

Educating free citizens for the 21st century - On innovation in education

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Introduction

There is a broad consensus, all over that world, that education is essential. In the UN's Sustainable Development Goals, agreed by leaders from all countries, quality education for all is goal number 4. Governments have quality education on top of their priorities, and states compete with each other in the PISA surveys, as if it was a world championship. Parents see education as essential for the children's success in life.

In that sense, education is a huge success. Education is good, and more education is even better. The problem worldwide is that millions of children do not get even primary education, and the quality of education in many countries is so bad that children leave schools as illiterates. Even in rich countries with comparable excellent schools, there are problems with stress, depression and drop out. In that sense, education has still not succeeded, and, therefore, quality education is one of the sustainable goals.

We do need more education and better education. And we need new education models to support the young generation for life in the modern world. We need the innovation of education. In this article I will discuss why the present mass education model does not meet the demands of today's world, why it needs to innovate. And I will describe the most critical areas of innovation.

Innovation is already happening: in progressive schools all over the world; in progressive school reforms in countries like Finland and Singapore. EdTech companies provide new services, that can be integrated into existing school models or delivered directly to the homes. But still, a school is a school, recognizable for a person from 200 hundred years back. Schools are conservative institutions with a circular, ritualistic, repetitive rhythm. In my more 45 years as an educator, I have been discussing the need for innovation of education right from the beginning of my career. But the situation is different now. Change and innovation have become urgent because of the rapid changes in our societies and of the planet.

In this article I will only discuss general education (K-12), as in my field of expertise, even though I think the need for innovation is equally vital in higher education.

The article is based on my experience as an educator in Denmark (I was the founding high school principal at Oerestad Gymnasium in Copenhagen) and in India, where I am the founding director Chaman Bhartiya School in Bangalore. I have collected inspiration from colleagues and friends in the Global Schools' Alliance and Ashoka Changemaker Schools.

1. A glimpse of the future of education?

The lockdown of countries all over the world because of the Covid-19 pandemic has meant the closing of schools for an undefined period. Education systems have reacted in different ways. In developed countries and affluent schools in developing countries, schools have provided online learning. In many states, this has only been possible for some schools. In India only well off private schools have been able to provide online education for the children.

It has been impressive to see how fast schools have been able to provide online learning, even schools with minimal experience in learning with technology. Schools have been using online platforms like Google Classroom, iTunes U, Zoom, LMS apps and even YouTube. Some schools have worked with EdTech companies to provide more advanced forms of online learning.

These experiences show that learning is possible without the conventional setup with classrooms, blackboards, rows of tables and chairs and with a teacher in front of the class in charge of everything.

The experiences are, in many ways, limited. The schools move their traditional teacher-centred teaching models to the cloud. The teacher instructs, provides additional audiovisual or textbook-based materials, and then the learners work on their own with assignments. On line, learning has been a combination of digital instruction and traditional home assignments.

There are not many examples where schools have organized personalized learning or project-based learning. It could have been done with the help of digital technology, though.

The experiences with Covid-19 education show on one side how vital schools are in the life of children and families. Children and young people are social creatures, and their community of friends define their world, and being away from them has been traumatic. Digital and physical proximity are two very different things, and even though the digital connection is better than no contact, it cannot substitute physical nearness. Learning is also a social activity, and with the individual assignments, the learners do not experience the collaborative aspect of education.

Schools are essential for the social and emotional development of the child. But the experiences during the Covid-19 lockdown also show that the schools must do a lot more to equip children and young people for extreme situations like this.

Many teachers report that more students than usually do not attend online classes or acts very passively. Especially children from challenged social backgrounds, where parents cannot or do not encourage children to take part in online learning are left behind with the present online learning models. But online learning shows that learning without a school building and with another role for teachers and students is possible, and with more intelligent use of technology could also bring changes to schools beyond lockdown.

In some countries, there is a lot of optimism around online learning, and some ask if schools, as we know them, are still relevant. My answer is, yes, schools are still needed. But only if they implement technology and change the teaching methods to a more child-centred approach, and only if they have a more holistic approach to children where they emphasize the development of empowerment and empathy.

2. The industrial mass education model

Education takes place in a school: a building separated from the community and the production system; classrooms behind closed doors with rows of tables and chairs, a blackboard and a teacher in front, a school day with subject-based lessons, a test and exams system. Education is compulsory in most countries.

This school model emerged with the industrial revolution and the creation of nation-states. Before industrialization, education was integrated with production (with the family or through apprenticeship). Schools became necessary when societies became more complicated. There was a need for elementary skills for every citizen and a selection process for the best heads to attend further education. And there was a need for institutions to impose citizenship, pride in national cultures and acceptance for authority and law in the new nation-states.

The instruction model in this institution was from the beginning one-sided. Within a well-defined curriculum, it was the teacher's task to impose necessary skills and social values on into the heads of the children. Obedience towards authorities was a primary value. Participation and innovation in society and production were for the further educated élites.

Even though contemporary schools have changed – more interaction, more creativity, less direct authority – schools are still based on the same curriculum, subject and teacher-centric model. In many ways is reasonably efficient in doing its job: it selects candidates for the élite, it teaches fundamental skills for all citizens, and it is – often indirectly and unconsciously – an arena for individual and social development and citizenship.

There are many signs, though, that this education model is outdated. We should not mistake the worldwide popularity of education as proof of the high quality of the mass education model. The model bears signs of a deep crisis facing internal as well as external problems.

Schools do not work for a large number of students. Many schools, especially in low-income communities, have very high dropout numbers. Many children, even in rich countries, leave schools as functional illiterates. Schools have become very competitive environments, and also the best students have symptoms of stress and depression.

The mass education model is for average students; but with the complexity and social stratification of society, it has become tough for teachers to find a relevant average. Teaching becomes more and more irrelevant for more and more students because the model cannot personalize instruction for the individual needs of every single student. The best students are not challenged, the weakest do not participate, and the middle does not exist. Therefore, in many countries, external tutoring in late afternoon and evenings is very common to prepare children for the challenging exams and entry tests.

Schools still give most children necessary skills for further education and citizenship, and through the exams system, they select and distribute candidates for the élites of societies. And they take care of the children, while the parents are working. But universities and colleges complain that the students do not have the competences they need in further education. Companies complain that they do not have the required competencies in the workplaces and that too much learning and unlearning must take place in the workplace. And the learners show signs of fatigue, depression and stress, even before life has started.

Of course, universities and companies have always complained. Last year's students have always been better than present year's students. But there is more to it than just the usual complaints:

- Do schools support all children in their character building and social and emotional development? Do they empower children for the lives they live and will live?
- Do schools develop empathy and citizenship for the local and global community?
- Do schools prepare the children for life-long learning in the rapidly changing world?

3. Today's context for education

The mass education model prepared children for the industrial revolution and the nation-state. Even though the modern capitalist nation-states were rapidly changing societies compared to the pre-capitalist societies, compared to the changes and challenges we see today, they were stable.

The context for schools is a world with rapid and accelerating change. These changes have an impact on every aspect of our lives, our social relations, the workplace and job market, the physical environment (urbanization and large cities) and the social stratification of society. Schools cannot prepare for a life with a defined career (the future jobs have not been created yet) and lifelong employment in one or a few companies, a given family structure, given shared societal values. Schools must prepare for thriving with change and uncertainty.

Exponential growth in information and the easy access to information makes it futile to try to cover all critical aspects of knowledge. Nobody can. Even what is accepted as knowledge is changing with new scientific concepts developing. Schools should create the illusion that they can cover the basic knowledge of everything. There are still foundational literacies that schools need to include (literacy and language, numeracy and mathematics, science, social science). But schools dedicate much more effort to let students find, evaluate, create and communicate knowledge.

VUCA is a concept that describes the world of the 21st century:

- volatile;
- unpredictable;
- complex;
- ambiguous.

To develop life skills and orientation compass for living in the VUCA world is an essential task for education. If schools teach as if they were living in the pre-VUCA world, they do not support the children for the life they are and will be living.

The planet is facing global challenges that will need to be solved if the earth will survive:

- globalization and interconnectivity vs isolation and nationalism;
- the concentration of wealth in the hands of the richest
- digitalization;
- advances in biotech;
- immigration;
- the erosion of global and national institutions;
- the decline in social cohesion.

The Covid-19 is an instructive example of the challenges we will be facing. It took the world by surprise, and within a very short period factories, shops, schools, transport and borders were closed, and people were told to “stay home stay safe”, and to work from home if possible. People and companies needed to adapt to the new situation very quickly and to find new solutions for mundane problems. Researchers all over the world were working to develop a vaccine for the virus. Health authorities were to give instructions and regulations about a virus; they were only gradually getting to know.

These challenges have an impact on every level and every sector of every country. On every level, there will be a need for problem solvers and innovators, that can find solutions to these challenges. Government decrees alone cannot solve the problem without scientific knowledge about the specifics of the global challenges and without innovative people to implement them.

4. The challenges to the industrial mass education model

The VUCA world changes the industrial mass education model. Will this model be able to contain the necessary changes in education, or will school need to disrupt to give room for these changes? Many schools worldwide have implemented radical progressive changes, but they are still exceptions from the general rule, that schools are what they have always been. The innovative changes in schools are dependent on individuals with enthusiasm and fighting spirit, and schools normalize when these people get tired or relocate.

In the VUCA world education needs to focus on the personal, emotional and social development of the child; but mass education with classes of 20-35 students and with an organization of the school

day with subject-based classes does not establish a framework for developing and supporting the child's character building.

To unfold the talent and passion of every child and to ensure that all students reach the goals, there is a need for personalization of education to adapt to the learning needs, learning styles and passions of every child. Schools need to be child focussed, which is difficult in the class, curriculum and teacher focused context of the mass education model.

In the VUCA world, there is a need for deep learning, problem-solving, innovation in collaborative learning environments. Such activities happen only occasionally in the mass education model. This model works with subjects taught in isolation, textbooks with a clearly defined syllabus and rigid exams, which works against deep learning and interdisciplinary problem-solving.

The isolation of the industrial school model and school building from the community and the workplace makes it difficult to contextualize learning applying scientific concepts to problems in the real world. It happens only on field trips and in special project weeks, which many teachers and administrators see as distractions from the authentic teaching and without value for the exams.

With the conventional classroom as the preferred learning arena, it is difficult even for progressive teachers to make the transition from teacher-centric to student-centric teaching and learning. Technology, when used, is used as textbooks and for note-taking tools, and not as a tool for personalized learning and collaborative problem-solving. It could happen, of course, but the physical space and the teaching culture define the activities and the roles of the teachers and the students.

The mass education model is based on the transmission of defined subject-based knowledge, not on problem solving and creativity. Children are seen as humans to become, not as individuals and citizens. In mission statements and school policies in most democracies countries, the mission of education is to develop free citizens, but that will happen, only when the syllabus has been transmitted to the child. While the transmission process is taking place, the child is an unfinished citizen. Contact with the world outside the school is a distraction. As long as they are in school, the students are not citizens that can contribute to solving problems in the community and work for the common good.

The VUCA world needs citizens and labourers that can take responsibility and solve problems in collaborative networks. Even though it could happen in the conventional schools, it does so very rarely, because it works against the primary instruction model, textbook focus and the exams system.

The joy of learning and engagement in solving essential problems in the community is the key to life-long learning that everyone needs to attend to if they will stay employable. The focus on testing and exams create an atmosphere of stress and competition, which made many students depressed and hating education. Students tend to see education only as a necessary evil, not as quality in itself. It becomes evident the closer the classes are to the final exams. The conventional school architecture is based on the prison model with closed rooms and long corridors. The instruction model is hierarchial and one-sided, which make students spectators to their education. When combined with after school tutoring, it takes the joy and happiness out of youth. Of course, joy is not excluded in the conventional school model, especially in preschool and primary school, but it seems very difficult to unfold the joy of learning in a school model where the subject and knowledge-based exams are the end goals.

Some will argue that the picture I paint of the industrial mass education model school is a caricature and outdated, and that schools have indeed changed in many countries, but I see the changes as basically cosmetic and rhetorical. Changes could happen within the traditional school model, but it is my conviction that the reason for the slow changes in education all over the world is to find in the school model itself. To take the full consequence of the new context of education of the VUCA world, and the global challenges, real disruption of the model is necessary for true innovation

to happen. This disruption can happen from within, from above (government initiatives) or from the outside through new education providers and models.

5. The meaning of education

Before I discuss the innovations that are needed for education to fulfil its role in supporting children and young people to live in the 21st century, I will define the role of education in a democracy. It is a general description, but it must take specific forms in the 21st century.

Education should be more than steps on a career ladder, more than preparing for exams that open doors to the next-door education and work life. Education is essential for a country. A high level and good quality of education make a country more competitive. Education is critical for the business community.

Qualified labour is a precondition for agility and innovation of companies. But education is more than career, economy and competences for work life. School should support children and youth in developing into free citizens with personal qualities and competencies to live a happy life in the world they live in and to contribute to the common good in a democratic society. Education is there to develop free individuals for a free society, not soldiers in the production army. I do not neglect the need for relevant competencies for work-life, because work is an essential component in a happy life. But the basis of education must be the development of the child.

There are three dimensions of education of free individuals:

1. Character-building
2. Citizenship
3. Employability

Character-building

A school must support the child in becoming a free an independent human being, with self-esteem, self-awareness, moral compass, empathy, resilience. Education must empower children, to make them understand themselves and their passions and to have the courage and resilience to insist and act on it. One becomes an individual in a social context, the individual is related to other human beings, depends on them and has an impact on them. Empathy is fundamental.

Citizenship

A free individual is a citizen. It has the right and duty to participate and act for the common good in the global community, in the national community and the local community. The citizen sees and understands what needs to be changed and feel inclined to do something about it. The citizen understands that his/her happiness depends on the happiness of the community. The citizen understands that change starts in the local community.

Employability

The free citizen will support himself/herself or do the best to be able to. Work is essential for self-esteem, the feeling of belonging and contributing. Education must help the children and young people to require the skills and competencies for further education and work-life. The workplaces are changing rapidly, and the concept of career is changing too. Therefore, a school must support the inclination towards life-long learning in all students. The 21st century competencies (the 4Cs: Critical

thinking and problem-solving, Creativity, Collaboration, Communication) defines some of the most important contemporary and future skills.

I see these three dimensions as equally essential to develop free citizens. In discussions about the future of educations, much has been said about the development of 21st century competencies. The need for emphasizing character-building and the development of citizenship is not discussed so much, even though they are still more critical in the VUCA world. Schools need to have a holistic approach to children, where character-building, citizenship and competencies for work-life are included in the objectives and learning activities.

The problem with the conventional industrial mass education model is that it does not entirely focus on any of these three dimensions. Children and youth need character-building more than ever to thrive in the 21st century. The planet needs new generations of people that can and will find solutions for the global challenges that threaten our world. Companies need innovative employees who can innovate business and develop new business models. All this is not enough. If schools fulfil their mission of developing free citizens, they have to change from content focused education to citizenship focused education.

6. Six dimensions of innovation of education

Even though innovations can take place within the industrial mass education model, systemic innovations are needed, if education will educate free citizens for the 21st century's VUCA world. As we have seen, education of free citizens has three dimensions: Character-building, Citizenship and Employability. Education must develop these three dimensions in every single student. At the same time, education must be for the masses. More children in the world need education.

Innovation in schools has until now taken place in niches, schools with visionary leaders and enthusiastic teachers. That is all very fine. But what is needed is systemic change, the innovation of education and more education. Is it possible to innovate and expand education? Is it possible to educate every single student in a holistic way and at the same time educate ever-growing masses?

Technology is key to the innovation of education. But technology cannot provide holistic education by itself. It needs a "human touch", a physical and social setup.

I see six dimensions of innovation in education:

1. Digital technology
2. The open learning hub
3. Competencies
4. Content
5. Pedagogy
6. Learning spaces

These dimensions are mutually connected. If you change them, it will have an impact on one or more of the others. Changes in one dimension affect other aspects.

It is not a new school model, but a framework for innovation schools. In the world of the 21st century, there will be a multitude of answers to the need for innovation. And there will be no final answers.

I mention digital technology first, not because it is the most critical dimension, but because it is the precondition for the other changes. Innovations in all dimensions can only happen with extended use of digital technology.

6.1. Digital technology

During the Covid-19 lockdown, we have seen more use of digital technology than ever before. It has become clear that with digital technology, you can provide teaching anywhere and anytime, without checking into a school building and without the teacher necessarily being with you in real-time. But we have also seen significant limitations in what digital technology can do by itself. And most schools that have provided online learning have not unfolded the true potentials in digital technology.

Learning 24/7

With digital technology, teaching and learning can become independent from time and space. The learner can learn when and where it is appropriate and work at his/her own pace. Digital technology can make teaching and learning less teacher-centric and more student-centric. But it is still the role of the teacher to create the framework, the learning experiences and the learning journeys, and to define the outcome criteria.

Personalization of learning

With digital technology, learning can become personalized. Teaching can be adapted to every learner: level, pace, learning style. Differentiation of education can become real because the teacher has organized learning activities for all the learners in a class and can have a dialogue with individual students while the others are doing relevant work.

With a digital textbook, audiovisual resources, updated materials from the internet, instructions from other teachers than the learner's own, the learner can find resources that make him/her understand difficult concepts. And everything can be repeated as many times as the learner needs.

The digital organization makes it possible for teachers to be in closer contact with each student and have mentoring dialogues about the challenges the learner faces. Paradoxically, digital technology can become a tool for establish human connection between learner and teacher closer than in conventional classroom teaching.

Visible learning

Digital technology can become a tool that makes learning visible for the learner and the teacher and thereby create a platform for metacognition about learning. It is easier for teachers to give individual feedback to the learner. Advanced digital learning resources have individual feedback in the app itself with instructions about how to handle the learning difficulties. The learner can create a portfolio with productions and reflections about the learning progress and challenge, which can become a standard base for learning dialogues between the learner and the teacher. By reflecting on the learning progress and obstacles, the learner learns to learn.

Tools for research and problem solving

There are worlds of information accessible on the internet that can be used to define problems and create a solution to the issues, fighting fake news and conspiracy theories with authorized and trustworthy information. There is no need for teachers to tell students what they can find themselves. But teachers must teach how to validate data. Critical thinking must be an integrated part of information seeking, information analysis and synthesis.

Tools for creation

Digital technology can help learners to become producers of knowledge, not only consumers, thanks to the production tools that combine words, sounds, pictures.

Tools for collaboration

Learning is a social activity. Sharing and collaboration is an essential part of problem-based learning. Many digital tools make it easy for learners to share and collaborate. They can collaborate in real-time, anytime and anywhere, and they can do with or without the teacher. With digital collaboration, the works of a project team can be tracked, also on an individual level, and the teacher can give feedback to the team as well as personalized feedback.

Tools for communication

While working on projects, the learners can communicate internally and externally using the many digital tools available. The learners can interact with resource personas outside the school, and they can express their results to get feedback. They can communicate using many different media of communication (emails, written documents, presentation slides, websites, social media, digital conferences, etc.). The digital resources are natural for the students, but they need to learn how to choose the right media for communication.

Tools for visualization and gamification

VR (virtual reality) and games are digital tools that help to visualize objects and situations that cannot be directly accessed (advanced laboratories, body parts, museums, countries). They broaden the world of the school and permit to apply science to real-world problems. AR (augmented reality) will help the learners to understand the object in the world. There are many AR and VR tools; but real deep learning happens when students learn how to code VR and AR apps.

Primary and high-level computer skills and data ethics

When a school starts implementing digital technology as the “backbone” of the learning activities, every learner must develop general digital literacy (necessary digital competencies) and knowledge about the use of digital tools for learning, and in particular the critical information seeking competence. They should also develop a basic understanding of data law (data protection, copyright) and ethics (digital empathy).

Implementation of digital technology in a school or a whole sector does not necessarily lead to better, more modern learning. Technology is just technology and can be introduced with many different objectives. Digital technology will change a school, but not necessarily in the direction you have imagined.

The implementation of digital technology must start with the question “why?”. For me, the answer is to develop a pedagogy that will enable the learners to become free citizens and will help the school to implement a child-focused pedagogy, that engages the learner in solving problems in the community. In that context, digital technology can change the role of the learner into being a producer and creator.

Without this reflection, digital technology will only be a tool for teacher-centric content and exams focused classroom teaching. In many ways, it might be a very efficient tool. But for me, this use of digital technology does not unfold the true potentials of the technology.

6.2. The learning hub

We identify a school with the school building. Education is what takes place inside this building. Even though there are examples of schools without a brick and mortar building, schools will still have a structure in the future. But the function should be more of “hub” for many different learning activities that can take place in the building, at home, in the community, in companies or Non-governmental organization’s (NGO) or in virtual rooms. Learning takes place in the learning space that can support the present learning activities of the child.

An open school must replace the separation between school and society. The learners will explore and solve problems in the “real” world and outside the school. The school will be open to experts from the community, companies and NGO’s; parents will be engaged in the school as resource persons (not as critical customers). The learners and teachers will be in constant interaction with the outside world through virtual connections.

When the learners start solving problems for the community, they will become resource persons, recognized as citizens in their own right, not only becoming human. Experiences from schools around the world show that children can do amazing things if the school gives them responsibility, if the teachers trust them and support them without taking over.

To become an open learning hub, each school will need to create a vast network of contact persons, companies and institutions. The school can use the contacts of the internal stakeholders (parents etc.) to open the doors of the school to different professionals. Still, schools will need to professionalize networking and give the learners networking skills, so that they can establish the necessary connections with people that can help them to solve their problems.

The reader may ask if every school in the world can become an open learning hub. Neighbouring schools might compete to get specific contacts. But there are problems enough in the world for learners to start solving, and people will help primarily children that are engaged and need support to solve the problem. If the learners take the initiative in networking, the easier way will be to establish connections. Moreover, the help is not always in the neighbourhood. Internet makes it possible for schools to connect with people all around the world that are experts in the topic that the learners are studying.

6.3. Competencies

Which competencies are crucial to become a free citizen who thrives in the rapidly changing 21st century world? Every education system and every school need to reflect on that and come with their answers. Curriculum and lesson plans should reflect these competencies, and schools and teachers should have the freedom to create engaging activities, that systematically make the learners develop these competencies.

As we have said, the competencies for the 21st century must relate to the three dimensions of education of free citizens: Character, Citizenship, Employability. Therefore, the competencies are interdisciplinary and will be developed through interdisciplinary and subject base activities. Assessment will happen through formative evaluation, personalized feedback and tests and exams.

The competencies must reflect a holistic approach. I see three strands of qualities and skills that are needed to educate free and thriving citizens:

- Personal and social qualities
- 21st century competencies
- Foundational literacies

I will not give a detailed description of the skills I find most important, but here is a list of inspiration.

Personal and social qualities

The personal and social qualities that are needed to live and thrive as a free citizen are: Empowerment, Empathy and Changemaking¹.

Empowerment

- Self-esteem, self-awareness
- Resilience
- Moral compass

Empathy

- Understanding and respecting people that are different from yourself
- Knowing your cultural background and understanding other cultures
- Cultural understanding
- Understand that when you relate to another person, you hold parts of this person destiny in your hands

Changemaking

- Courage
- Action
- Engagement in acting for “the common good” (a positive footprint)

21st century competencies (the 4Cs)

These competencies are vital in the workplace of the 21st century (the 4Cs):

- Critical thinking and problem solving
- Creativity
- Collaboration
- Communication

Foundational literacies

Knowledge is essential, even in the 21st century. The basis is for everything is the 3Rs:

- Reading
- Writing

¹ Inspired by the Ashoka Changemaker Schools network.

- Arithmetic, numeracy

Other literacies

- STEM (science, technology, engineering, mathematics)
- Social studies
- Language
- Cultural understand and global citizenship
- Sustainable living
- Financial literacy
- Digital literacy
- Aesthetic literacy
- Healthy living

The competences will not be taught as separated subjects but through a holistic approach, where the learners develop personal qualities, 21st century competencies and literacies through the learning activities.

In discussions about progressive pedagogy, some are claiming that the substitution of content-based education with competency-based education will lead to an academic decline.

There is a need for a higher academic standard, not a lower. The students must learn more, not less. Therefore, the competencies must be described very carefully and in detail and with a progression. Assessment must be an integrated part of learning so that it is clear which competence objectives have been reached, and which objectives the learner still needs to develop. The teachers must do the planning of learning activities in a way that ensures that all students meet all the goals.

6.4. Content

The subject, textbooks, tradition define the content of education. There is a need for more systematic and fundamental reflections on the content priorities in the light of the 21st century global challenges: do the curriculum and lesson plans reflect what is most important to learn for children in the 21st century?

I cannot, of course, go into details about the content of education, but its renewal should be based on these principles:

- Flexible, easy to change
- Room for teachers and learners to plan together
- Engaging, relevant
- Actual
- Authentic, mirror the world we live in
- Encourage inquiries and problem solving for the common good
- Give priority to global challenges in its local and global forms
- A combination of subject-based and interdisciplinary activities

In the world we live in, even under Covid-19, there is no topic more important than the climate changes and the crisis that will emerge from these changes. The choice of content must be seen in the prism of climate change. Not every activity should address climate change directly, but they should

directly or indirectly develop knowledge and competencies that can help the learner understand what is happening and give them incentives to contribute to solving the problems.

The UN Global Sustainable Development Goals could be a back-carpet for the content priorities of every school in the world.

The modernized content is not a substitute for science and subjects. The subject-based science is the basis for understanding the world and for the creation of solutions. A subject can, in no small extent, be taught through problem-solving activities (projects, challenges, games, production). But there will also need to be stand-alone instructions, where basic concepts are taught without necessarily connecting them to a problem (for example grammar and mathematics). Where it is possible, the learning activities should activate the learning in solving problems in the world outside the school.

6.5. Pedagogy

The pedagogy for the development of the free citizen will consist of a great variety of methods, and this is not the place to give a detailed presentation. Most of the ways are well known and implemented in many schools. But what is needed is a systematic shift of focus and support from extended use of digital technology.

Child-centred

The pedagogy will be child-centred. The development of the child is the point of departure and the goal. The child is learning with the support of the teacher.

Personalized

Teaching is personalized. In collaboration with the child, the teacher organizes learning experiences, where the child takes his/her learning journey in his/own pace and preferred learning style, and with stops and detours to explore what he/she finds attractive.

Passion based

Learning is passion-based. The learner has choices to work on topics and challenges according to his/her passions. When students are allowed to follow their passions, it will be easier for them to overcome the difficulties they may encounter on their learning path.

Activity, play and creation based

The learner is active. The teacher must organize learning activities where the learner is exploring, fighting to understand, finding solutions, events where the learner learn through play, and didactic situations where the learner creates (digital-physical, aesthetic creations), and presents his/her own work to an audience.

Feedback

Feedback is essential in all learning. The learner will get individual feedback: from the teacher, from peers, from external stakeholders. And the learner will learn self-assessment. Evaluation should cover all three dimensions of feedback, not only academics. There will be testing, but only as one of many forms of assessment. The learners will receive input for growth and feedback as a natural part of the learning process.

These fundamental pedagogical principles will take many concrete forms. Only with the help of digital technology it will be possible to implement the policies in classes of the average size.

6.6. Learning spaces

The learning spaces of the open school are not restricted to the school building. Apart from inside the school building, learning takes place in the virtual world and the world outside the school. But even in my thought that the open school must be a learning hub, the school will still be essential as a place for learning and socializing. During the Covid-19 lockdowns, it has become evident how important the school building is as meeting place for socializing among the learners and for contacts between the learners and the teachers. In this section, I will describe some of the innovations that schools are implementing².

The physical learning space is the third teacher. It can either support or be a hindrance for your school vision and teaching philosophy. It can inspire and help to form the learning activities the school wants to implement. The physical space is a vision statement.

The narrative of a conventional school building in the industrial mass education tells the story of hierarchy, teacher centrism, rote learning and isolation from the outside world. It creates an environment for instruction that consider learners as recipients of instruction and answering machines.

In the school for the 21st century, the physical space should inspire for exploration, problem-solving, collaboration, creation and critical thinking.

When new schools are being designed, or old schools renovated, the planning process must start with the “why?”, not with design ideas. If the planners do not want to innovate teaching, there is no need for innovation in school design. On the other hand, if the planners and decisionmakers wish to innovate the concept of school and the teaching methods, the innovative design of physical learning spaces sends a strong message about what kind of activities the building should contain.

The physical room is essential for the well-being of the learner. In the holistic approach of the school for the 21st century, the room must provide a safe atmosphere, homeliness, spaces that match the unique needs of every learner. The room is a pedagogical technology that provides the environment and teaching aids that are necessary: exploration, collaboration, ideation and creation, deep learning, meditation, physical activities. The environment should be inspiring and stimulating phantasy. There should be spaces that stimulate inquiries, collaboration, creation, contemplation and intimate conversation, studying and deep learning, physical activities; not necessarily as separated rooms, but areas where the activities can happen.

² This section draws heavily on materials shared by Lene Jensby Lange, Autens, Denmark.

School architecture and interior design are developing all over the world. New schools do not look like schools anymore. There is a movement from the conventional school building with corridors and classrooms to a great variety of solutions that can enable schools to innovate teaching and create a stimulating environment for the learners.

The following are some of the trends we can see in contemporary room design for schools:

- From pacifying to activating learning spaces
- From standardized to flexible and from mono-functional to multi-functional learning spaces (open learning spaces with flexible furniture)
- From class and subject organized learning spaces to interdisciplinary learning (with the staircase as an essential element)
- Areas that facilitate physical movement
- Practical workshops, innovation labs, studios
- Integration of the virtual and analogue
- Social and informal zones, corridors, stairways
- Varied decor, more soft furniture, thoughtful lighting etc. – and experience design
- Surfaces for knowledge sharing and surfaces with built-in knowledge
- Excellent facilities for teacher preparation and collaboration
- Shared use of facilities (community, organizations, institutions)

Some teachers and administrators claim that it is challenging to innovate teaching in a conventional school building. But you do not need an expensive new construction to create modern learning environments. An old building can be renovated and refurnished within a low budget.

7. Implementation of innovations

I have described six dimensions of innovation for schools. It is not a checklist or to-do list but dimensions of change that need to be carefully thought through, if you want to educate free citizens for the 21st century. I have argued that in today's context of rapid change and global challenges, there is a need for new citizenship, new work-life competencies and support for character building. Innovation in education is urgent because of the changes and challenges in the contemporary world. The planet needs global citizens who want, and can, create the necessary changes locally and globally.

Innovation in education will not happen without a significant system change. It can only happen if schools and districts start defining how they will change to meet the needs of our time, and start doing it. I hope that the six dimensions of innovation can be of inspiration, but every school and district should make their priorities.

Changes from below should be supported by system changes from the top (lawmakers and ministries). The lawmakers should stay away from detailed regulation and control of schools. They can help changing schools, by:

- Defining the essential competencies
- Making content regulations more flexible
- Giving room for deep learning and project-based learning
- Changing the content-based exams system, that is an obstacle to many progressive intentions in schools

Lawmakers should trust the teachers and administrators, and set them free to create the best school for their learners.