having to work on a concrete problem.«

The model of the telephone, i.e. a drawing with appurtenant explanations, was created in the course of a single day, during which the group was guided through an innovative process.

»We were forced to think in a tremendously creative way – and to do it quickly,« says Christina Andersen.

The five group members have taken the exercises along with them in their studies. »We have learnt that we must remember to think outside the box, and that the direct approach is not always the best one.«

**»WE HAD
PRECONCEIVED
NOTIONS ABOUT
ONE ANOTHER, AND
EVERYONE FELT
THAT THEIR
DISCIPLINE'S WAY
OF DOING THINGS
WAS BEST«**

– Student
Gunhildur Kristjansdottir

METROPOLITAN UNIVERSITY COLLEGE



The two occupational therapy students, Heidi Klysner (left) and Gunhildur Kristjansdottir (right), were given a difficult challenge to solve together with Christina Andersen, BA in Health and Nutrition (middle), and two nursing students.

THE CUSTOMER

»We would never have come up with the idea of making a mobile phone ourselves.«

At the Bispebjerg Rehabilitation Centre Naia Jacobsen was involved in formulating the problem that the students were tasked with solving. The hope was that the group would provide some fresh impetus. However, she had not expected them to deliver a usable solution. Because, according to Naia Jacobsen, the mobile phone can be used, particularly when citizens have to move from the Rehabilitation Centre to their own homes or to a nursing home.

»That's when the telephone is really smart because it enables the staff to film exercises, which helps the citizen, or speech problems that the staff need to keep an eye on,« she says. »It is difficult to include all the observations and nuances in written records. Information can get lost. That's why it is such a big help when others can view it.« Naia and the department's other employees who monitored the group's efforts got something out of the project as well.

»It was very inspiring to work with them. We were given an impetus to alter our practice, and we would never have come up with the idea of making a mobile phone ourselves.«

WHAT?

In February 2011, the Bispebjerg Rehabilitation Centre assigned five students in the healthcare professions at Metropolitan University College a problem that was to be solved in an interdisciplinary fashion.

HOW?

The group spent a week observing at the Rehabilitation Centre in order to immerse themselves in the problem. The group was then guided through the innovative process in the course of a day by means of the KIE model (see page 19, ed.). The result was a model for a mobile telephone that could help staff members and citizens.

WHY?

In 2010, Metropolitan University College received a grant from the Danish Ministry of Children and Education and Young Enterprise Denmark to create a healthcare innovation. In 2012 the school will get the news whether a larger project application will make it possible to put the telephone into production.

1

FROM **FIXED** SCHEDULES TO **DYNAMIC** ACTIVITIES

Make organizing the teaching more dynamic, and seize the opportunities that emerge in the process. Strengthen improvisation.

3

FROM **THEORETICAL** KNOWLEDGE TO KNOWLEDGE APPLIED IN **PRACTICE**

The pupils use theoretical knowledge as basis for conceiving and developing practical solutions to actual, concrete problems.

5

FROM **FICTITIOUS** PROBLEMS TO **REAL** CHALLENGES

Motivate the pupils to explore the reality instead of just inventing problems to be solved.

2

FROM KNOWLEDGE ACQUIRED IN **THE CLASSROOM** TO KNOWLEDGE OBTAINED **OUTSIDE THE CLASSROOM**

Learning takes place everywhere – both in the classroom and in the world surrounding us. Today, children and young people get information from many sources, and the outside reality plays an increasing role in teaching and learning.

4

FROM RIGHT **ANSWERS** TO **OPEN QUESTIONS**

The pupils should not just be encouraged to give the right answers, but also to act as inquisitive anthropologists and reporters who bring in new, valuable knowledge that may be used to ask new questions.

TEAR OUT AND HANG UP



TEAR OUT AND HANG UP



STEPS TOWARDS MORE INNOVATION IN TEACHING AND LEARNING

6

FROM **PASSIVE** LEARNING TO **ACTIVE** INVOLVEMENT

A move from a passive, receiving pupil to an active, creating pupil. The pupils should get involved in generating new knowledge and new solutions.

7

FROM LEARNING WITH THE HEAD TO LEARNING WITH THE ENTIRE BODY

The teaching should even inspire the pupils to touch, smell, and feel instead of just reading in a book or looking at a screen – as this creates shared images on the retina.

9

FROM THE TEACHER AS OMNISCIENT EXPERT TO THE TEACHER AS FACILITATOR

The teacher should help bring about new knowledge instead of just recounting old, familiar knowledge. The teachers are responsible for their methods and should use many different techniques and tools in their teaching.



ABOUT DORRIT SØRENSEN

MA (Education) and master in project and change management. She is a consultant and senior lecturer at Metropolitan University College. Dorrit Sørensen has worked with innovation and entrepreneurship in the field of education since 2004 and has developed several innovation models for use in teaching. She develops and teaches education programs and courses and gives talks about innovation and entrepreneurship to school managements and others. Dorrit Sørensen has participated in the development and teaching of the Pioneer Education, which is a part of the Pioneer Campaign.

8

FROM **INDIVIDUAL** PUPILS' WORK TO **JOINT** PROBLEM SOLUTION

Instead of prioritizing individual work from the pupil, put the problem in the centre ever so often, and let all the pupils contribute knowledge to solving the problem together.

10

FROM FORMAL **CLASSROOM** TO **EXPERIMENTAL WORKROOM**

The classroom is a laboratory for experimenting, and there should be room for making mistakes.

Senior lecturer Dorrit Sørensen and entrepreneur Nicolai Seest have compiled teachers' experiences plus their own knowledge into this short checklist, which is not an either/or but a both/and. Allowing for both tradition and innovation.



ABOUT NICOLAI SEEST

Entrepreneur and business developer, formerly chairman of the Danish Entrepreneur Association, Nicolai Seest has started a handful of businesses and has been business coach to more than 300 business owners. Based on both his own and others' entrepreneurial experiences, he develops pedagogic tools, courses, and education programmes focusing on promoting entrepreneurial competencies. Through his company Hands On Business, Nicolai Seest has participated in the development and project management of the Pioneer Campaign, which the Pioneer Magazine is part of.



Dorte Fensteen Nielsen teaches at the Free Upper Secondary School Copenhagen.

THE UPPER SECONDARY SCHOOL TEACHER

THE NECESSARY DISCOMFORT

By PETRINE ELGAARD //
Photographs: NICKY BONNE

**»IT IS WHEN
THE PUPILS FIGHT
BACK THAT
INCREDIBLE
THINGS HAPPEN«**

– Dorte Fensteen Nielsen

Dorte Fensteen Nielsen formerly saw herself as a Danish and English teacher. Now she is mainly just a teacher.

The first time Dorte Fensteen Nielsen tried innovative teaching she turned an upper secondary school class loose on the topic of trafficking in women. Neither she nor her colleagues had any idea what would come of the project when they embarked upon it. But the pupils went mad for working in this way, and their common goal became to stage an event in downtown Copenhagen in order to get passers-by to think about the subject of trafficking.

»It was not a particularly nice sensation to let go of the reins and allow the pupils to manage their own activities,« says Dorte Fensteen Nielsen.

»There was a moment when I thought: 'Nothing is happening'. But then the pupils suddenly got moving. They sought out the knowledge themselves and put it into action; it was fantastic.«

Three years have passed since that first project, and the upper secondary school teacher now applies the innovative approach to both large and small assignments in her teaching.

Now the challenge is no longer losing control, but rather being a part of developing new and surprising processes.

»The discomfort of the unknown is simply going to be there whenever we work innovatively. It is when the pupils fight back and get out of their comfort zone that incredible things happen.«

That the projects force Dorte Fensteen out of her own comfortable habits has changed her views on what it means to be a teacher as well.

»Now I think more pedagogically and didactically rather than within my subject area. My perspective and academic territory have been opened up, and I trust the pupils more.«

She feels that when something goes wrong, good things can be taken from that as well.

»If I take a chance in a subject, and it doesn't work, it's important to learn from that. I talk with the pupils about why it didn't work. The ability to use the mistakes constructively has eliminated my fear of being unable to succeed as a teacher.«

Dorte Fensteen Nielsen's best advice to other teachers who are embarking on innovative teaching: »Stay with it, keep your spirits up, and believe that you are doing the right thing.«

THE PRIMARY AND LOWER SECONDARY SCHOOL TEACHER

POSITIVE CHAOS

»THE BEST THING IS TO SEE THAT MY PUPILS ARE LEARNING SOMETHING IN A COOL WAY. THAT IT WORKS«

– Jesper Storm Nørskov

Innovative pedagogy means a great deal to Jesper Storm Nørskov – both in the classroom and at home. It has taught him to be more open and to enjoy being a bit superfluous.

A good topic is important, even very important. That's why, when Jesper Storm Nørskov starts the pupils out, the project proposal is always completely different from what they are used to. 'It's damn weird' was one topic he presented to an 8th year class. But it was up to the pupils themselves to determine what it was that was weird, to whom it was weird, and what could be done about it.

»It gets them to think and to apply their creativity and academic knowledge,« says Jesper Storm Nørskov. He has been working with innovative pedagogy for the 12 years he has been a teacher. Some of the projects have been small, others so big that they end up in the local media, like the joint sports day that his pupils arranged for the 8th year classes of

an entire municipality, or the concert to which the entire town was invited.

»The best thing is to see that my pupils are learning something in a cool way. That it works,« he says.

»When they forget that they are on their break and just keep working, or if I feel a bit superfluous, that's when I know the teaching process is succeeding.«

The inherent unpredictability poses a challenge that Jesper Storm Nørskov embraces.

»It's positive chaos, and it requires me to listen to my pupils and adopt their ideas when those ideas are better than mine.«

Innovative pedagogy is very important in his life, not only professionally but personally as well. He also applies it when he meets other people and when he spends time with his children.

»It permeates everything for me and has taught me to be more open and curious and to accept new challenges when they arise. Not just as a teacher, but consistently,« says Jesper Storm Nørskov.



Jesper Storm Nørskov is a teacher at the city school, Frederiksborg Byskole, in Hillerød, and an innovation consultant for the Center for Educational Resources.

ENTREPRENEURSHIP DOES NOT **JUST** HAPPEN SPONTANEOUSLY

By RASMUS THIRUP BECK //
Photograph: NICKY BONNE

**»THOUGHT
WITHOUT ACTION
IS FRUITLESS«**

– PhD Anne Kirketerp

PhD Anne Kirketerp has done research in the field of ‘entrepreneurship didactics’ – the idea that thoughts and actions must go together in education.

Danish students are generally not adept enough at taking action. They possess plenty of knowledge but have difficulty turning it into anything concrete.

However, the general conclusion reached in Anne Kirketerp’s doctoral thesis is that their teachers can change that with a few relatively simple interventions. She refers to her field as ‘entrepreneurship didactics’ and feels that ‘innovative didactics’ are just empty words, as all education should be innovative from the outset.

»Entrepreneurship didactics consists of education that quite concretely supports the ability of pupils to convert their knowledge into joy for both others and themselves, and it includes the teacher requiring them to take action,« explains Anne Kirketerp, who is the Head of Development at the Centre for Entrepreneurship and Innovation at Aarhus University.

She draws her inspiration in part from Babson College in the USA, which is renowned for turning out new entrepreneurs. The students there are rewarded for taking an active role in their education, and, as a permanent feature of the curriculum, the first-year students each receive 3,000 dollars to establish a business.

»They say: ‘Thought without action is fruitless.’ The point is that they force the students to do something,« says Anne Kirketerp, who goes on to explain that teachers who work on entrepreneurship will also discover that these sorts of concrete, physical assignments will often bring into the fold the one-fourth of the class that normally sits at the back of the room daydreaming or being disruptive.

One of the tools that the teacher can use is the so-called ‘Push model’, which is one of the main results of Anne Kirketerp’s research.

The model shows how the teacher helps the pupils to convert thoughts into transformative action through a demand for action – or ‘push’.

»At present the educational system is bypassing a large group, mainly boys, because they are not geared towards sitting and listening. This boy/girl problem cries out for entrepreneurship didactics, which can enable the pupils to understand what they are to use their education for,« she explains.

A LITTLE PUSH WITH A BIG EFFECT

EXAMPLE 1

You sit through four class sessions and hear about different business methods. You have no business ideas and do not know how you are supposed to apply this information. Afterwards you go home and forget what you have heard.

RESULT: No learning, or just blocked learning, as there has been no altered thinking or action.



Anne Kirketerp
 Head of Development,
 PhD, Aarhus University,
 Centre for Entrepreneurship
 and Innovation

EXAMPLE 2

The same four class sessions, but this time you already have a business idea and automatically relate that idea to the possibilities presented by the instructor. Afterwards you go home and think about what you want to do personally.

RESULT: Expectant learning and altered thinking about a subject area.

EXAMPLE 3

The same situation as in Example 2, except that the instructor concludes by saying: »I would like you to describe the type of business method that best suits your business idea. Your answers must arrive by e-mail in ten minutes.«

RESULT: The topic becomes something that enables a change in thinking.

EXAMPLE 4

The same situation as in Example 3, but now you are also 'pushed' to take concrete action in relation to your business method, e.g. to actually start up your business.

RESULT: Altered thinking and behaviour.

📌 **SOURCE:** "Entrepreneurship in education – theoretical and practical implications", Anne Kirketerp, PhD



THE BIGGEST DIFFERENCES BETWEEN TRADITIONAL TEACHING AND INNOVATIVE LEARNING

- ④ Conscious effort to promote the creative, innovative, and enterprising mindset and competencies of the participants
- ④ An awareness and linguification of the assigning of value to the ideas that have been developed
- ④ The participants learn how to prioritise, systematise, and categorise the large volume of ideas
- ④ The product must have significance for someone other than the group, class, or school
- ④ Concrete problem sets formulated by outside parties are worked on
- ④ The participants become aware of the importance of networking
- ④ The participants work with prototyping
- ④ The participants practice 'performing' ideas

THE KIE-MODEL

INCORPORATING INNOVATION INTO THE SYSTEM

By IRMELIN FUNCH JENSEN
and EBBE KROMANN //
Photograph:
RICKEY JOHN MOLLOY

How can a pedagogic mindset involving keywords such as creativity, innovation, and entrepreneurship be used in education in a way that works for every subject in the educational system? Two teachers present their pedagogic and didactic tool.

The Danish government clearly has a desire for all Danes, from nursery school to PhD level, to work with innovation in the course of their education. But how does the teacher accomplish this, when creativity and innovation are normally characterised by the atypical, i.e. the unmeasurable, the chaotic, and thus a departure from traditional teaching?

We have developed the pedagogic and didactic KIE model, a dynamic model that provides the framework for innovative teaching and, in turn, innovative learning by the participants.

It has been tried in practice in basic education, youth education, and higher education in Denmark, and has now spread throughout the entire country, partly as a result of the Danish Ministry of Children and Education's Pioneer Campaign. It is also being used in Estonia, Finland, and China.

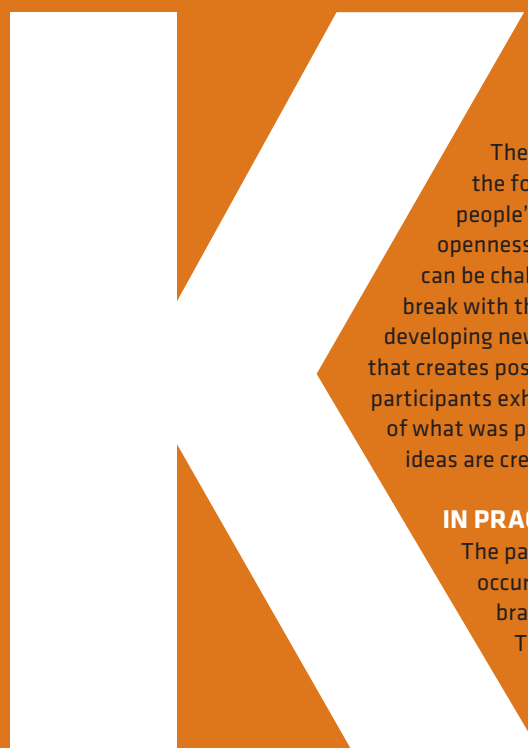
The KIE model is composed of three separate 'learning environments': the creative, the innovative, and the enterprising. This is a dynamic model rather than a phase model.

✎ **Irmelin Funch Jensen**, senior upper secondary school teacher at Rungsted Upper Secondary School and owner of the CreateAndLearn company, with innovation as the core. Has conducted many workshops on the use of the KIE model in practice (including in China), innovation management, and the innovative organisation.

✎ **Ebbe Kromann**, senior lecturer, the department of schools and learning and research & development, Metropolitan University College, Copenhagen. Has conducted over 100 courses on the KIE model in Denmark and given lectures and workshops concerning innovation in practice abroad, including in China.

Irmelin Funch Jensen and Ebbe Kromann are authors of numerous books about the KIE model for use in primary and lower secondary school, upper secondary school, and in higher education.





THE CREATIVE LEARNING ENVIRONMENT

The participants are playful, impulsive, and conceptually creative; the focus is on divergent thinking. The participants go along with other people's ideas and contribute their own new ones, an approach that requires openness and empathy. There are no judges, and all ideas are welcome. This can be challenging for teachers and participants alike. Creativity attempts to break with the traditional, habitual ways of thinking by generating ideas and developing new problem sets. What we have here is a totally new way of thinking that creates possibilities for the participants, and often for the teacher as well, as the participants exhibit their latent powers of innovation. Possibilities outside the realm of what was previously imaginable will now unfold. It is here that the multitude of ideas are created and grappled with.

IN PRACTICE

The participants work individually and in groups to create ideas. This can occur with the help of, for instance, picture cards, role cards, or reverse brainstorming based on a topic chosen by the teacher or an outside party. There are no naysayers in the creative learning environment. The point is to be open to ideas, go along with ideas, think big, and use one's imagination. The ideas will typically be jotted down on post-it notes, which will be put up during the process. The teacher is a facilitator who establishes the framework for the creativity of the participants.

THE INNOVATIVE LEARNING ENVIRONMENT

Drawing on the logical and analytical. Here the participants are systematic, explorative, linear, rational, and more detail-oriented; the focus is on convergent thinking. The creative ideas must be transformed from a learning standpoint. This means that the participants must exercise their skills in using selected ideas and academic standards in a fruitful context with a view to realising and creating visions or solving problems. The creative idea is also ascribed a value, not necessarily a narrow financial value, but rather a general value in terms of benefiting others. In working with innovation, the role of the teacher is altered from that of an omniscient teacher at the chalkboard to that of a process facilitator and academic consultant. Along with the participants, the teacher will not just consume knowledge, but also be able to produce new knowledge.

THE ENTERPRISING LEARNING ENVIRONMENT

The participants are turned outward and action-oriented. Here the innovation is concretised in terms of putting the idea out into the world in a form that others can use. Here the participants must practice 'doing competence' through a concrete realisation of their idea. Here they practice decisiveness, taking responsibility for the group decisions, and getting out into the world through concrete action. Being enterprising means taking the initiative, reifying something that has value in concrete form.

IN PRACTICE

The participants now have their idea, which has been thought through thoroughly and must be realised so that it benefits others. They must, for instance, present their material to an outside party. If this happens at the place of learning, they may need to find a suitable location and make sure that the necessary facilities are at hand. If it is to take place at the outside party, agreement must be reached as to when and where. Prototypes must be polished up before the process begins. It may often be necessary to go back into the creative learning environment to come up with ideas for a good presentation.

IN PRACTICE

The participants typically work in groups and commence by forming an overview of the subject content. This is typically done with the help of mindmaps. The pupils are urged, for instance, to assess what is good about their idea and what could be done better. They immerse themselves in their topic and use the teacher as an academic consultant. Using other worksheets, they gradually form an opinion as to how their work could be made as valuable as possible for others. During this process, the teacher facilitates by means of relevant worksheets and ensures that the proper academic standard is maintained.

INNOVATION AROUND THE WORLD

In each issue of the Pioneer Magazine, we bring an example of a new way to work with innovation in education. In this issue, we take a trip to Sweden.



Tilde Björfors, director of Circus Cirkör, believes that the school must rouse the pupils' curiosity.

Photograph: Emilia Bermark-Jimenez.



YOU CANNOT HAVE YOUR HEAD ELSEWHERE WHEN YOU HANG ON A TRAPEZE

The Swedish Circus Cirkör teaches the creative potential of acrobatics to office workers and schoolchildren alike.

● By RASMUS THIRUP BECK // Photographs: CIRKUS CIRKÖR

A juggler must focus totally on keeping the pins flying. If he doesn't, he will invariably drop them. And for the acrobat hanging on a trapeze ready to catch his partner, a split second of distraction could be fatal. Conversely, if you master such intense concentration, not only can you impress an audience – you may also perform better in your life in general. This is one of the basic premises behind Circus Cirkör's work with schools and universities in Sweden.

»When you put a strain on your physical limits, a certain risk is often introduced. For this reason you have to involve yourself. It won't work if your mind is somewhere else,« says the manager of the circus, Tilde Björfors. On top of that, acrobatics, especially in the so-called contemporary circus

version, which has inspired Circus Cirkör, is very creative. Circus performers seek constantly to do something that hasn't been done before. »Actually, risk and creativity are linked together,« says Tilde Björfors, who helped found Cirkör and today has the title of circus director, and she continues: »When you are 100 per cent involved, you are also more open to improvisation – with intent to create. When you create, you are also at risk – you are doing something no one has done before.«

COLLABORATION WITH AN UPPER SECONDARY SCHOOL

Like other circuses, Circus Cirkör gives performances and goes touring – they sell between 70,000 and 100,000 tickets every year. But the troupe puts just as much focus on making the circus a part of life outside the ring. They teach 'office acrobatics' to company employees, train school teachers in using contemporary circus in their teaching, hold courses in universities, and run their own upper secondary circus school. This contemporary circus school has 40 pupils and is run in

LET THE BODY TEACH – THREE GOOD EXERCISES

One of the fundamental principles of Circus Cirkör's teaching is that you can use the body to learn and perform intellectually. Tilde Björfors gives three concrete examples from the work of her troupe:

- ❶ There is no scientific explanation, but juggling helps one's mathematical thinking. Circus Cirkör has successfully taught math teachers in lower secondary schools to use juggling in class. In several places, the pupils juggle before taking a test.
- ❷ If you want to give the pupils a really good lesson in collaboration, ask them to build a human pyramid. Everyone joins in, and they are forced to cooperate.
- ❸ We all know situations where you just cannot get started on a task or a problem. Circus Cirkör teaches company employees to do acrobatics to recover their energy. They call it 'office acrobatics'.



cooperation with the alternative St. Botvid upper secondary school south-west of Stockholm. St. Botvid takes care of all the traditional subjects, such as math and Swedish, while Cirkör takes care of all the artistic subjects. Contemporary circus is a great help to the pupils – especially those who are not made for traditional teaching. This point is pivotal to the circus director, who herself had a hard time when she went to school.

»WHEN YOU PUT A STRAIN ON YOUR PHYSICAL LIMITS, A CERTAIN RISK IS OFTEN INTRODUCED. FOR THIS REASON YOU HAVE TO INVOLVE YOURSELF.«

Cirkusdirektör Tilde Björfors

IT CLICKED IN PARIS

»You must sit still, and everything is split in right or wrong. That was very hard for me. I was very curious and eager to

learn, but I didn't like doing it the way I had to in school. Later, I came across the 'contemporary cirkus' in Paris, and it just 'clicked'. There you learn with your body, and there are no rules,« she tells.

The perpetual pursuit of what is possible should also be part of the school, the people behind Circus Cirkör believe, but this is far from the case today. »Actually, what I see is that it is the first thing that gets killed when you are only taught on the basis of what is right or wrong,« Tilde Björfors asserts.

Her point is not that traditional teaching should be thrown out with the bath water – but rather that the school should preserve the pupils' curiosity. The two teaching methods should complement each other.

🌐 www.cirkor.se

INNOVATION AROUND DENMARK

Innovation projects go on all over the country. We have plotted a small selection on this map and hope you will be inspired.

'STRENGTHENING ENTREPRENEURSHIP CULTURE', AALBORG UNIVERSITY

A unifying initiative for the educational institutions in the northern region of Denmark with an aim to strengthen the entrepreneurial culture. It brings the most recent knowledge from the university to all educational levels from primary school to university.

KAOSPILOTS, AARHUS

The KaosPilots is a three-year-long education with a focus on learning by doing through client assignments from entrepreneurs, consultants, leaders, and thought leaders. The KaosPilots focus on four creative disciplines: Project Design, Process Design, Business Design, and Leadership Design.

THE 'INNOVATION AND TALENT' PROJECT, NORTHERN JUTLAND

The 'Innovation and Talent' Project will enable post-compulsory education in Northern Jutland to offer challenging and different teaching and learning with an aim to create a rewarding and inspirational education for specially gifted pupils and to facilitate their transition as they advance in the educational system.

TEACHER TRAINING PROGRAMME, COPENHAGEN

Metropolitan University College offers all students in the teacher training programme an opportunity to take part in 'solutions camps' involving assignments given by outside partners.

THE ENTREPRENEURSHIP SCHOOL, IKAST-BRANDE

The Entrepreneurship School is a venture by Ikast-Brande Municipal Council. It covers primary and lower secondary schools as well as vocational upper secondary schools. The purpose of the project is to develop a culture where children's and young peoples' learning is built on innovation and creativity.

INDEPENDENT STUDY PROGRAMMES, REGION ZEALAND

Post-compulsory education in Region Zealand is seeking to encourage innovation, entrepreneurship, and a culture of independence by offering direct professional assistance to pupils as they implement or develop initiatives. Every pupil is offered at least one activity per school year.

ISI 2015, ODENSE

Five primary schools in Odense participate in the project ISI 2015 - innovation, science, and integration. The project focuses on multicultural schools and examines whether innovative methods in science may result in more students from ethnic minorities choosing upper secondary science programmes.