10 schools for the 21st century



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Introduction: Why does the 21st century need different You're reading a collection of schools for the 21st century, and you schools? may be wondering why schools in the 21st century should be any different from schools in the 20th. Are our schools unsuccessful? What is the 'measure of success' for our schools? The UK Government wants all students in England to score A* to C in the five core GCSE subjects so would this qualify as success? In 2010 only one in six students actually achieved this, in more than half of state secondary schools fewer than 10% achieved this and in 270 schools there were no students who achieved this. But for many parents success is their child achieving a place at university. Fewer than half of all students actually get there. Students themselves may feel successful when they get a job and start living a life independently from their parents. However, the number of unemployed young people has increased dramatically.

But what if all students achieved an A*-C in the five core GCSE subjects would our education system be a success then? What if every single student in the UK got into university? Could we rest, happy that the UK education system was the best it could be?

Businesses and universities have claimed that the current system hasn't prepared students for the worlds of work and higher education. Universities cite research that shows, that of the students who do get to university, almost a quarter fail to complete their degree and businesses have complained that they're taking on workers who lack crucial basic employment skills such as problem solving, team-working and time management.

However, these are all problems of the 20th century. What we are most concerned with here are those of the 21st.

The world is changing at a rapid rate. Technology has made things possible that people couldn't have dreamed of 100, 50 or even 25 years ago. It has transformed our relationship to information and to each other. Today we can find out something instantly that it used to take weeks, months or even years to find out. People thousands of miles away from each other can connect as if they were in the same room.

This world offers a great deal of opportunity but it also presents challenges. We have ageing populations – young people will have more and more people to support as they grow older. The world's economy is truly globalised, more closely interconnected than ever before. When today's students graduate they will be competing globally for their iobs.

This has had a dramatic effect on the kinds of skills in demand. Manual work and routine task input have declined, with many of these becoming automated. In contrast, the need for people that can perform tasks that are non-routine and analytical or interactive has soared. Businesses are demanding so-called 'higher-order' skills such as analysing, evaluating and synthesising information, problem solving and social and emotional skills. This will become more pressing not only for businesses, but for entire societies. If we are to develop candidates who are capable of holding their own on a global stage we simply must get better at nurturing these skills.

Both collectively and individually we are heading for an uncertain future. The world is changing quickly and education must change with it. Here we showcase a collection of schools that are rising to the challenge. We think we can learn from all of them.

High Tech High

San Diego, USA

High Tech High is a group of 11 public charter schools in San Diego. Applicants are selected by lottery according to postcode, using an algorithm to ensure that the school populations mirror the demographics of San Diego County. High Tech High is best known for its students' projects, which always conclude with a public exhibition to which the whole community is invited.

Inspiring a sustained and intergenerational culture of learning

Age range: 5 - 18 No. of students: 3,500 A visitor from Virginia asked his tenth grade tour guide at High Tech High: "Do you have homework?"
She replied, "No."
The visitor said, "Then what do you do at night when you are at home?"
The student replied,
"I finish my projects."

Why it's a school for the 21st century



In 2005, a class of students at High Tech High wrote a field guide to the flora and fauna of San Diego Bay. The students' research has since been used by environmental groups to assess the bay's health, and is available for purchase on Amazon. Since then, students have published three more books about the bay. Describing the latest volume, the Director of the San Diego Zoological Society summarised the whole project's remarkable achievement: "Part history, part politics, part biology, part artistic reflection, and all heart, this compilation is a remarkable testament to the power of projectbased learning in a complex and changing world."

The San Diego bay field guide project was designed and run by a biology teacher, a humanities teacher and a maths teacher. Collaboration like this is standard practice at High Tech High, where teachers work in multidisciplinary teams and are given planning time to develop extended projects that combine 'academic' and 'practical' work.

High Tech High projects always conclude with a public exhibition. These are crucial for two reasons: first, because a live audience provides a stronger incentive to produce quality work than teacher assessment ever could, and second, because they bring parents and other local people into the school on a regular basis, strengthening the links between school and community.

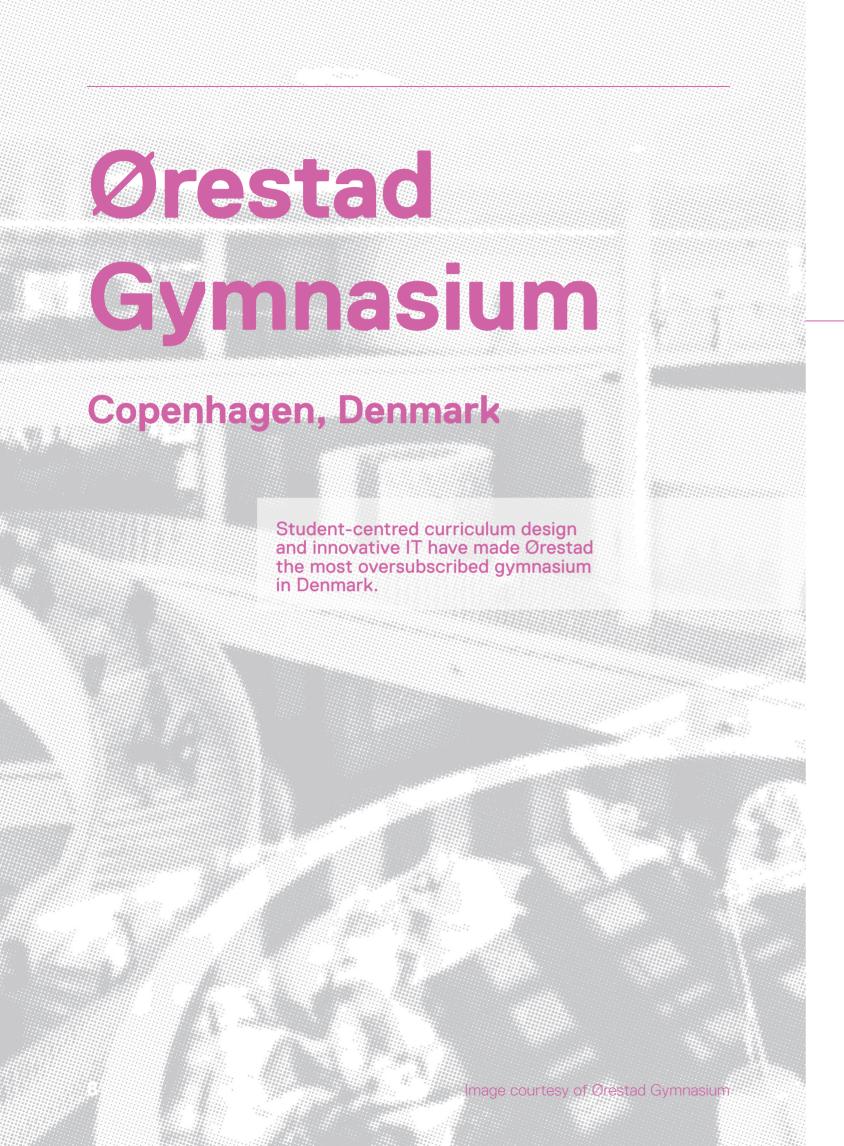
Learning for teachers as well as students:

In 2007, High Tech High opened a school of education, open to all teachers (not just those at High Tech High). The school sees itself not just as a place for disseminating knowledge but as a 'laboratory of teaching and learning for all its members', with graduate students working alongside High Tech High teachers and students to try out new ideas and learn more about how everyone learns.

The evidence that it works

99% of High Tech High students go on to university or a two-year college. 35% of these are the first generation of their family to do so.

Image courtesy of High Tech High



An 'experimentarium of pedagogy', Ørestad college learns and evolves alongside its students

Age range: 16 - 19 No. of students: 1.000

Why it's a school for the 21st century



Collaborating beyond the school walls:

Ørestad Gymnasium's curriculum, which is built around 'real-world' case studies, is designed and taught in collaboration with a range of educational institutions and media specialists, including the Danish Design School and the University of Copenhagen.

Teachers work in small interdisciplinary teams with the autonomy to try out new studentcentred pedagogical methods so that the school can test and refine new ways of teaching and learning, rather than only implementing other people's innovations.

Students are empowered by technology:

Ørestad Gymnasium's wide array of technologies gives students an unusual degree of autonomy over when and where they work, and how they demonstrate their learning. For example, podcasting allows students to combine images, text, sound and narration, and enables less outgoing students to demonstrate their skills

(in languages, for example) outside the pressure of a classroom environment.

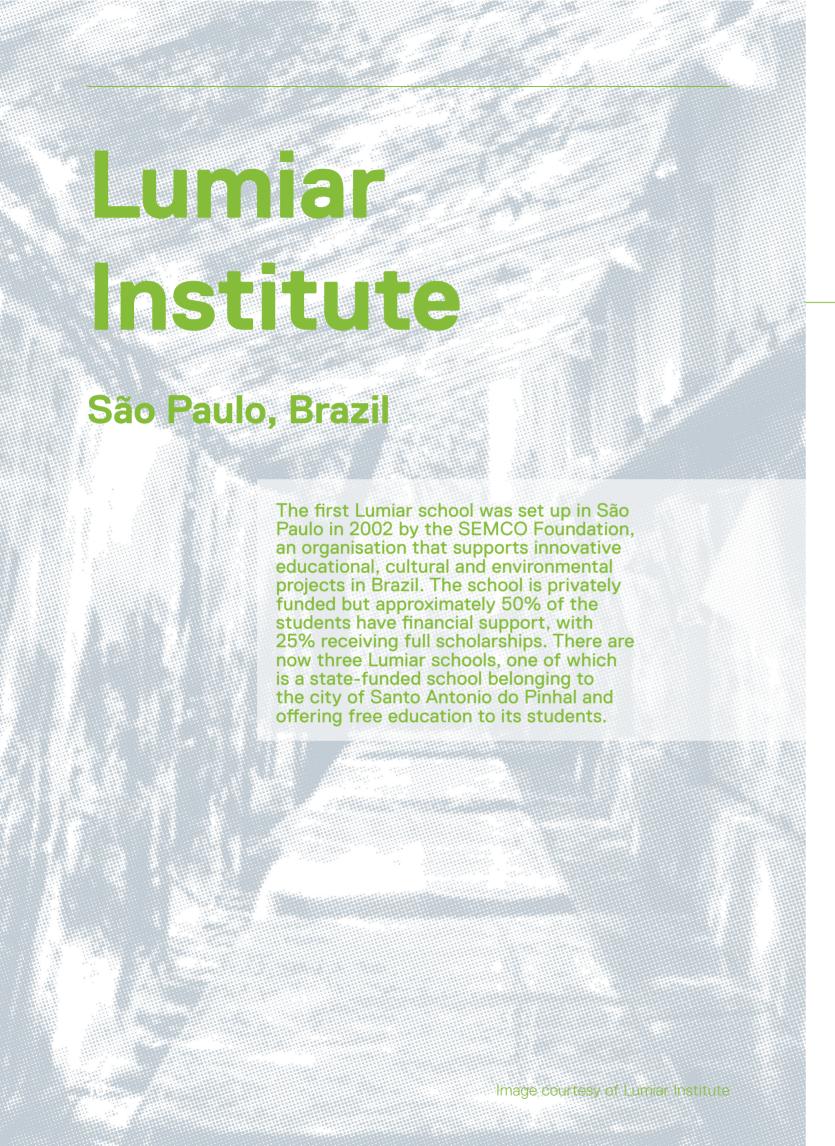
Students also use smartphones as project tools - making annotated videos of chemistry experiments, for example. Through work like this, students create engaging resources for their peers.

Teachers use the school's virtual learning environment to give instructions and students upload work for assessment, allowing them to 'hand in' their work from anywhere. Staff are currently developing a fullyonline 'education plan' for home educated young people and young people already in employment.

The building itself reflects this commitment to flexibility: 'traditional' classrooms are used solely for efficient delivery of new information, while open areas allow for group working, with students in charge of directing their own learning and teachers assuming a mentoring role.

The evidence that it works

Despite nearly half of Ørestad students coming from families with no history of further education, they achieve results comparable to the national average and are more likely than their peers to be accepted onto university courses.



Teaching students to 'learn how' rather than just to 'know what'

Age range: 4 - 15 No. of students: 170

Why it's a school for the 21st century

Teaching is focused on building skills rather than transmitting information:

At the Lumiar schools, there are no lessons, fixed timetables or traditional teachers. Instead, one half of the 'pedagogical staff' work as advisors, mentors, and coaches, monitoring the students' progress and supporting them to select three or four projects that they would like to work on every term. The other half of the staff are 'masters' of a particular set of skills, such as engineering or piano playing, and work part-time to design and facilitate projects that equip students with these skills.

Staff use a 'matrix of competencies' to ensure that students are progressing in all key areas of development, acquiring interpersonal, social and cognitive skills. Assessment is not conducted through tests and examinations but through ongoing observation, interaction and dialogue with students, the results of which are recorded in a learning portfolio that accompanies students throughout their educational journeys. At any point, students can choose not to take part in the projects, instead using the library or recreational areas for independent study and play.

Students and parents play a key role in school decision-making:

Democratic decision-making forms a vital part of Lumiar students' education. A typical school day begins with students collectively deciding how to divide up space and resources at the school (there are no classrooms) in order to accommodate all of the projects.

Lumiar schools also hold a weekly whole-school assembly known as 'The Circle', which is attended by all school staff, students and parents. Discussion topics can range from proposals for new projects to disciplinary issues. Additionally, The Circle gives students an opportunity to share their achievements, so it serves both a deliberative function and a celebratory one.

The evidence that it works

Lumiar Public in Santo Antonio do Pinhal is the highest performing state school in the municipality. In 2007, Lumiar schools were selected to be one of 12 projects on the worldwide Microsoft Innovative Schools Program.

Matthew Moss High School

Received UK

Matthew Moss, situated in an area of high deprivation in Greater Manchester, works on the principle that students must be given a stake in their own learning. After all, if you don't own your learning, why should you look after it?

Helping students develop the initiative, enterprise and creativity to become lifelong learners

Age range: 11 - 16 No. of students: 900

Why it's a school for the 21st century



Helping students to learn by pursuing their passions:

In their first year at Matthew Moss, students take part in 'My World', for which they design and carry out extended projects based on their own passions. Past students have carried out projects ranging from researching the 1947 partition of India through family history, to building a model of a 6th century monastery in Ireland, to rebuilding a disassembled car engine. Because students learn outside school and often create projects connected to their own families, parents can get involved in their children's work.

Teachers use a mixture of assessment methods, including vivas, journals and public project exhibitions, so that students have many ways to demonstrate their learning. They are developing tools to measure learners' personal, learning and thinking skills, which are also available for teachers and parents to assess their own progress as mentors and learners — ensuring that the whole school community is learning together.

Assessment is underpinned by a skills framework developed in consultation with parents, students and local businesses that focuses on developing students' personal organisation, problem-solving, research, team-work and communication skills.



Students at Matthew Moss take responsibility for aspects of the school that they would normally be kept away from – for example, students plan and manage their own school trips and are taught how to make purchases using the school budget. This is both a preparation for the responsibilities of adulthood and a way of strengthening their sense of belonging in the school.

The evidence that it works

Among local schools, Matthew Moss consistently has the lowest figures of former students not in employment, education or training; this is despite the percentage of students with special educational needs being above the national average, along with the number eligible for free school meals. At least one local sixth form college accepts Matthew Moss students with results an average of one grade lower than their peers from other local schools, because of its reputation for developing skilled learners.

Big Picture Learning

USA, Canada, Australia, Israel and the Netherlands

Founded in Rhode Island with 50 students in 1995, Big Picture now boasts 131 schools in five countries, primarily based in areas of high deprivation.

Connecting students and the community to create learning programmes rooted in the real world

Age range: 11 - 18

No. of students: thousands

Why it's a school for the 21st century



Big Picture's motto is 'education is everyone's business', and staff put this belief into practice by forging strong links both with the local community and the world of work.

Fundamental to the Big Picture curriculum are the internships that students carry out at locations ranging from City Hall to the local skateboarding shop. They learn how to be adults by being with adults, developing personal relationships with experts in their chosen field of study. The link between school and the world of work is strengthened through a long-term project that students carry out in school as part of their internships.

Students at Big Picture schools are put in charge of their own learning: each student creates an individual learning plan, with advice from their parents, teachers and internship mentors. This document sets out the learning goals for which they will be held accountable. Learning is assessed through journals, weekly check-in meetings, exhibitions and an annual presentation of portfolios –

anticipating the sorts of assessment that students will undergo in their future careers.



At the Met in Rhode Island (the original Big Picture school), a Parent Leadership Training Institute empowers parents to engage with the school and to lead the revitalisation of local neighbourhoods. Parents participate in curriculum planning meetings, attend student work exhibitions and become mentors. This whole-family approach to education raises the aspirations not only of students but of entire communities.

The evidence that it works

Big Picture's 67 schools in the USA (all of which are non-selective) have an overall graduation rate of 92% compared with around 66% nationally. At the Met, over 80% of students are eligible for free school meals. Nevertheless, 74% of Met students have gone on to college or a technical training programme, compared with 68% of graduating students nationally. Three-quarters of these students were the first in their families to attend university.

Kunskapsskolan

Sweden and the UK

At Sweden's largest provider of independent 'free' schools, spaces and teaching strategies are designed to accommodate the needs and preferences of different students, in order to support them to reach their full potential and become effective independent learners.

Enabling students to take responsibility for their own learning

Age range: 12 - 19 No. of students: 10,000

Why it's a school for the 21st century



Students choose where, when, how and what they learn:

Students at Kunskapsskolan are supported by teachers and parents to develop and pursue a personalised educational plan. This begins with long-term attainment goals set when they begin at the school, and is updated at weekly tutorial meetings to review and reflect upon their progress and to set new short-term aims and challenges.

Like many schools, Kunskapsskolan uses an online virtual learning environment which is accessible to students, teachers and parents.

Students plan their day-to-day schedules and record their progress using an online log, while teachers upload students' results, tasks and comments in the school's online Student Documentation System.

This streamlines the logistics of Kunskapsskolan's personalised learning model, while also making it easy for parents to keep up with what their children are doing at school.

Core subjects such as English, maths and modern languages are taught in 35 steps that all students follow at their own pace, while other subjects are taught as cross-disciplinary courses centred on a common theme. Students can choose which level to work at and which courses to participate in, tailoring their schedules and strategies to their own needs, strengths, preferences and ambitions.

When not in class, students are free to do much of their work at home, or they can opt to study in one of Kunskapsskolan's open-access 'learning spaces'. These spaces provide a range of facilities – from lecture halls to small study spaces – for students to use, giving them further autonomy in their approach to learning.

The evidence that it works

Kunskapsskolan schools are consistently above average on Sweden's national assessments, and outperform other Swedish schools serving similar demographics.

"For me, a school where you are only given ready-made solutions is not satisfactory. Here, the students set goals and choose different ways of acquiring knowledge. This prepares you for university."

- Kunskapsskolan student

Colegio Cardenal de

Santiago, Chile

Founded in 1980 for students excluded from other schools, Colegio Cardenal de Cracovia serves an area of high deprivation in Santiago, Chile's capital city. In order to engage its often difficultto-reach students, the school has reconstituted itself as an 'independent republic' with a student-led government.

Treating democracy. citizenship and governance as fundamental aspects of learning

Age range: 4 - 11 No. of students: 926

Why it's a school for the 21st century



Students help to run the school, using democratic structures:

After several years of working with the most challenging students in a part of the city designated as 'high social risk' by the Chilean government, Colegio Cardenal de Cracovia's founder, Juan Carlos Navarrete Alvarez, decided that his students would not engage with the school unless they felt both that they belonged there and they were responsible for it.

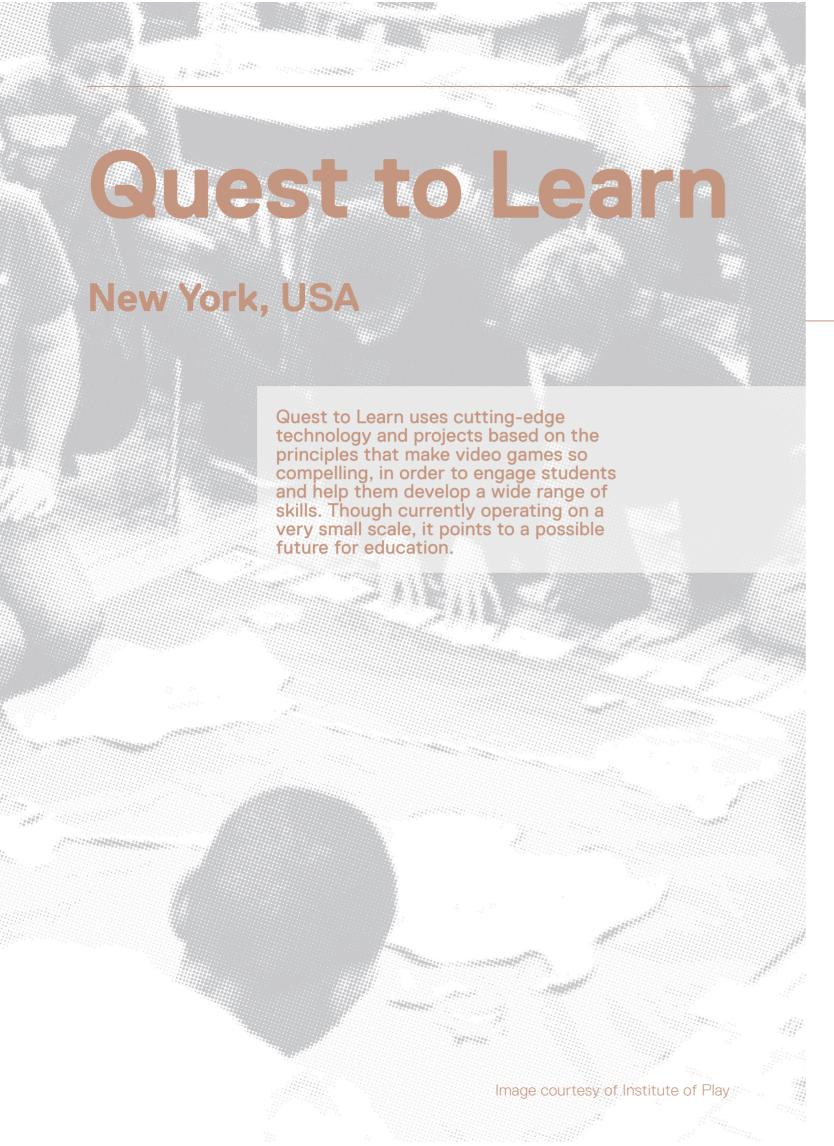
So he held a referendum for students, parents, and teachers on whether the school should become an 'independent republic'. The referendum passed with 87% of the vote, and Cracovia has not looked back. It now has its own political constitution, cabinet, currency, bank and a range of 'government departments' run by students, including a Department of Health and a Department for Education. Students are divided by age into smaller communities from within which individual students are elected to fulfil various roles as ministers and representatives. They also vote to elect a president and prospective candidates must fulfil certain criteria - such as good school attendance - in order to run.

Students work alongside adults to operate the school's 'police force' and 'Ministry of Justice', even holding trials in order to decide on appropriate disciplinary sanctions for bad behaviour.

Cracovia balances an emphasis on discipline and responsible behaviour with advocacy of constructive recreation and self-expression. Celebrations of national holidays form an important part of the school's calendar, representing an opportunity for students to take pride in their own cultural heritage as well as allowing them to organise and lead the events themselves. The school also runs a popular radio show, 'Karol World'. Featuring a staff of nearly 800, including teachers, parents and students of all ages, it gives young people a public voice and provides a space for school and community to come together around issues of local and international concern.

The evidence that it works

In 2008 Chile's leading newspaper, El Mercurio, endorsed the school as one of fifty 'exemplars of education'. In 2011, it was recognised by the Chilean education organisation Educacíon 2020 as one of the country's leaders of innovation in education.



Creating, inventing and problem-solving through 'mission-based' learning and digital gaming

Age range: 11 - 14 No. of students: 150

Why it's a school for the 21st century



Applying insights from videogame design to learning:

Founded in partnership with computer game designers, Quest to Learn is built on the principles that make computer games so compelling: learning by doing, building on experience, and applying knowledge in a range of different settings.

Students tackle 10-week 'missions' composed of a series of 'quests' which pose problems the students must solve through a variety of methods such as gathering resources, performing mathematical calculations and scientific experiments, analysing texts and media, and building their own games. Students play a variety of roles depending on what a task requires (including scientist, photographer and engineer) – and approach problems 'in character'.

New technology is used extensively, with students encouraged to develop their prototyping and 'tinkering' skills by building games, simulations and small machines. SMALLab, an 'embodied learning' space combining real objects with virtual-reality projections, lets students experiment with maths, physics and design in ways not possible in the real world.

As in computer games, progression is based on mastery – students can't advance to the next quest without having completed the previous one. Missions culminate with a 'boss level'. in which the whole school works together on a single challenge.

In one mission, 'Spartan Private Investigators', students investigate conflicts between Sparta and ancient Greece. They design a time machine and find the best place to locate it using Google Earth and a lesson on longitude and latitude, read Greek myths and familiarise themselves with Spartan culture.

The evidence that it works

Quest to Learn's student engagement levels score in the top 3% of schools in New York City with similar intakes (45% of Quest to Learn students are eligible for free school meals, and 25% are identified as having special educational needs). In their first year at Quest to Learn, students make statistically significant gains in systems thinking, time management and collaboration.

Discovery 1

Christchurch, New Zealand

Discovery 1 was set up in 2001 by a group of parents and teachers, based on the principle that students should be trusted with as much autonomy and responsibility as possible.

Giving primary students the autonomy to learn on their own terms

Age range: 5 - 13 No. of pupils: 200 "For me Discovery is great because I get to choose how I learn and what I learn. I am encouraged to challenge myself and push myself. I like that my learning can be reallife learning, like at the moment we are planning to support the cleanup of an old people's home hit hard by the earthquake."

- Chelsea Palmer. 12

Why it's a school for the 21st century



Discovery 1's curriculum, built around what it calls 'discovery learning', was co-designed (and continues to be reviewed and reshaped) by parents, staff, pupils (both past and present) and experts in the community. It accommodates New Zealand's national curriculum but gives students the freedom to forge their own paths through it.

Discovery 1 puts all its pupils in charge of their own learning: teachers ask them what they want to learn and what support they need, helping them to design projects and plan their time using calendar software. Assessment criteria are also worked out by pupils in negotiation with their teachers and families.

In some instances, 'pupil ownership' of learning can be taken literally: pupils retain 'copyright' over their completed project work, and it cannot be viewed without their permission. Autonomy can also be earned: older pupils gain 'trust licences', allowing them to take responsibility for their own safety when learning outside school.

Using a flexible timetable, supported by parent input:

The school day at Discovery 1 is structured around core 'must do' literacy and numeracy tasks and optional 'can do' workshops. These 'can do' sessions are often designed and run by parents and other people from the local community.

Each day, pupils also have time for self-directed learning to pursue their own interests or catch up on work at their own pace, drawing on resources and experts as needed.

The evidence that it works

Discovery 1 pupils have significantly higher reading, depth of thinking and attitude scores than the New Zealand average. The school draws its intake from across the city and a wide range of backgrounds, with Māori pupils comprising 14% – double the proportion in Christchurch as a whole. The school is now so oversubscribed that it is opening a 'satellite' school outside Christchurch.

22 Image courtesy of Discovery 1

School of One

New York City, USA

In 2010, School of One was implemented as a full-time in-school maths programme in three New York schools. It gives students computer-generated personalised learning plans which allow them to work at their own pace and level, within a learning space designed to accommodate different

skills taught simultaneously in different

parts of the classroom.

Customising learning and reconfiguring teacher-student relationships through the use of computer technology

Age range: 11 - 14 No. of students: 1,500

Why it's a school for the 21st century

Students learn at their own pace, with bespoke 'playlists':

When students of the School of One maths programme arrive at their lessons, their first port of call is a large screen which displays the bespoke 'playlists' of activities that they will follow that day. Generated by sophisticated algorithms, these playlists are tailored to the needs, preferences and abilities of each individual student. For example, a student who responds well to face-to-face interaction might begin the day with a one-on-one consultation with a teacher, followed by a small-group activity in which the participants learn about percentages through carrying out a role play based on a restaurant outing. Another student who learns effectively through the use of technology might spend the time doing computer-based activities and quizzes. Teaching can also include large-group instruction and online sessions with a remote tutor.

This variety is possible due to the design of the School of One learning space, which is large and open to enable different kinds of learning experiences to take place at the same time. A short test at the end

"I like that it makes school not too hard, not too easy, but just right for me." - School of One student, Manhattan, NY.

of the lesson assesses the students' understanding of the topics covered, generating a new playlist for the next day which ensures that they work on the areas that they need to develop, at a level that stretches them. In this way, students move through the maths curriculum at a pace and level that they are comfortable with, without falling behind. The system also provides teachers with a nuanced picture of each student's performance and progress.

The part that teachers play in learning is radically transformed:

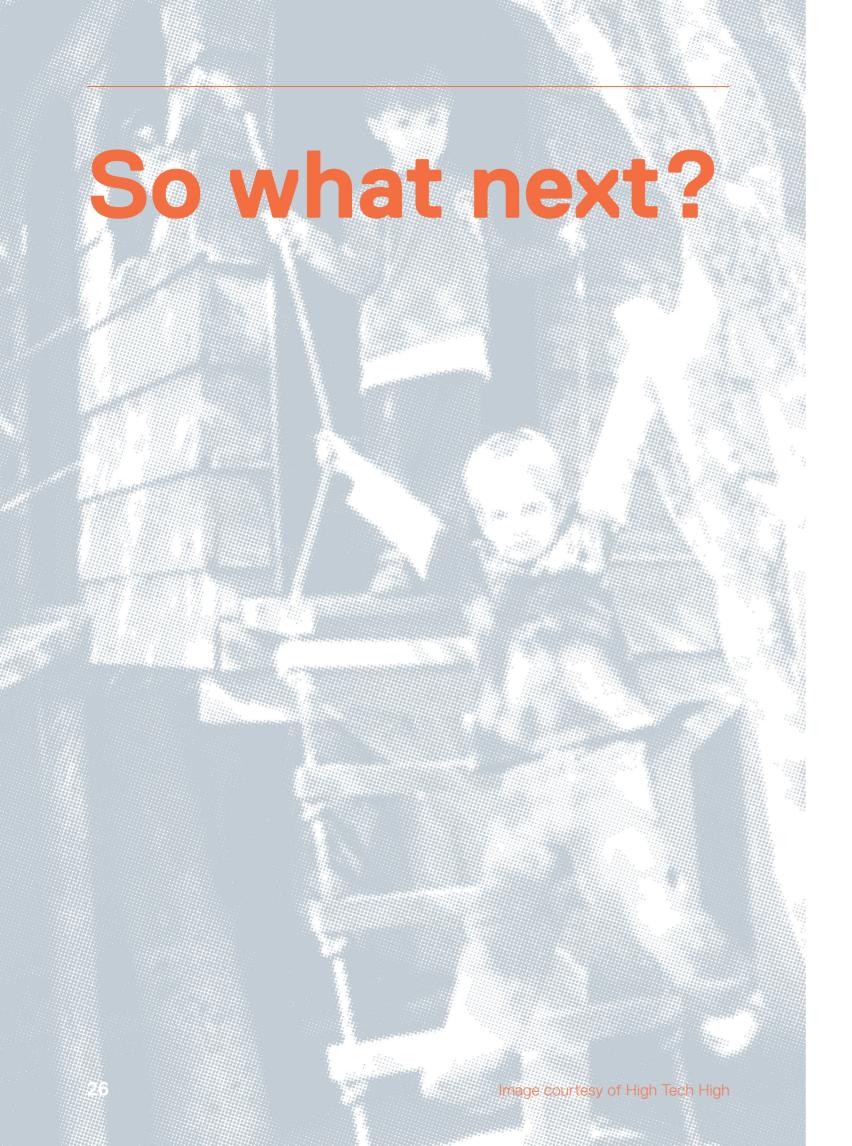
Since the School of One model allows teachers to spend less time on administrative tasks, this frees them to focus on getting to know students, as well as helping them to develop a deeper, more conceptual understanding of the material. For example, teachers design in-depth activities which explore concepts such as architectural design, product development and financial investment, enabling students to apply what they are learning to real-world situations.

The evidence that it works

In a summer school pilot, students of School of One acquired new maths skills at a highly accelerated rate, estimated by NYC Department of Education's Research and Policy Study Groups as seven times faster than peers with similar demographics and pre-test scores.

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Image courtesy of School of One



Each school in this publication has come up with a different response to the challenges (and opportunities) for education in the 21st century. Their achievements are inspiring, not least because so many are working with extremely hard-to-reach students. It is also worth pointing out that most of them are no more expensive to run than any other school (High Tech High, for example, operates with a smaller per-student budget than most schools in America).

There is no one-size-fits-all model that can be extrapolated from these schools, but they provide a set of models for 21st century education that could be adapted to a range of contexts. More broadly, they also provide an indication of the value of innovation to education across the world, for all types of students.

We are incredibly excited about the schools we identified for this publication and we hope you are too. Schools like these are currently the exception rather than the rule, but there is no reason we couldn't have many more of them.

If this appeals to you, you can help to make it possible:

- If you work in a school, or are thinking of setting up a free school, get in touch with some of these schools and find out more about how they work and how you could adapt and build on their model.
- If you are a policymaker, examine which aspects of your current policy are encouraging the development of innovative schools like these, and which are making it difficult.
- If you are a parent, start asking why there aren't more schools like these to which you could send your children.

Every one of these schools was made possible by a small group of people with a vision, and a system that enabled that vision to come into being. These schools prove that visionary professionals can create 21st century schools. And that's a very good thing, because we will certainly need them.

To find out more about our work in education visit

www.innovationunit.org/knowledge/ our-ideas/21st-century-education

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About us

We are the Innovation Unit for public services. We have a strong track record of supporting leaders and organisations delivering public services to see and do things differently. They come to us with a problem and we empower them to achieve radically different solutions that offer better outcomes for lower costs. We are a not-for-profit social enterprise and we work to influence public debate, re-shape public policy and transform public services.

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