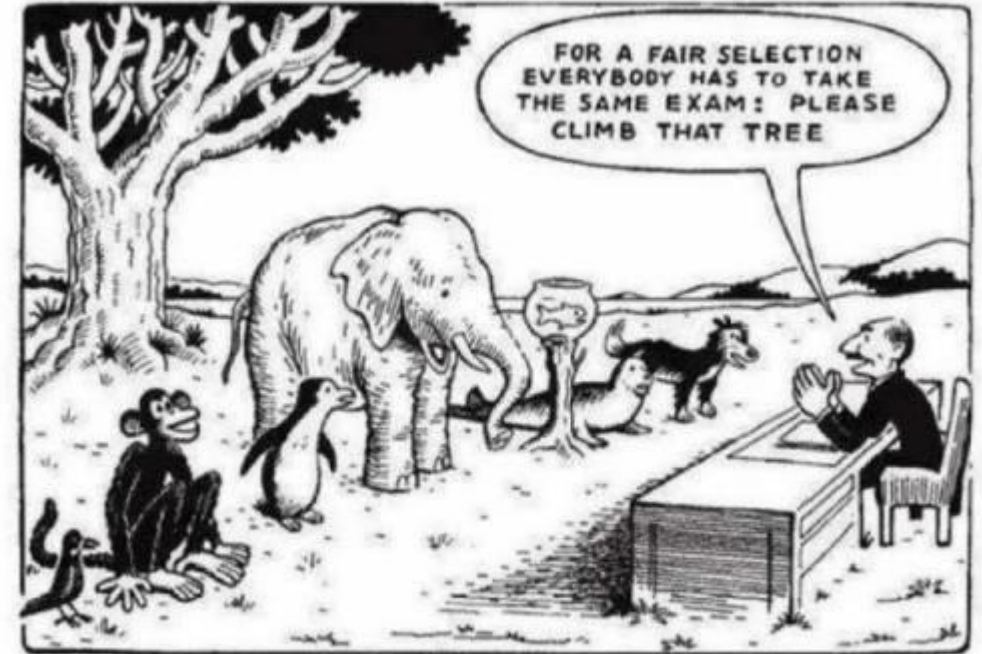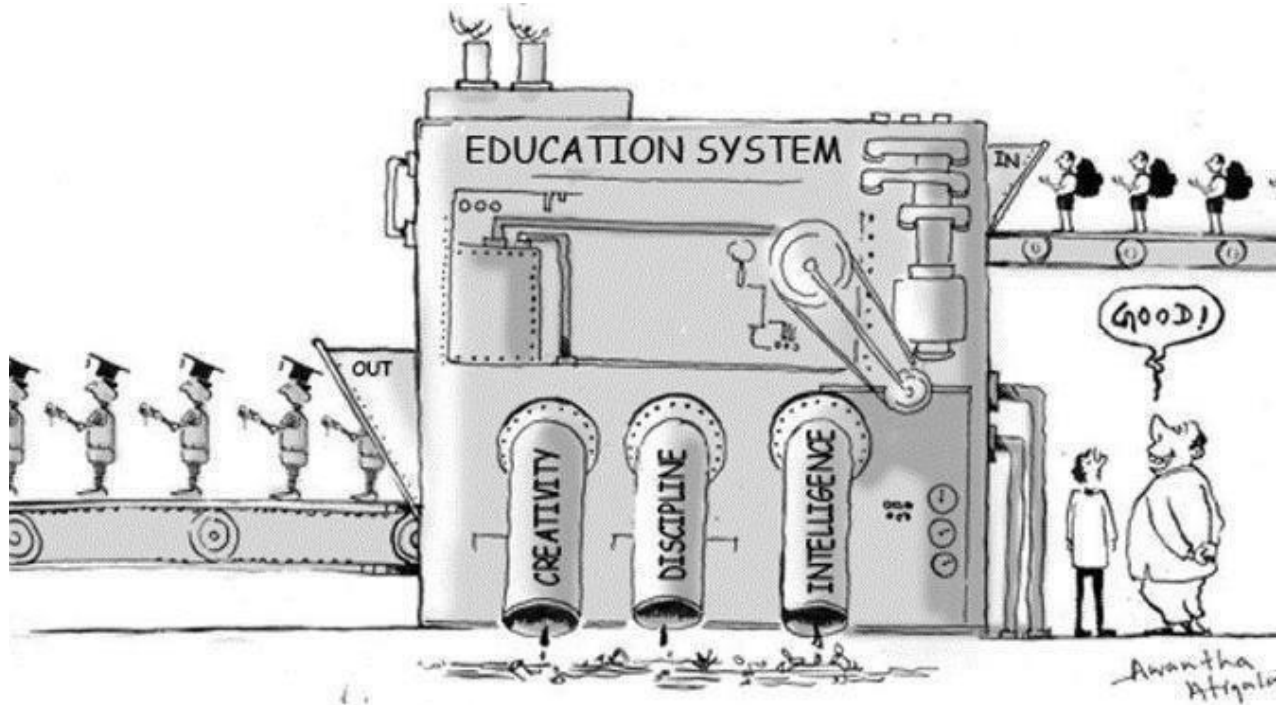# Future of Education

# Tech Enabled K – 12

# Contents

1. Education now - global
2. Goals of education
3. Education technology
4. Education going forward
5. Way forward
   i. Content
   ii. Delivery
   iii. Assessment
   iv. Capacity Building
6. Case studies

Education in the past

# Solutions in Education

# Need to Rethink Education

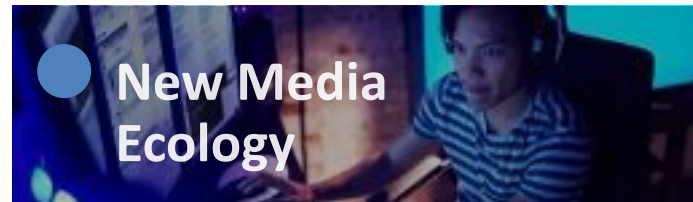# Disrupters of Education

- Rise of Smart Machines & Systems
- Computational World
- Extreme Longevity
- Superstructed Organizations
- New Media Ecology
- Globally Connected World
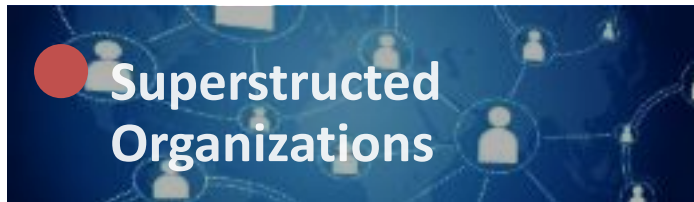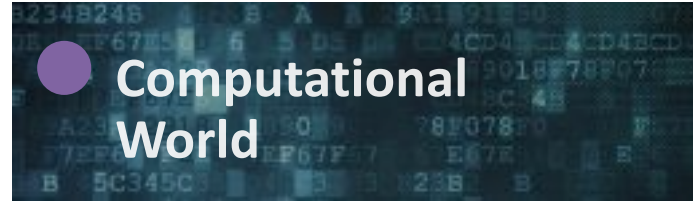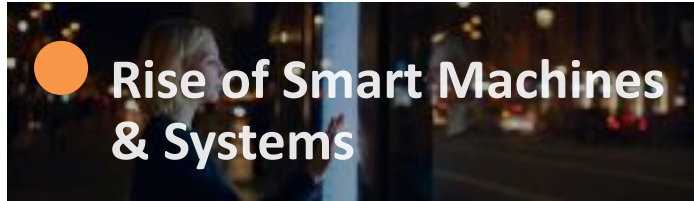
Novel & adaptive learning

| | | |
|---|---|---|
| Computational thinking | Design mindset | Cognitive load management |
| New-media literacy | Cross-cultural competency | Sense making |
| Virtual collaboration | Transdisciplinary | Social intelligence |

# Goals of Education

- Transforming learning
- Achieving equity
- Helping students thrive in and shape their future.
- Building national consensus on the emphasized composition of **knowledge, skills, attitudes and values**

# Goals of Education

- Teach Essential Skills for 21$^{st}$ century

   1. ***Ways of Thinking:*** creativity and innovation, critical thinking, problem solving, decision making, and learning to learn (or metacognition)
   2. ***Ways of Working:*** communication and teamwork
   3. ***Tools for Working:*** general knowledge and information communication technology (ICT) Literacy
   4. ***Living in the World:*** citizenship, life and career, and personal and social responsibility, including cultural awareness and competence.

# Opportunity Recognized Globally



'Digitalization of education is generating large quantities of data. Leveraging that data to improve student learning and both educator and institutional performance will be the hallmark of exceptional institutions.'

Gartner Inc.

# Education Analytics

Three kinds of analytics



**INSTITUTIONAL ANALYTICS**

Focus is on institutional efficiency.

**LEARNING ANALYTICS**

Focus on large learning measures e.g. retention rates, graduation rates.

**LEARNER ANALYTICS**

Focus on individual learners and their learning paths.

Education analytics is about using data to:

- empower *teachers* with insights
- boost *student* success through offering personalized learning
- remain competitive
- optimize operations and costs

# 5 Areas of Tech Enabled Educational Revolution

## Holistic Education Technology Framework

### Education Process

Management Systems
+
Enrollment
+
Emergency Management
+
Alumni & Loyalty Programs

### Education Content

Learning Management System
+
Content Aggregation
+
Diploma Programs

### Education Assessment

Testing
+
Question Banks
+
Learning Assessment

### Education Counselling

Personality Assessment
+
Career Guidance
+
Portfolio Management
+
University Cnsl.

### Education Tools

STEAM Kits
+
Education Apps (surveys, ebook, etc…)
+
Online Competitions
+
Gamification

## AI + Blockchain + RPA
### (Tech Foundation and Governance)

# Expected Changes in Education - Content

- **Academic standards supplamented by 'other content':** The codex of academic standards that drive public schools today must change in quantity, scale, and function—or fall into the background completely.

- **New content areas will be developed**: Math, science, social studies, and literacy have been the pillars of modern education for over a century. But in the face an uber-connected and technologically-driven world, new perspectives naturally emerge. Rather than 'content areas,' it is now possible to unify learning experiences by new criteria, including the ability to use specific technologies.

- **Networks could trump content:** The idea that who you interact with becomes more important than what you study or desire to understand. Membership in such communities would provide a learner with considerable opportunity to acquire knowledge, forge relationships, and pursue apprenticeship.

# Expected Changes in Education - Delivery

- **Personalized learning to disrupt how we think of curriculum:** Personalized learning isn't just about differentiated content, but rather just-in-time, just-enough, just-for-me access to authentic and accessible learning resources. Development of curriculum playbooks.

- **Mobile Learning & self-directed learning could form the core of formal education models:** Whether through adaptive learning apps, "1:1 blended learning," personalized learning algorithms, or self-directed learning, the future of learning is undoubtedly mobile, personal, and self-directed.

- **Evolved elementary schools:** As society evolves at a more rapid pace than ever, literacy is changing, and elementary schools must respond in kind—with literacy not as a goal, but its sole purpose: Reading, writing, and emerging critical thinking skills.

# Expected Changes in Education - Assessment

- **Development and implementation of a new kind of assessment:** Rather than measurement, true assessment is the process of uncovering understanding. Figuring out what a learner does and does not understand, and moving forward from there. Focusing on metacognition and immediate feedack not scores.

- **Certification could be supplemented by "online brand":** As people seek to continuously brand themselves—just as corporations have been doing for a century—the result could be the same in education: human identity based on reputation, portfolios, and data rather than intimate and authentic human interaction, and iterative understanding.

- **Radical rethinking of—'certification'**:  a relic of a time when people, information, and communities stood still.

# Expected Changes in Education – Goals

- **New reasons "to go to school":** The days of "going to school to get a job" could be slowly replaced by "critically learning so that we come to understand what must be done." This shift will cause schools of all levels and size to respond.

- **Elite academic institutions could become the new "fringe":** While autodidacts, homeschoolers, unschoolers, and apprenticeships are currently the 'fringe' of education, that could change. As the focus of learning shifts from pure academic proficiency to a tone more open, fluid, and self-directed, many will naturally resist such a change. Those that believe in the value of top-down, compliance-based, text-driven, test-centered, letter-grade approach will catalyze a fringe return to a "golden era" of academics, including focus on classical education, failure and success, academic standards, good grades, and professional preparation.

# Current Education Methodology

- Compulsory education using **transmission model**, through which teachers transmit factual knowledge to students through lectures and textbooks.

- Development of standards that are taught through the transmission model and tested through **recall-based assessments.**

- The transmission model **demands less disciplinary and pedagogical expertise from teachers** than does the contrasting "constructivist" model through which students actively—rather than passively—gain skills and knowledge.

- 21$^{st}$ century skills are more **difficult to assess** than factual retention.

# Way Forward - Content

- **Simultaneously Develop Lower--and Higher--Order Thinking Skills**; Lower-order exercises are fairly common in existing curricula, while higher-order thinking activities are much less common. Higher-level thinking tends to be difficult for students because it requires them not only to understand the relationship between different variables (lower-order thinking) but also how to apply—or transfer—that understanding to a new, uncharted context (higher-order thinking).
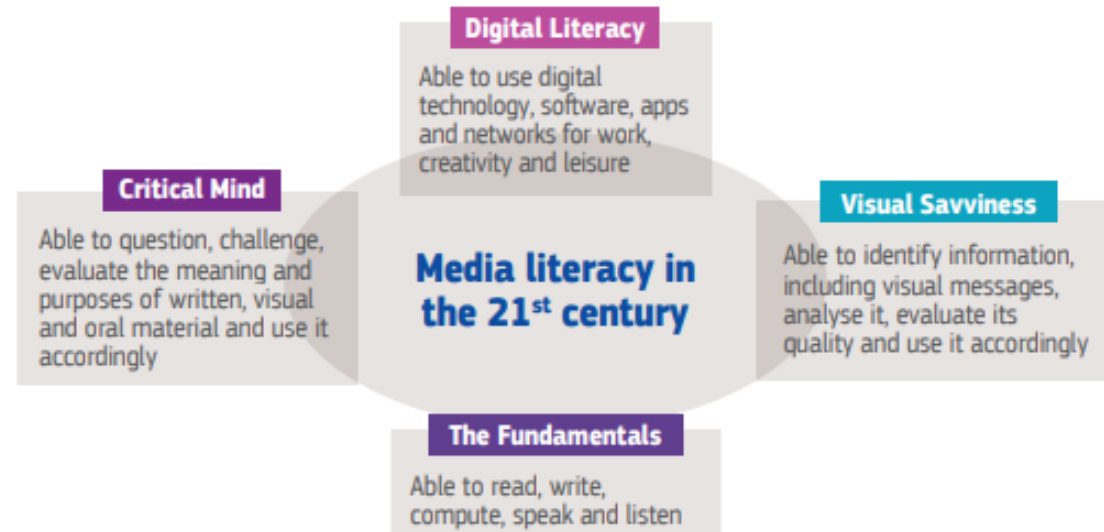
# Way Forward - Content

- **Teach Students to Learn to Learn**; Not only is learning to learn a critical skill in itself; activities that develop metacognition also help students to learn skills, knowledge, strategies, and attitudes more effectively.

- Teachers can reinforce students' metacognition by modeling it on a regular basis and talking through their own thinking as they address an example problem and then asking students to reflect on the teachers' model.

- Students benefit from believing that intelligence and capacity increase with effort (known as the incremental model of intelligence) and that mistakes and failures are opportunities for self-inquiry and growth rather than indictments of worth or ability.
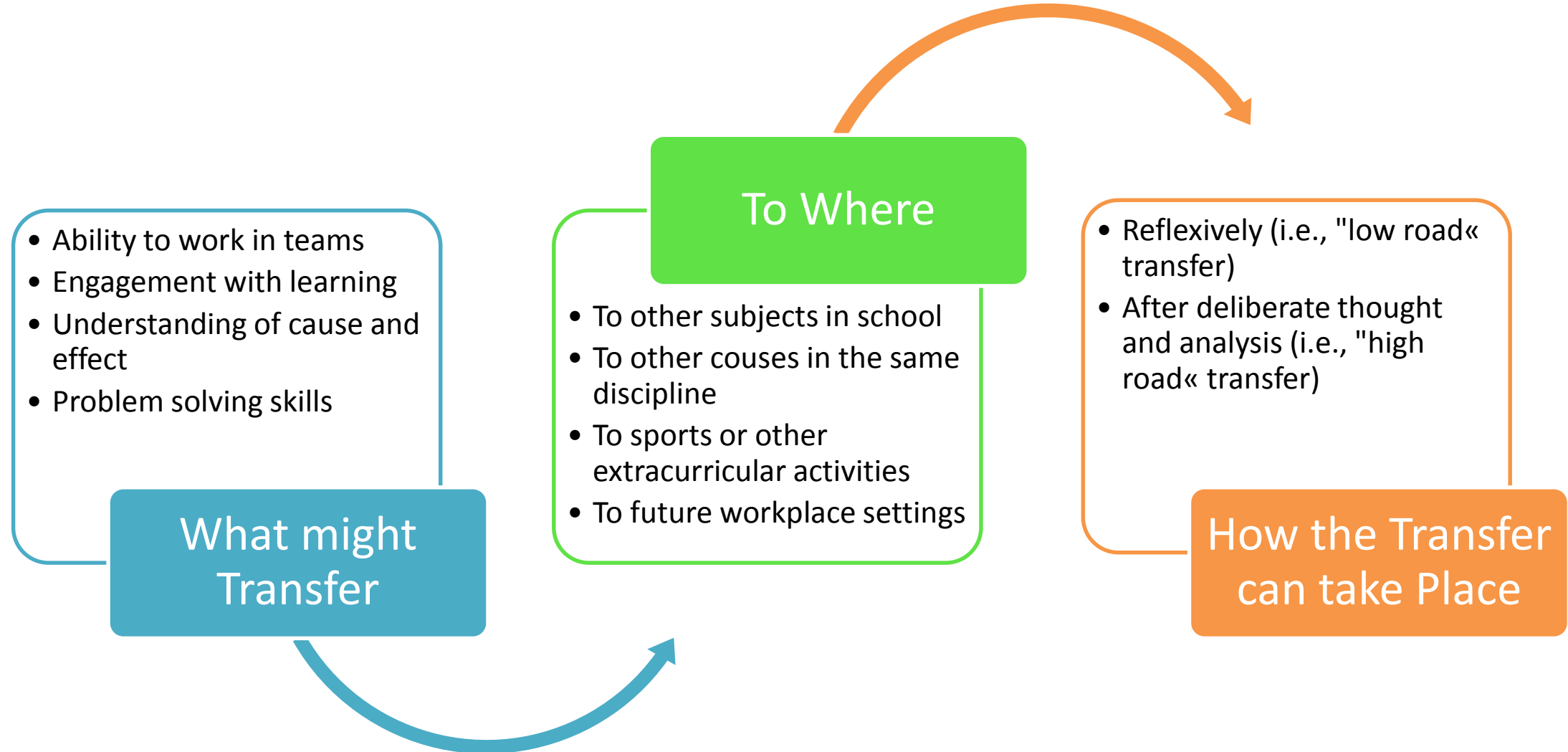
# Way Forward – Content

- Digital skills are becoming a core literacy. And young people are at an advantage.
- For the first time in history, young people are more proficient at a sought-after skill than their older peers. This may have profound ramifications for labour markets that are still very much based on seniority and years of experience

**Four dimensions of media literacy for the 21st century**

**Digital Literacy**
Able to use digital technology, software, apps and networks for work, creativity and leisure

**Critical Mind**
Able to question, challenge, evaluate the meaning and purposes of written, visual and oral material and use it accordingly

**Media literacy in the 21st century**

**Visual Savviness**
Able to identify information, including visual messages, analyse it, evaluate its quality and use it accordingly

**The Fundamentals**
Able to read, write, compute, speak and listen

# Way Forward - Delivery

## Encourage Transfer of Learning

**What might Transfer**

- Ability to work in teams
- Engagement with learning
- Understanding of cause and effect
- Problem solving skills

**To Where**

- To other subjects in school
- To other couses in the same discipline
- To sports or other extracurricular activities
- To future workplace settings

**How the Transfer can take Place**

- Reflexively (i.e., "low road« transfer)
- After deliberate thought and analysis (i.e., "high road« transfer)

# Way Forward - Delivery

- **Address Misunderstandings Directly**; Another well-documented science-of-learning theory is that learners have many misunderstandings about how the world really works, and they hold onto these misconceptions until they have the opportunity to build alternative explanations based on experience. This process generally requires explicit guidance and takes time.
- To overcome misconceptions, learners of any age need to actively construct new understandings.
- It is human nature to need to "find out for ourselves."

# Way Forward - Delivery

- **Exploit Technology to Support Learning**; Technology offers the potential to provide students with new ways to develop their problemsolving, critical thinking, and communication skills; transfer them to different contexts; reflect on their thinking and that of their peers; practice addressing their misunderstandings; and collaborate with peers—all on topics relevant to their lives and using engaging tools.

- There is broad consensus that technology holds great promise for education. It has not yet lived up to this promise, in part because teachers have not had the opportunity to learn to maximize its pedagogical value. Without direction, teachers tend to use it to mimic the transmission model.

22

# Way Forward - Assessment

- **Develop Formative Assessment Platforms** to remind students of their learning goals, give them feedback about their progress and misunderstandings as they learn, guide them to shift course as they need, and are a critical part of the learning process.

- **Focus on Summative Assessments** giving students the opportunity to demonstrate what they understand at a given point in time. They are useful to certify students' achievements, for example, to assign grades, determine level of preparedness for further study, or award diplomas. They are also useful to measure teachers', schools' and systems' performance for accountability and improvement purposes.

# Way Forward - Assessment

- Assessment is moving in the direction of harnessing technology to address the marking and standardization challenges.

- **Use technology to assess students' knowledge and skills in real time as they engage in the learning activity**. Artificial intelligence tools are progressing to the point that they can assess students' open-ended answers as well as or better than can humans.

# Way Forward - Assessment

- Assess a broader range of skills in the national examinations and adapt the examination in Grade 12 to certify achievement at the end of compulsory education
- Positively influence learning through the national examinations and assessment
- Using the wider evaluation system – of teacher appraisal, school evaluation and system evaluation – promote better assessment and learning

# Way Forward - Capacity Building

- **Develop an Effective Professional Development Program**, Changes in curriculum and instruction have many important human capital implications, including those related to teacher training, professional development, career mobility, and general cultural standing of the teaching profession
- An education system that focuses on 21$^{st}$ century skills requires a strong human capital base. To accomplish this end, in addition to investing in the capacity of teachers who are now starting to enter the teaching profession, invest in building the capacity of current teachers to teach 21$^{st}$ century skills.

# New Education  Model

# Way Forward – Early Childhood

- Education received in early childhood often shapes life prospects.

- Investments in early education have the highest rate of return.

- Pre-school education boosts cognitive, character and social skills.

- Investing in pre-school education is one of those rare policies that is both socially fair – as it increases equality of opportunity and social mobility – and economically efficient, as it fosters skills and productivity. But all these benefits are conditional on the quality of the education provided.

# Way Forward – Life Long Learning

- Most children entering primary school today are likely to work in jobs that do not yet exist.
- People change jobs – and even professions – much more often than a generation ago.
- Demands for competences keep evolving. Investing in lifelong learning, including through more learning on the job, is the best promise to maximise future employability. Employers are already the biggest contributors to adult learning, accounting for roughly 50 % of all spending , and workplace innovation is key to acquiring and updating skills.

# Way Forward – Future University

1. **Open loop university:** instead of limiting access to an academic setting in early adulthood, offer opportunities to prime-age adults to return, pivot careers and reconnect with the community.

2. **Paced education**: rather than four-year courses structured around semesters and mainly based on lectures, offer phases of interactive learning, of varied length based on the needs of the students.

3. **Purpose learning**: students would be asked to 'declare a mission, not a major' when starting their studies. For example, instead of saying that she is studying biology, a student would say that she is learning human biology to cure cancer, or drug addiction. Based on these, faculty and students would tackle societal challenges through 'Impact labs' around the world.

4. **Competence hubs**: Rather than separate academic departments and disciplinary-based teaching, the university would create multidisciplinary competency hubs mixing faculty, researchers and students in state-of-the art studio classrooms. Upon completion of their courses, graduates would receive a 'Skill-Print' summarising their skills, capabilities, talents, ability to learn and work on projects and with team-members, to be used with prospective employers, rather than a grade transcript.

# Way Forward – Partnerships

- The growing diversity of actors engaging in education opens up numerous new opportunities for people to train and retrain at different moments in their lives.

- New forms of partnerships between school actors, as well as between public and private actors are rejuvenating curricula, experimenting with new intersections between disciplines, and are already having an impact on employability.

# Case Studies– Ecole 42

Tech entrepreneur spearheads Europe's most successful coding school

- In France, École 42 is a free, teacher-less, self-organised university set up by a tech entrepreneur.
- It is schooling thousands of programmers through project-based learning and peer-to-peer learning.
- Entry is totally merit-based as students are selected through a one-month, elimination-based test that they must endure to get a place at the school, and the curriculum is 'gamified'.
- Almost 80% of students have a job before they finish the course and 100% are employed by the end of it.

# Case Studies– Singapore

Personalising classroom learning using data analytics:

- The Government of Singapore is exploring innovative use of emerging technologies to enrich the learning experience and enhance the quality of teaching, enabling everyone to achieve their full potential.
-  A key feature includes personalised learning using analytics, whereby data relating to the student – on school attendance, test results, participation in class, as well as self-assessments and teacher assessments – is gathered and combined to draw out crucial insights into students' learning strengths and difficulties. The goal is to help teachers build better pedagogical programmes, empower students to take an active part in their learning, target at-risk student populations through personalised interventions, and assess factors affecting completion and student success.

# Case Studies– Finland

Phenomenon-based and interdisciplinary teaching:

- In 2016, it launched a national programme aimed at improving primary and lower secondary education, further developing the phenomenon-based, interdisciplinary approach to teaching which the country has been experimenting with since the 1980s.
- The new core curriculum for basic education focuses on transversal (generic) competences and works across school subjects; with collaborative classroom practices, where pupils may work with several teachers simultaneously – thereby also encouraging Finnish school teachers who have traditionally focused on a given topic to work together with their peers in school around multidisciplinary modules.

# Appendix
# Global Education Indicators

# Private Pre K -12 Key Growth Drivers

- Globalization

- Industry expected to grow 9.2% annually

- Positive parental perception

- Recession-resistant business

- Recurring revenue

- Ability to lower costs with technology and partners

# Private K-12 Sector

The global private education market amounts to USD1.1 trillion with huge investment opportunities

Private sector keeps taking market share from public sector

## Spending in Private Education Sector in 2016

| | ~$313B | ~$368B | ~$130B | ~$205B |
|---|---|---|---|---|
| | Canada | Others | Others | |
| | | Singapore | | |
| | | Australia | Russia | |
| | | Japan | Italy | |
| | USA | | France | |
| | | | Spain | |
| | | China | Germany | |
| | | | UK | |
| | North America | Asia Pacific | EMEA | Others |

Source: World Bank, Parthenon Group Analysis

## Share of K-12 Students in Private Schools 2004 vs 2014

■ 2014   ■ 2004

| Country | 2014 | 2004 |
|---|---|---|
| UK | 46% | 18% |
| Australia | 35% | 30% |
| China | 22% | 7% |
| Thailand | 19% | 13% |
| Brazil * | 14% | 11% |
| Malaysia | 14% | 3% |
| Sweden | 13% | 7% |
| US | 8% | 10% |
| Germany | 8% | 6% |
| South Africa | 5% | 2% |
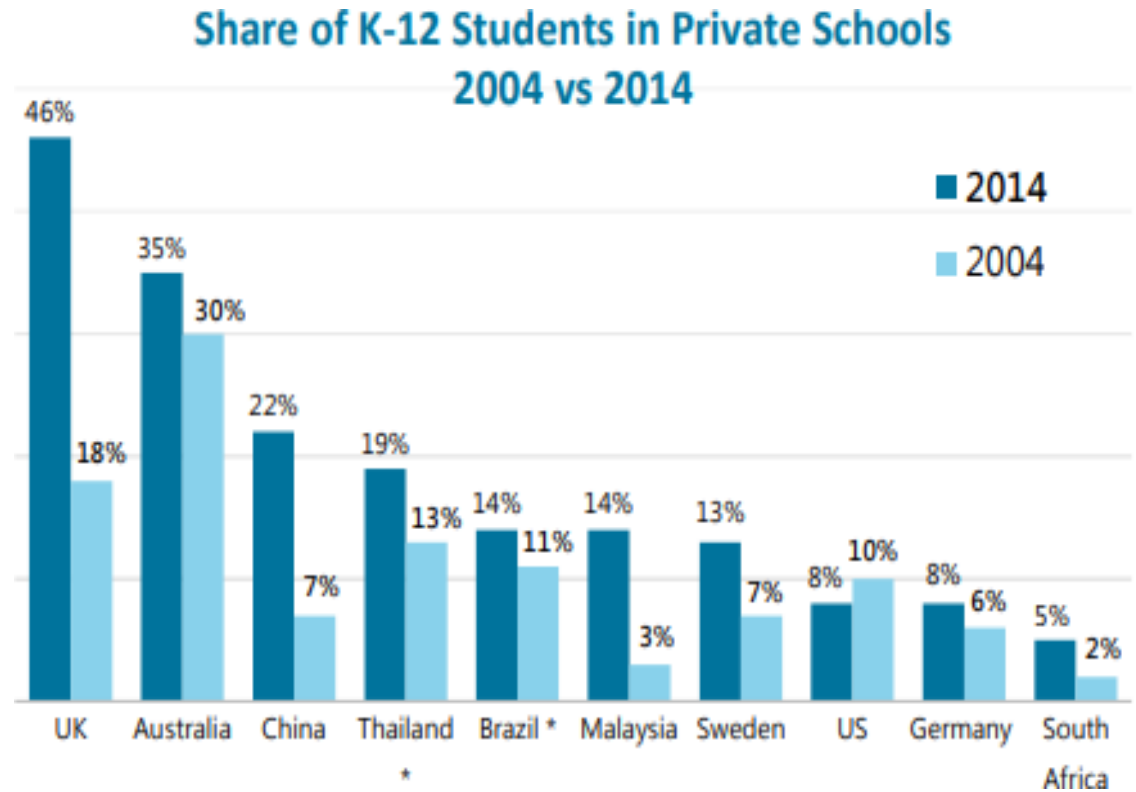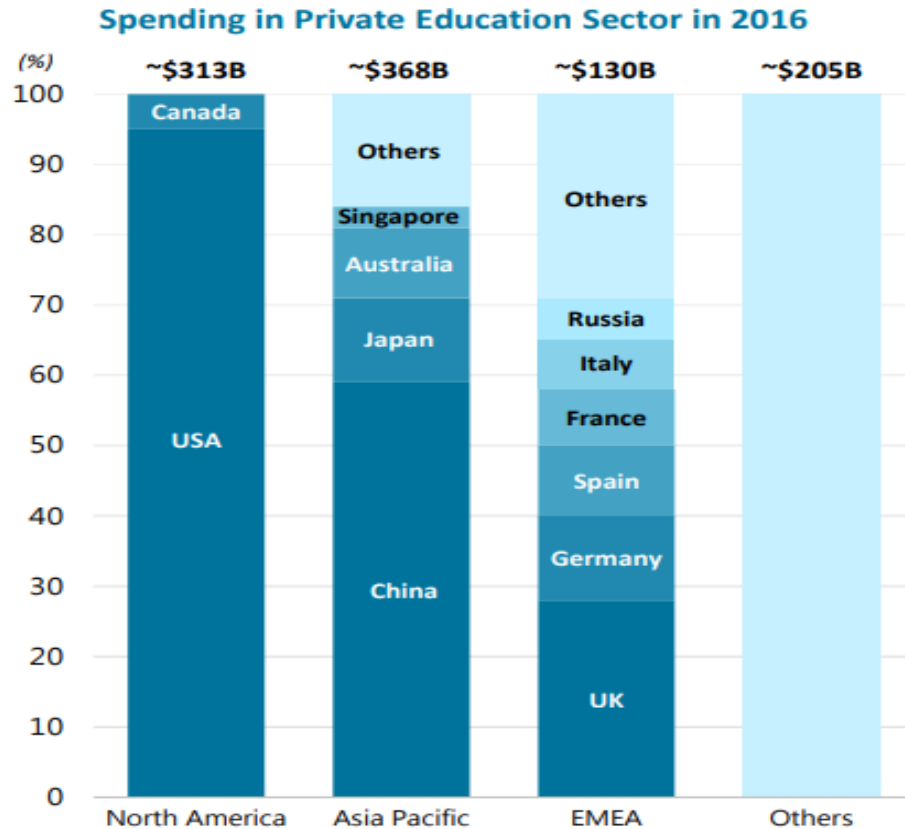
# International Schools

- Boom in "international schools", teaching English, mostly offering British A-levels, American APs and SATs, or the International Baccalaureate.
- During the past quarter-century, according to ISC, numbers have grown from under 1,000 to more than 7,300. In the 2013-14 academic year they generated $41.6 billion in revenue and taught 3.75m students globally (see chart).
- Twenty-two countries have more than 100 international schools, headed by the UAE, with 478, and China, with 445.
- Four-fifths of the students are locals seeking education in English.
- Further growth is on the cards. In another decade, the ISC predicts, there will be 14,400 international schools worldwide, teaching 8.9m students.
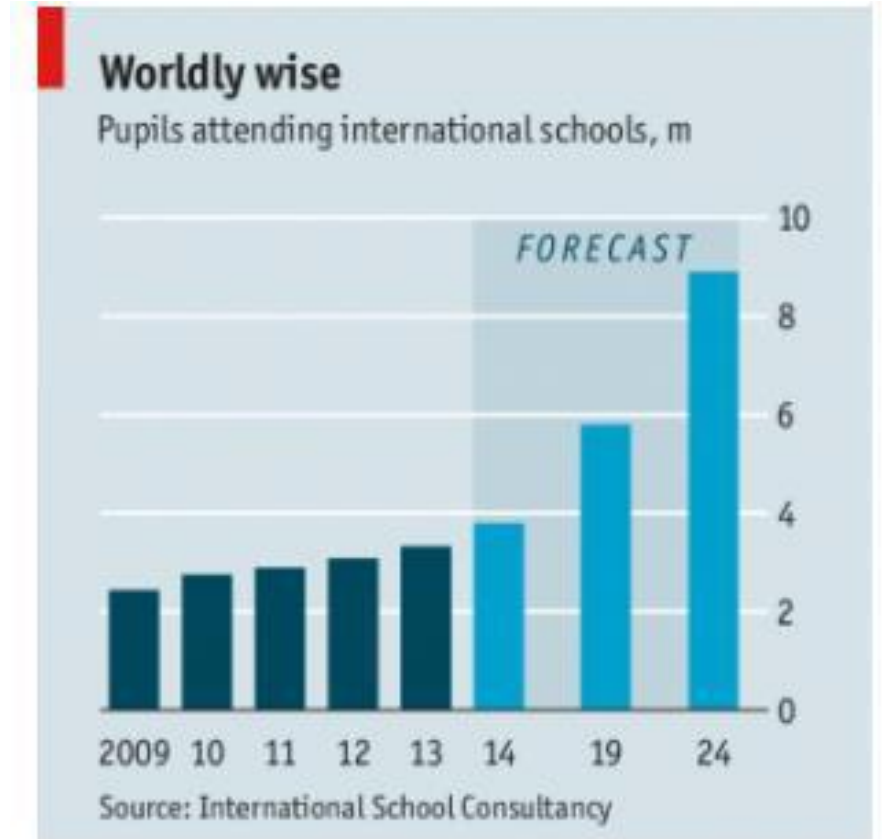


**Worldly wise**
Pupils attending international schools, m

FORECAST

2009 10 11 12 13 14 19 24

Source: International School Consultancy

# Private K-12 Sector

The global private education market amounts to USD1.1 trillion with huge investment opportunities

Private sector keeps taking market share from public sector



Spending in Private Education Sector in 2016



Share of K-12 Students in Private Schools 2004 vs 2014
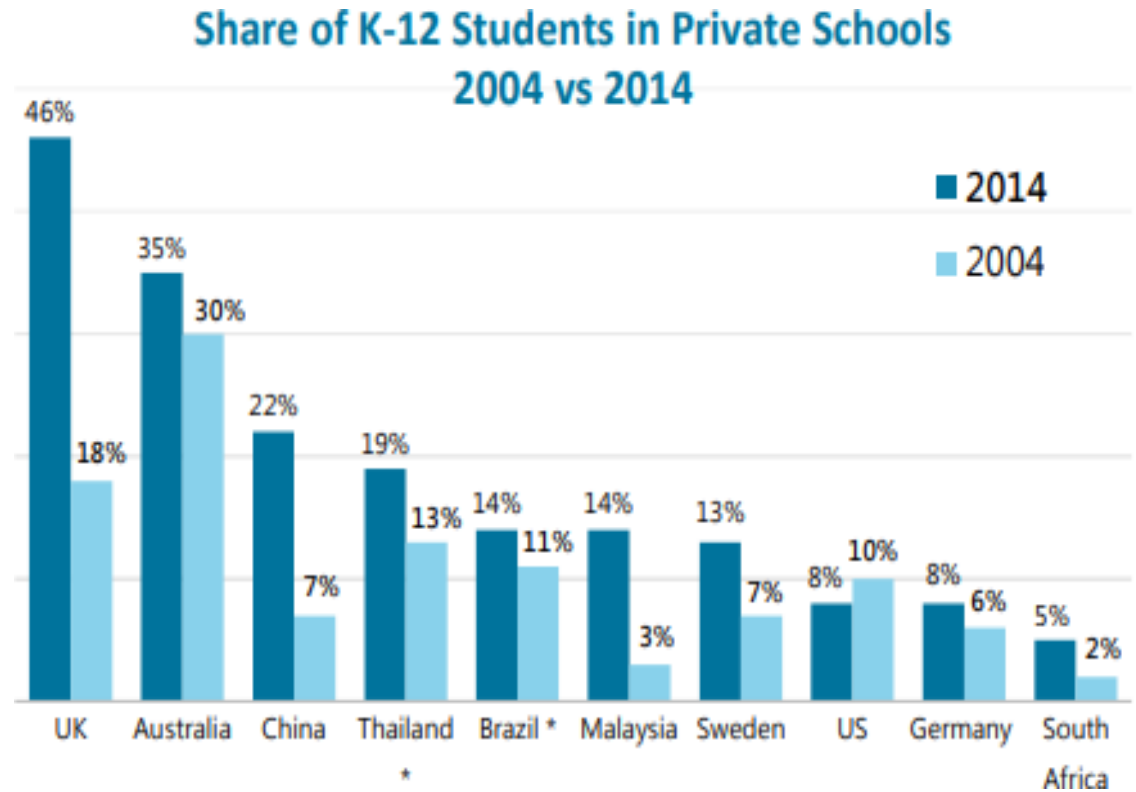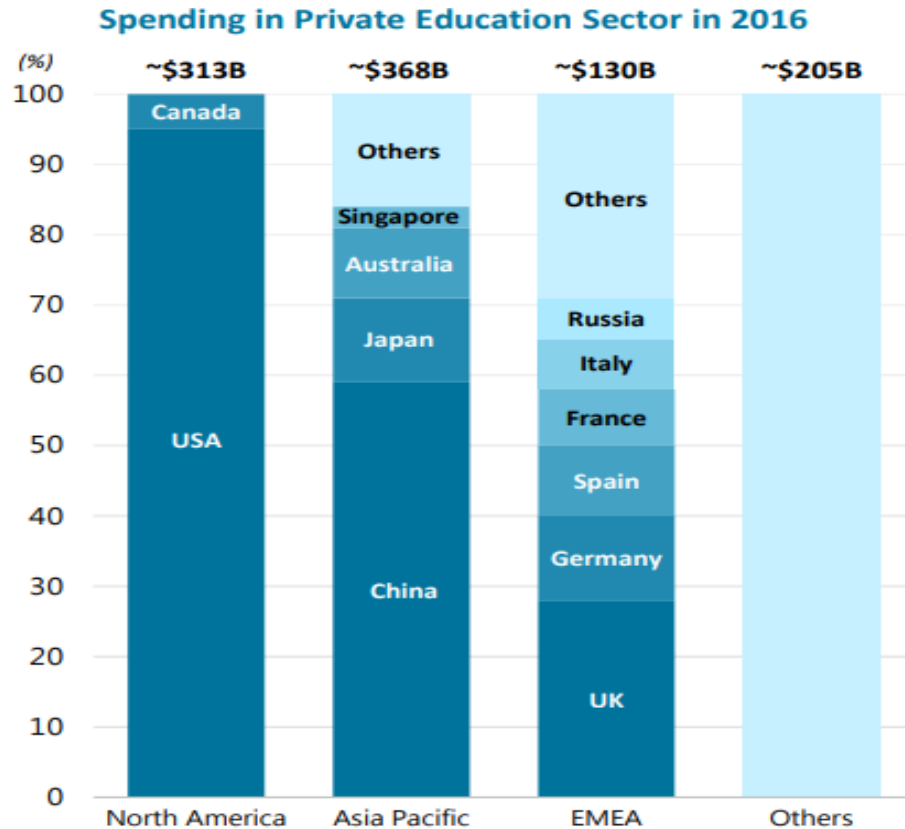
Source: World Bank, Parthenon Group Analysis

# Thank You

"The illiterate of the 21$^{st}$ century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn".

Alvin Toffler [Future Shock (1970)]