



Cambridge Assessment  
International Education

# Updating the Curriculum Based on Future Students' Needs

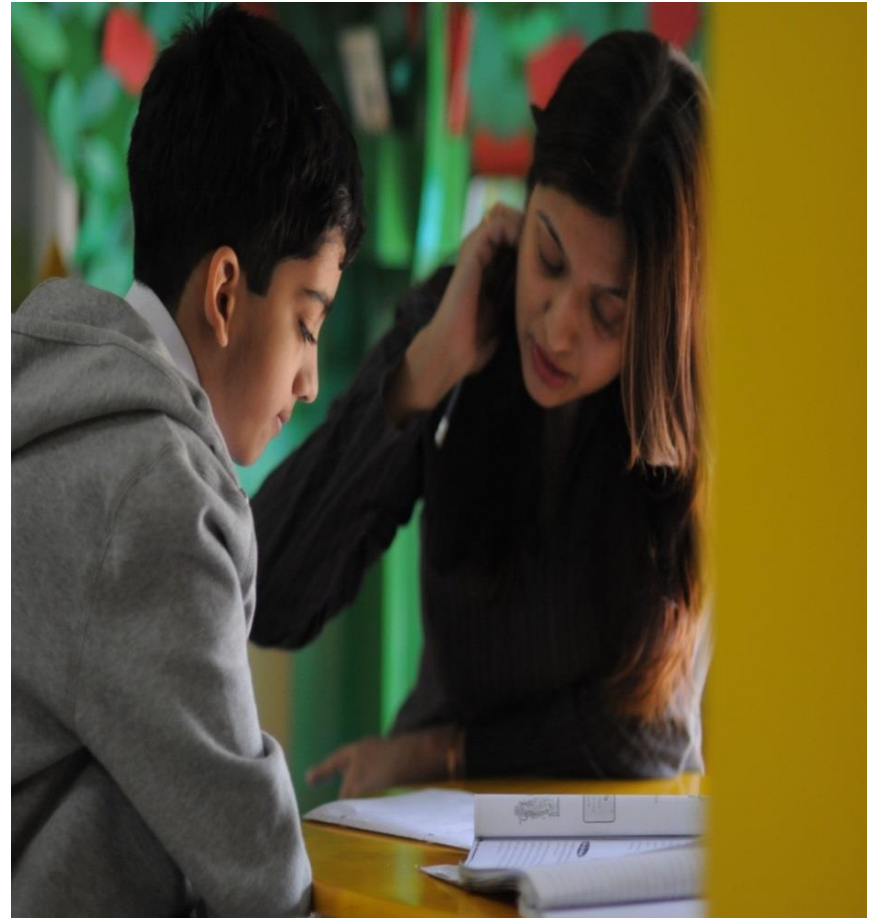
British Council Schools Conference  
April 2018: B a r r a n q u i l l a  
*Anchoring 21st Century Skills In  
Schools: From Theory To Practice*

Dr Tristian Stobie



# Overview of Presentation

- ▶ What is the curriculum?
- ▶ 21<sup>st</sup> Century challenges
- ▶ The curriculum battleground
- ▶ What are the implications for the curriculum?
- ▶ Understanding dangerous myths



# What is the curriculum?

The word 'curriculum' is used in many different ways and the meaning depends on the context:

- ▶ **School** curriculum content
- ▶ **Subject** curriculum content
- ▶ **Co-curricular** curriculum
- ▶ **Informal** curriculum
- ▶ **Assessed** curriculum
- ▶ **Enacted / taught** curriculum
- ▶ **Experienced** curriculum

The learners' experience will depend on the school's:

- vision and values
- teaching quality
- environment and culture
- curriculum/subject curricula
- assessment practices
- internal structures/operations
- and the learner's motivation and knowledge.

**Broad interpretations describe the curriculum as the educational experience students receive as a result of attending a school.**

# Quality of instruction is critical

*“A bad curriculum well taught is invariably a better experience for students than a good curriculum badly taught ... what matters is how things are taught.” ..... The most effective teachers generate learning in their students at four times the rate of the least effective teachers”* Dylan Wiliam.

*“Teachers are among the most powerful influences in learning.”*

John Hattie

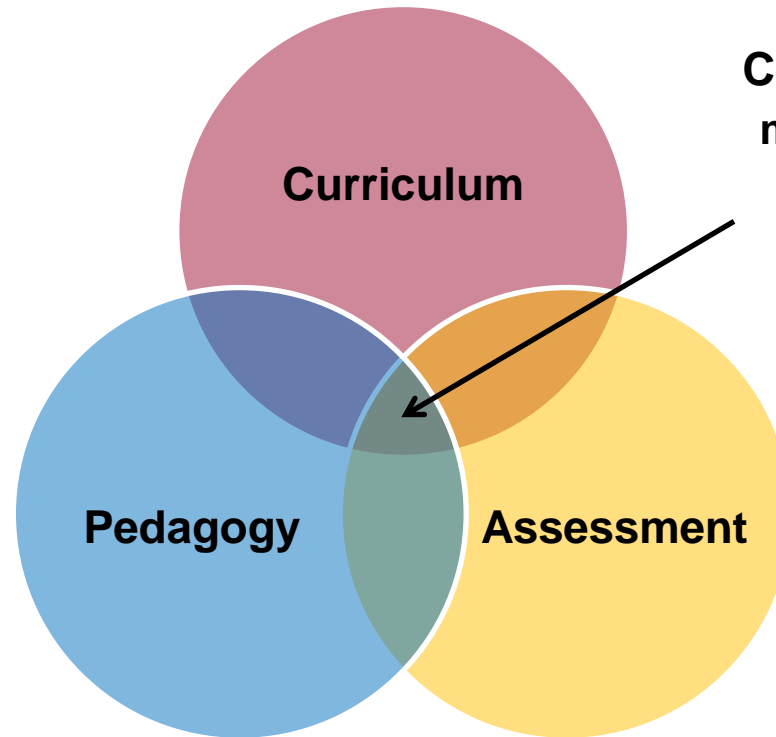
“What is the most important school-related factor in student learning? **The answer is teaching.**” Bob Schwartz

# An aligned instructional system

## Coherent and aligned instructional systems are important

See also: National Center on Education and the Economy [NCEE]. **Marc Tucker** <http://www.ncee.org/>

The content of the curriculum, the pedagogical approach and the assessment approach must be aligned in order to maximize learner achievement



**Coherence:**  
maximizes  
learners'  
progress

Roach, A. T., Niebling, B. C., & Kurz, A  
*Evaluating the alignment among curriculum, instruction and assessments:  
Implications and applications for research and practice.*

### Competing in the global age: characteristics of the modern world:

1. Workplace: Accelerating change demands different skills
2. Information overload
3. Constant change and speed of change
4. Uncertainty
5. Multiple careers. No longer 'a job for life'
6. Importance of interdisciplinary understanding, based on rigorous disciplinary understanding, to solve problems
7. Resilience, adaptability and creativity needed for an individual [and a society] to succeed. *Learning how to learn*
8. Importance of communication, collaboration

**A move towards educational practices that support the development of these skills and dispositions.**

## 21<sup>st</sup> century challenges

# Dealing with uncertainty

*“I believe the prime function of education in an uncertain world should be to provide young people with the competence and self-confidence to cope with uncertainty well: in other words to be good learners....the main concern of teachers is to equip their pupils with the ability to be intelligent in the face of change.”*

Guy Claxton [1990]

## 21<sup>st</sup> century challenges

# Social Media and technology

The digital age provides new challenges and the adolescent brain is changing:

- ▶ High Horsepower, Poor steering
- ▶ Immediate gratification. Short attention span.
- ▶ Restless
- ▶ Learning by doing
- ▶ Multiple identities
- ▶ Changes in mind, body & behaviour
- ▶ Extensive Gaming: disrupts sleep, rest and memory, stimulates the brain's reward system, influences the way we navigate our thinking and learn
- ▶ Young people can be more lonely than previous generations and have poor social intelligence



# Getting on as well as getting in to university

## Generic Competencies for Higher Education

Study conducted by Cambridge Assessment 2011 identified 10 areas applicable to all subjects:

- ▶ Active enquiry
- ▶ Open and creative thinking style
- ▶ Motivation
- ▶ Self-discipline
- ▶ Organization
- ▶ Copes with demands
- ▶ Resilient
- ▶ Emotional control
- ▶ Self-reflective
- ▶ Organization citizenship

### Top Undergraduate Performers are:

- “Intellectual Magpies”
- “Engaged with the subject”
- “Critical and questioning”
- “Makes connections”
- “Integrates material”
- “Self-directing”
- “Confident, will try new things”
- “Works through problems and setbacks”
- “Proactive, finds out what is needed”
- “Focuses on the right things”
- “Strong sense of purpose”
- “Think and arrange things in a systematic way”
- “Can reflect on how they are doing and learning experiences”

# Importance of skills in the 21<sup>st</sup> century curriculum

## Assessment and Teaching of 21<sup>st</sup> Century skills

Griffin et al 2011

Category	Skills
Ways of thinking	<ol style="list-style-type: none"><li>1. Creativity &amp; innovation</li><li>2. Critical thinking, problem-solving, decision-making</li><li>3. Learning to learn, metacognition</li></ol>
Ways of working	<ol style="list-style-type: none"><li>4. Communication</li><li>5. Collaboration (teamwork)</li></ol>
Tools for working	<ol style="list-style-type: none"><li>6. Information literacy</li><li>7. ICT literacy</li></ol>
Living in the world	<ol style="list-style-type: none"><li>8. Citizenship – local &amp; global</li><li>9. Life &amp; career</li><li>10. Personal &amp; social responsibility</li></ol>

# Is academic achievement even relevant?

## Mr Yip's challenge

- ▶ Mr Leo Yip, Chairman,  
Singapore Economic Development Board
- ▶ *“Individuals need to be adaptable and willing to learn. They need to have the confidence to deal with problems that have no clear-cut solutions. And they need to be able to work effectively with others, across races and nationalities, and communicate clearly.”*

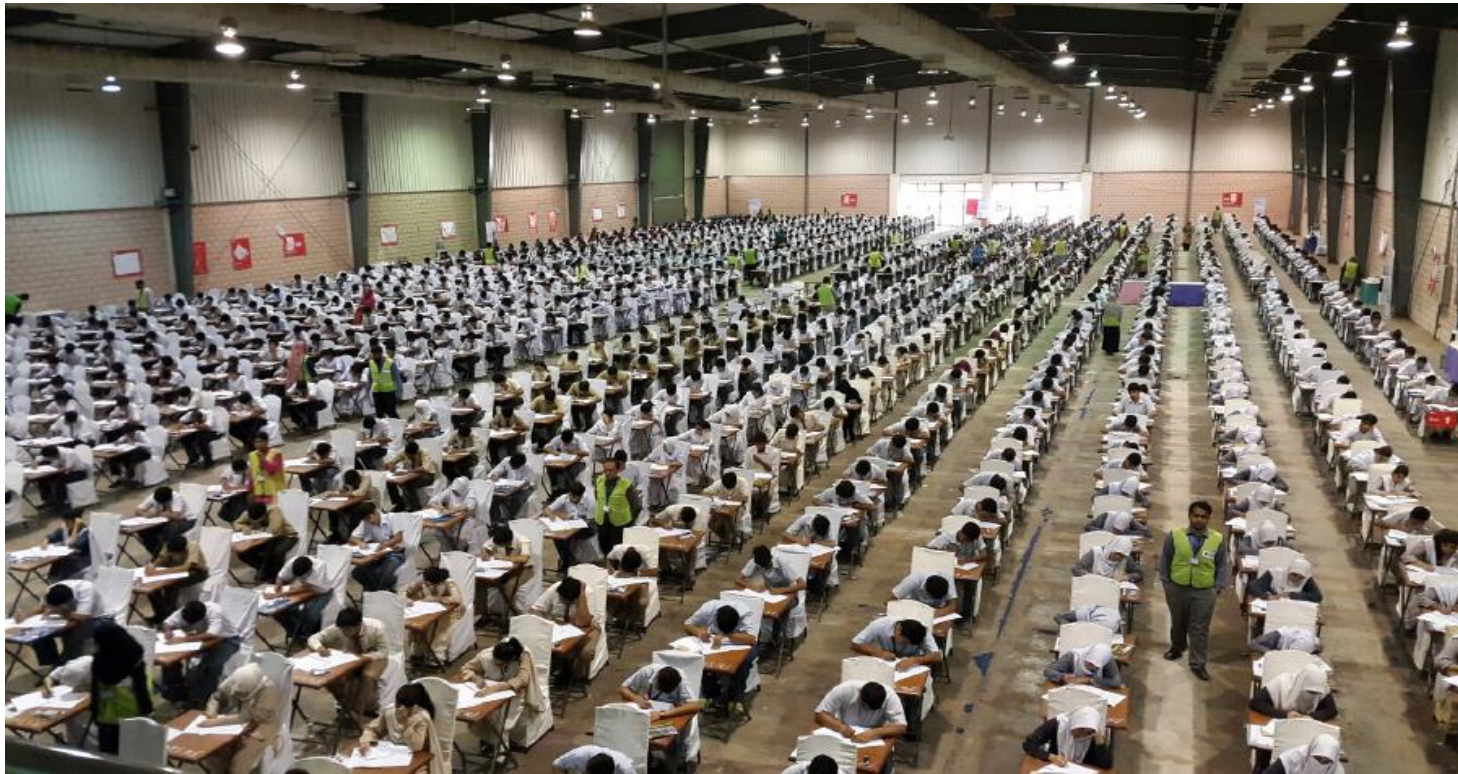
**“Good grades at school are not enough.**

***Indeed, they might not even be relevant.”***



# Examinations are evil?

***“Existing models of assessment typically fail to measure the skills, knowledge, attitudes and characteristics of self directed and collaborative learning that are increasingly important for our global economy and fast changing world.”*** Darling-Hammond L [2000]. Education Policy Analysis Archives . 8 [1]





*'Students work to pass, not to know; they do pass, and they don't know.'*

T.H. Huxley, 1860

And sometimes they cheat:

## India students caught 'cheating' in exams in Bihar

Source: <http://www.bbc.co.uk/news/world-asia-india-31960557>



# Danger of teaching to the test



*"I expect you all to be independent, innovative, critical thinkers who will do exactly as I say!"*



# What to Teach?... Curriculum Structure: Discipline based vs Inter-disciplinary

The Independent Newspaper UK Monday 23 March 2015 <http://www.independent.co.uk/news/world/europe/finland-schools-subjects-are-out-and-topics-are-in-as-country-reforms-its-education-system-10123911.html>



For years, Finland has been the by-word for a successful education system, perched at the top of international league tables for literacy and numeracy.....Which makes it all the more remarkable that Finland is about to embark on one of the most radical education reform programmes ever undertaken by a nation state – scrapping traditional “teaching by subject” in favour of “teaching by topic”.

Subject-specific lessons – an hour of history in the morning, an hour of geography in the afternoon – are already being phased out for 16-year-olds in the city’s upper schools. They are being replaced by what the Finns call “phenomenon” teaching – or teaching by topic.

The reforms reflect growing calls in the UK – not least from the Confederation of British Industry and Labour’s Shadow Education Secretary Tristram Hunt – for education to promote character, resilience and communication skills, rather than just pushing children through “exam factories”.



A more traditional view:

Should the Curriculum should be based on students inquiring into what they are interested in?

3.

*“ This ‘Knowledge Age’ or ‘21st Future Learning’ approach is gaining ground because it offers what some call an exciting digital utopianism. Dispense with the teacher, bring out the iPad, let's co-inquire together. But pupils don't know what they don't know. You can't look it up on Google when you don't know what you are looking for. You can't recognise it when you see it, and you can't judge it if you do find it..... **A teacher who says "I co-inquire with my students", "I learn from them", "we construct knowledge together" does not deserve that status.**”*

Rata, E. [2013] The New Zealand Herald. Accessed 7<sup>th</sup> September 2013.  
[http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=11120838](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11120838)



The Mail on Sunday (Main)  
16 November 2014

# Minister tells schools to copy China – and ditch trendy teaching for ‘chalk and talk’



By **Jonathan Petre**

SCHOOLS are being urged to go back to ‘chalk and talk’ teaching that was once widespread in Britain – in order to reproduce the success the traditional methods now have in China.

Education Minister Nick Gibb said having a teacher speak to the class as a whole from the front was much more effective than children working on their own – the method which has become dominant in schools over the past 40 years.

per cent in China.

The research, by Zhenzhen Miao and Professor David Reynolds of the University of Southampton, concluded: ‘Effective teachers spent longer time on interacting with the whole class rather than with individuals/groups or leaving pupils to independent seatwork.’



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# The Curriculum Battleground

## Different Perspectives / Priorities / Tensions [*simplistic and generalized*]

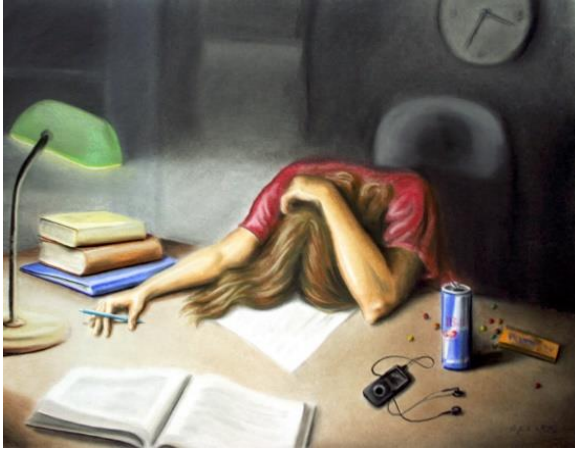
### Traditional

- ▶ Cultural transmission
- ▶ Disciplinary
- ▶ Knowledge / content based
- ▶ Narrow learning objectives
- ▶ Summative assessment based on tests / examinations emphasising reliability
- ▶ Teachers deliver curriculum
- ▶ Teachers not directly involved in high stakes assessment

### Modern

- ▶ Cultural transformation
- ▶ Interdisciplinary / phenomenon based
- ▶ Process / skills led
- ▶ Broad learning objectives with a focus on competencies
- ▶ Authentic summative assessment based on portfolios and teacher assessment valid to broader educational aims
- ▶ Students and Teachers create curriculum
- ▶ Teachers involved in high stakes summative assessment marking coursework

# What are the implications for the curriculum of the future?



# What are the implications for the curriculum?

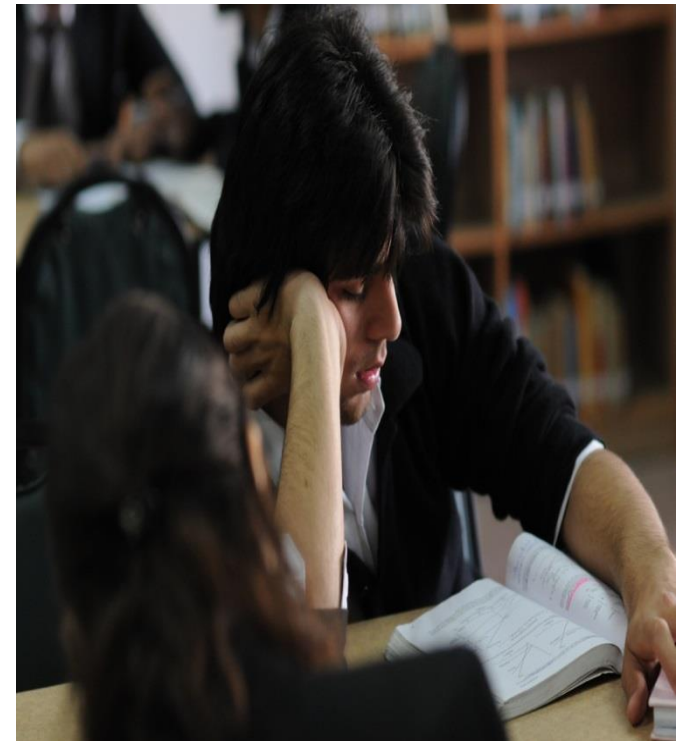
## Understand what learning Involves:

Learning involves a process of making [constructing] meaning which is:

- ▶ incorporated into prior knowledge
- ▶ “... a significant change in capability or understanding”
- ▶ Deeper forms of learning modify previous understanding
- ▶ transfer to new situations

Adapted from the introduction to *Testing Times: the uses and abuses of assessment*. Gordon Stobart. Abingdon. Routledge. 2008

**Constructivism is a well established theory that explains how learning happens. It is not an approach to teaching with which it is often confused.**





What are the implications?

## Focus on active, visible Learning

**“The biggest effects on pupils’ achievement occur when teachers become learners about their own teaching, and when pupils become their own teachers.” John Hattie**

**Active and guided instruction is much more effective than unguided and facilitative instruction.**

Teachers need to:

- ▶ be directive, influential, caring and actively engaged in the passion of teaching and learning
- ▶ to construct meaningful experiences in the light of what each student is thinking.
- ▶ have proficient knowledge and understanding of their subject to provide meaningful and appropriate feedback
- ▶ know the learning intention and success criteria of each lesson and how well they are attaining these and where to go next
- ▶ teach for transfer...relating and extending ideas
- ▶ create a learning environment where error is welcomed as a learning opportunity

Hattie. J [2009] Visible learning: A synthesis of over 800 Meta-Analyses Relating to Achievement  
Routledge. Oxford UK.

# What are the implications for the curriculum?

## Stretch and challenge in the classroom.

### Effect Sizes for teacher as activator and teacher as facilitator

Teacher as Activator	d	Teacher as Facilitator	d
Reciprocal teaching	.74	Simulations and gaming	.32
Feedback	.72	Inquiry based teaching	.31
Teaching students self-verbalization	.67	Smaller class sizes	.21
Metacognition strategies	.67	Individual instruction	.20
Direct instruction	.59	Problem based learning	.15
Mastery learning	.57	Different teaching for boys and girls	.12
Challenging goals	.56	Web based learning	.09
Frequent / effects of testing	.46	Whole language reading	.06
Behavioural organizers	.41	Inductive teaching	.06
<b>Average activator</b>	<b>.60</b>	<b>Average facilitator</b>	<b>0.17</b>

What are the implications for the curriculum?

# Focus on a learning rather than a performance orientation

Source: Watkins, C. [2010] Learning Performance and Improvement. *Research Matters*. The London Centre for Leadership in Learning issue 34, summer 2010. [www.ioe.ac.uk/insi](http://www.ioe.ac.uk/insi)

We need to challenge and change culture

From	To
Proving Competence	Improving Competence
Performance orientation	<b>Learning Orientation</b>
‘Looking good’	‘Learning Well’
	Making Learning an object of attention, conversation and reflection

*“Students with more elaborated conceptions of learning perform better in public examinations”*

*“The evidence leads to the conclusion that learning about learning is a practically viable and educationally important strategy which also has the effect of improving performance”*

What are the implications for the curriculum?

# Learning to Learn

**Learning to learn means reflecting on one's learning and intentionally applying the results of one's reflection to further learning** [Professor David Hargreaves / Chris Watkins]

**Metacognition** is a term used to describe the processes involved when learners plan, monitor, evaluate, and make changes to their own learning behaviours.





### Learning to learn:

*“Children’s developing self-regulatory abilities predict academic outcomes and emotional well-being **more powerfully than any other aspect of children’s development**, including, for example, traditionally measured intelligence (Veenman & Spaans, 2005) and early reading achievement (McClelland et al, 2013). The crucial role played by these abilities has been extensively researched in relation to the development of an increasingly wide range of domains. These include:*

- ▶ *reasoning and problem-solving*
- ▶ *mathematics*
- ▶ *reading and text comprehension*
- ▶ *Writing”*

Veenman, M.V.J. & Spaans, M.A. (2005). Relation between intellectual and metacognitive skills: age and task differences. *Learning and Individual Differences*, 15, 159-76.

McClelland, M.M., Acock, A.C., Piccinin, A., Rhea, S.A. & Stallings, M.C. (2013). Relations between Preschool Attention Span-Persistence and Age 25 Educational Outcomes. *Early Childhood Research Quarterly* 28, 2, 314–24.

# What are the implications for the curriculum?

## The importance of meta-cognition and self regulation

On average, introducing meta-cognition and self-regulation into the classroom has a high impact, with pupils making an average of eight months' additional progress.

[educationendowmentfoundation.org.uk/evidence/teaching-learning-toolkit/meta-cognition-and-self-regulation/](https://educationendowmentfoundation.org.uk/evidence/teaching-learning-toolkit/meta-cognition-and-self-regulation/)

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Keywords

Average Impact

Cost

### Meta-cognition and self-regulation

High impact for very low cost, based on extensive evidence.

£ 1 2 3 4 5 6 7 8 9 10

+8 months

Download Approach

#### Videos and Case Studies

**Toolkit Talks: Meta-cognition and self-regulation**

**Toolkit Case Study: The Skills Programme at EGA, London**

#### What is it?

Meta-cognition and self-regulation approaches (sometimes known as 'learning to learn' approaches) aim to help learners think about their own learning more explicitly. This is usually by teaching pupils specific strategies to set goals, and monitor and evaluate their own academic development. Self-regulation means managing one's own motivation towards learning. The intention is often to give pupils a repertoire of strategies to choose from during learning activities.




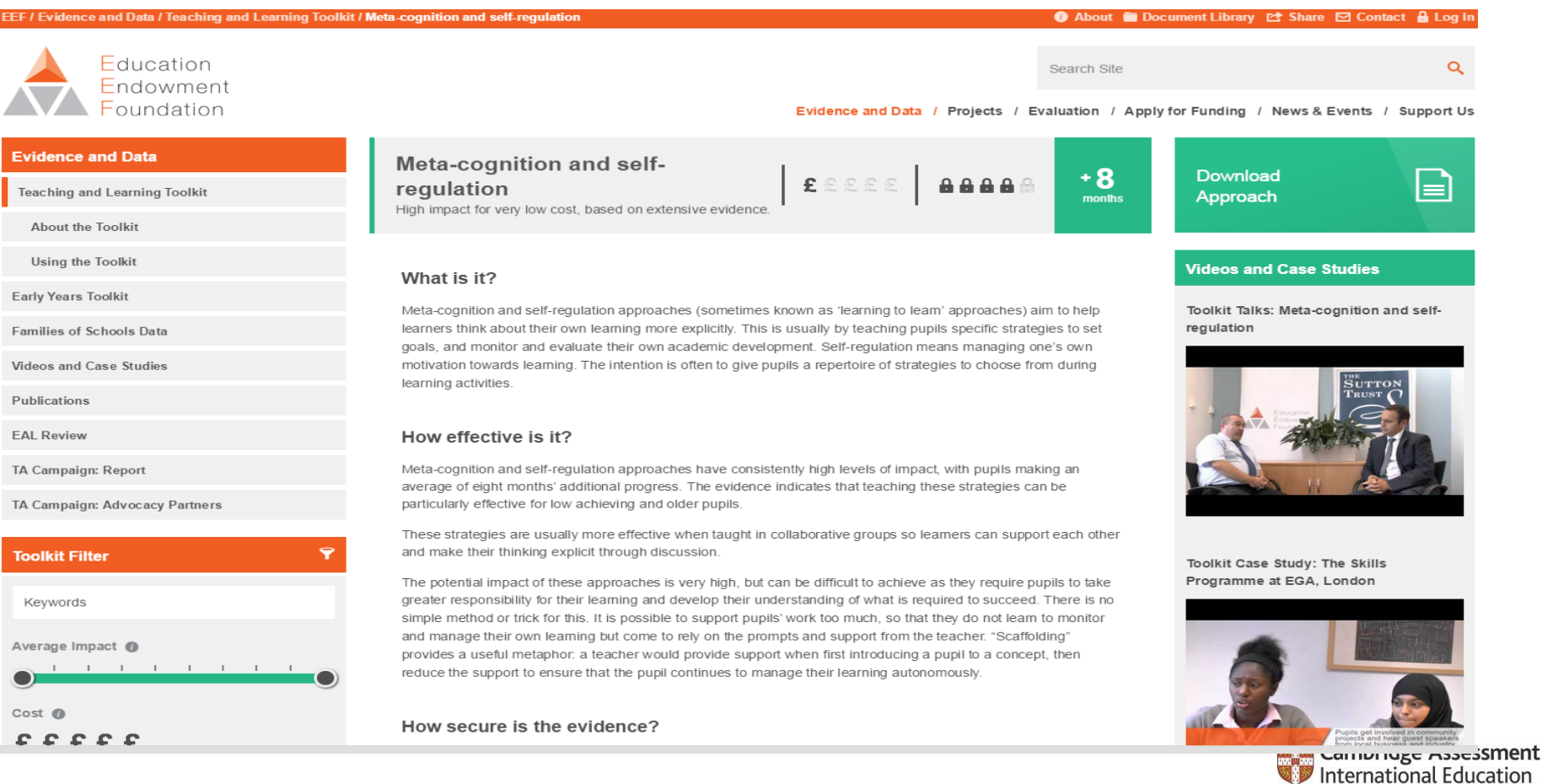

#### How effective is it?

Meta-cognition and self-regulation approaches have consistently high levels of impact, with pupils making an average of eight months' additional progress. The evidence indicates that teaching these strategies can be particularly effective for low achieving and older pupils.

These strategies are usually more effective when taught in collaborative groups so learners can support each other and make their thinking explicit through discussion.

The potential impact of these approaches is very high, but can be difficult to achieve as they require pupils to take greater responsibility for their learning and develop their understanding of what is required to succeed. There is no simple method or trick for this. It is possible to support pupils' work too much, so that they do not learn to monitor and manage their own learning but come to rely on the prompts and support from the teacher. "Scaffolding" provides a useful metaphor: a teacher would provide support when first introducing a pupil to a concept, then reduce the support to ensure that the pupil continues to manage their learning autonomously.

#### How secure is the evidence?



# What are the implications?

## Building Learning Power

*Source: Guy Claxton, adapted from building learning power*

### Move From:

- ▶ Retention
- ▶ Discussion
- ▶ Justification
- ▶ Calculation
- ▶ Tight manipulation
- ▶ 'Knocking out small essays'
- ▶ Accepting criticism
- ▶ Achieving targets

### Move To being an Expansive school:

- ▶ asking interesting questions
- ▶ checking what we are told
- ▶ thinking on our feet
- ▶ making good use of resources
- ▶ harnessing our imaginations
- ▶ unearthing problems
- ▶ being bold and trying new things
- ▶ helping ourselves when we are stuck
- ▶ checking and improving our own work
- ▶ seeking and valuing feedback
- ▶ working well in different groups
- ▶ listening carefully and respectfully
- ▶ concentrating despite distractions
- ▶ becoming our own teachers



What are the implications for the curriculum?

# Cambridge learner and teacher attributes

see: <http://www.cambridgeinternational.org/teaching-and-learning/cambridge-learner-attributes>

Cambridge learners	Cambridge teachers
<b>Confident</b> in working with information and ideas – their own and those of others.	<b>Confident</b> in teaching their subject and engaging each student in learning.
<b>Responsible</b> for themselves, responsive to and respectful of others.	<b>Responsible</b> for themselves, responsive to and respectful of others.
<b>Reflective</b> as learners, developing their ability to learn.	<b>Reflective</b> as learners themselves, developing their practice.
<b>Innovative</b> and equipped for new and future challenges.	<b>Innovative</b> and equipped for new and future challenges.
<b>Engaged</b> intellectually and socially, ready to make a difference.	<b>Engaged</b> intellectually, professionally and socially, ready to make a difference.

What are the implications for the curriculum ?

## Emphasize powerful knowledge

Curriculum of schools should be an entitlement to powerful knowledge.

Too much concern with ***“Is this curriculum meaningful to my students”*** rather than ***“what are the meanings this curriculum gives my students access to?”***

Young, M. [2013] Overcoming the crisis in curriculum theory: a knowledge – based approach. Journal of Curriculum Studies [Vol 45, No. 2 5th April pp101-118]. Routledge.



# Disciplinary vs Interdisciplinary study

Critical thinking is discipline specific not generic and cannot be taught in isolation of knowledge.

*“Interdisciplinarity is excellent if it is firmly rooted in disciplinarity. Each subject is not an end in itself but it must be an efficient tool. We must keep its identity and especially its own methodology. Only on that basis will we be able to construct progressively a serious interdisciplinarity otherwise we will lead or student’s to mental confusion and superficial surveys.”*

Gerard Renaud [1989]



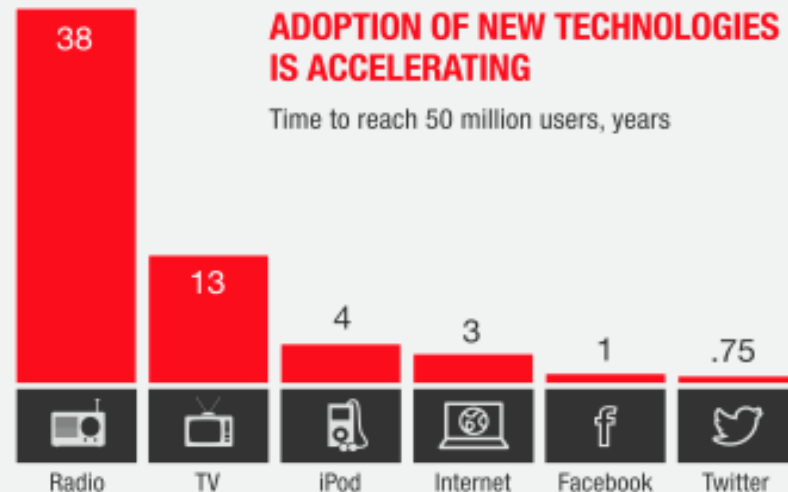
What are the implications for the curriculum ?

## The critical importance of information literacy

**1 trillion** objects expected to connect to the Internet by 2025



### GLOBALIZATION AND TECHNOLOGY ARE CHANGING THE FACE OF THE BUSINESS WORLD



**TECHNOLOGICAL BREAKTHROUGHS ARE SPEEDING UP**

The path toward **mobile Internet**



### DISRUPTIVE TECHNOLOGIES TO WATCH

Estimated potential economic impact by 2025 across sized applications<sup>1</sup>



**Mobile Internet**  
\$4 trillion–\$11 trillion



**Automation of knowledge work**  
\$5 trillion–\$7 trillion



**Internet of Things**  
\$3 trillion–\$6 trillion

## What are the implications? The importance of bilingualism

1. Increased mental processing capacity
2. Greater control over mental processing
3. Improved memory
4. Greater meta-linguistic awareness
5. Increased mental flexibility
6. Improved health
7. Improved inter-cultural skills
8. Increased opportunities for trade
9. Increased income

Mehisto, P. *Excellence in Bilingual Education: A Guide for School Principals*, CIE/CUP, 2012



What are the implications for the curriculum ?  
Focus on understanding: The importance of selective depth.  
Less can be more.

**Do not overload the curriculum**

*“Coverage is the enemy of understanding”*

[Howard Gardner]

*“The most important thing I found out from [my father] is that if you asked any question and pursued it deeply enough, then at the end there was a glorious discovery of a general and beautiful kind.”* Source: Richard Feynman (1994) No Ordinary Genius



What are the implications for the curriculum ?

# A broad and balanced curriculum

**Making sense of the curriculum must be done locally.**

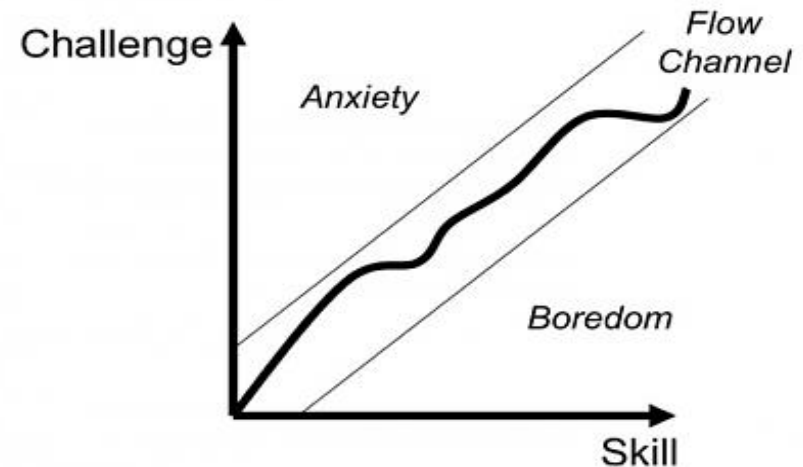
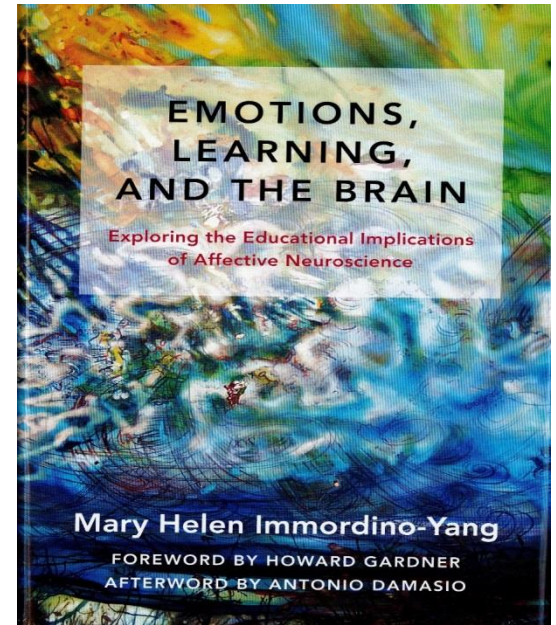
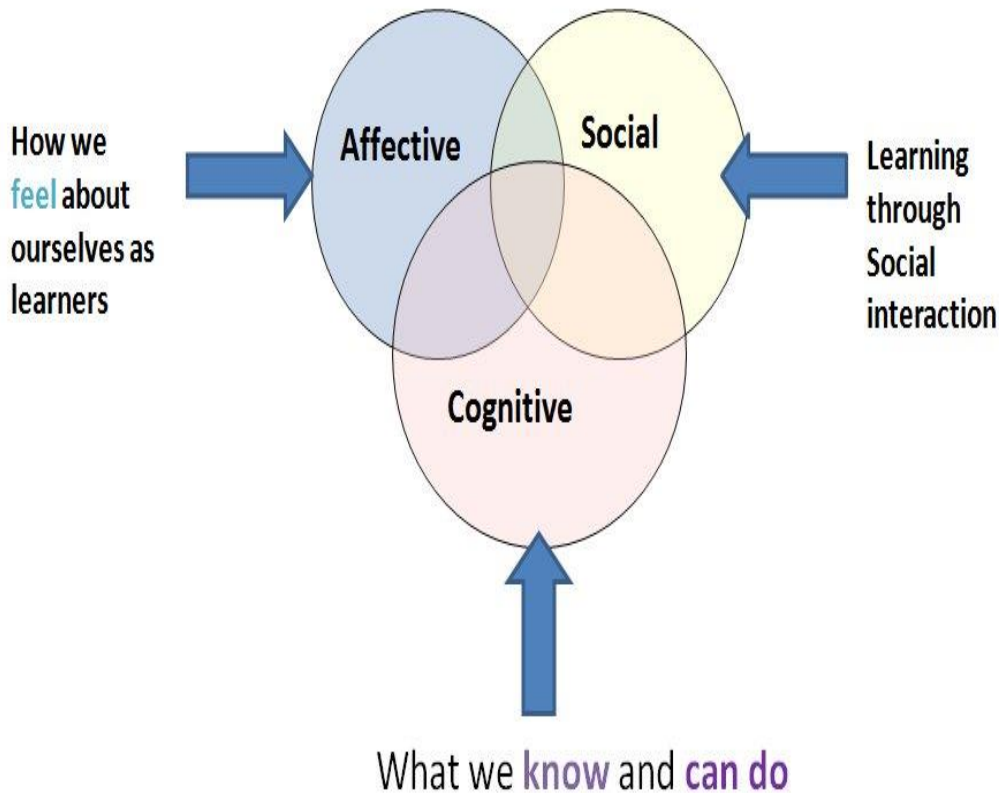




# What are the implications for the curriculum ?

## Importance of emotional thought

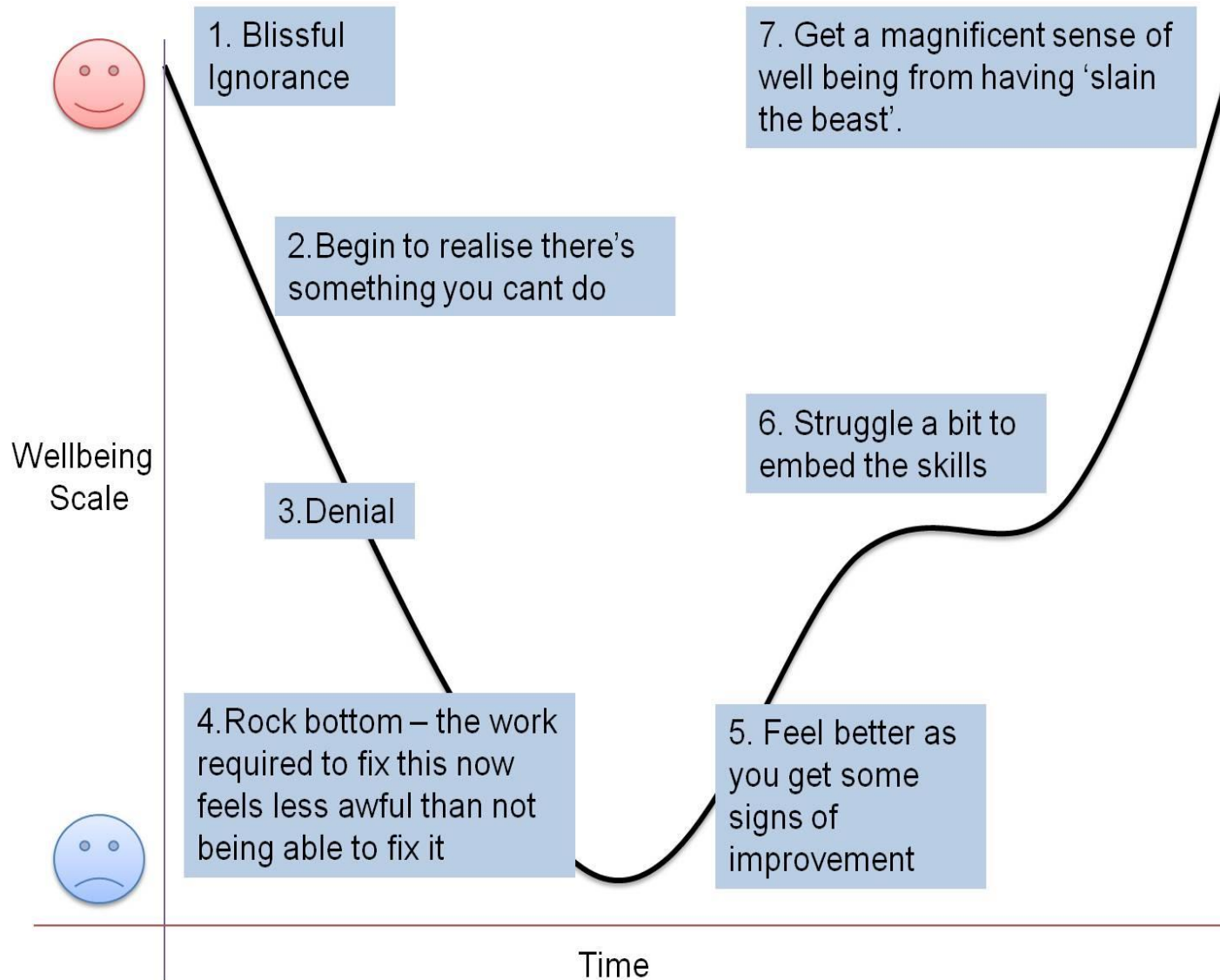
Self concept is an amalgam of....



"Flow" concept by Mihaly Csikszentmihalyi. Drawn by Senia Maymin.

# What are the implications for the curriculum ?

## Develop Grit / Resilience



## What are the implications for the curriculum ?

### The critical importance of goal directed deliberate and diligent practice

The importance of **working memory** as a bottleneck to processing power in learning and performance is well understood:

Longer and complex chains of skills can only be effectively developed after smaller chains have been formed through practice.

- ▶ **Active**, not passive
- ▶ **Expansive** practice, not dull repetition
- ▶ **Purposeful**: Focus on important areas for skill consolidation or conceptual development

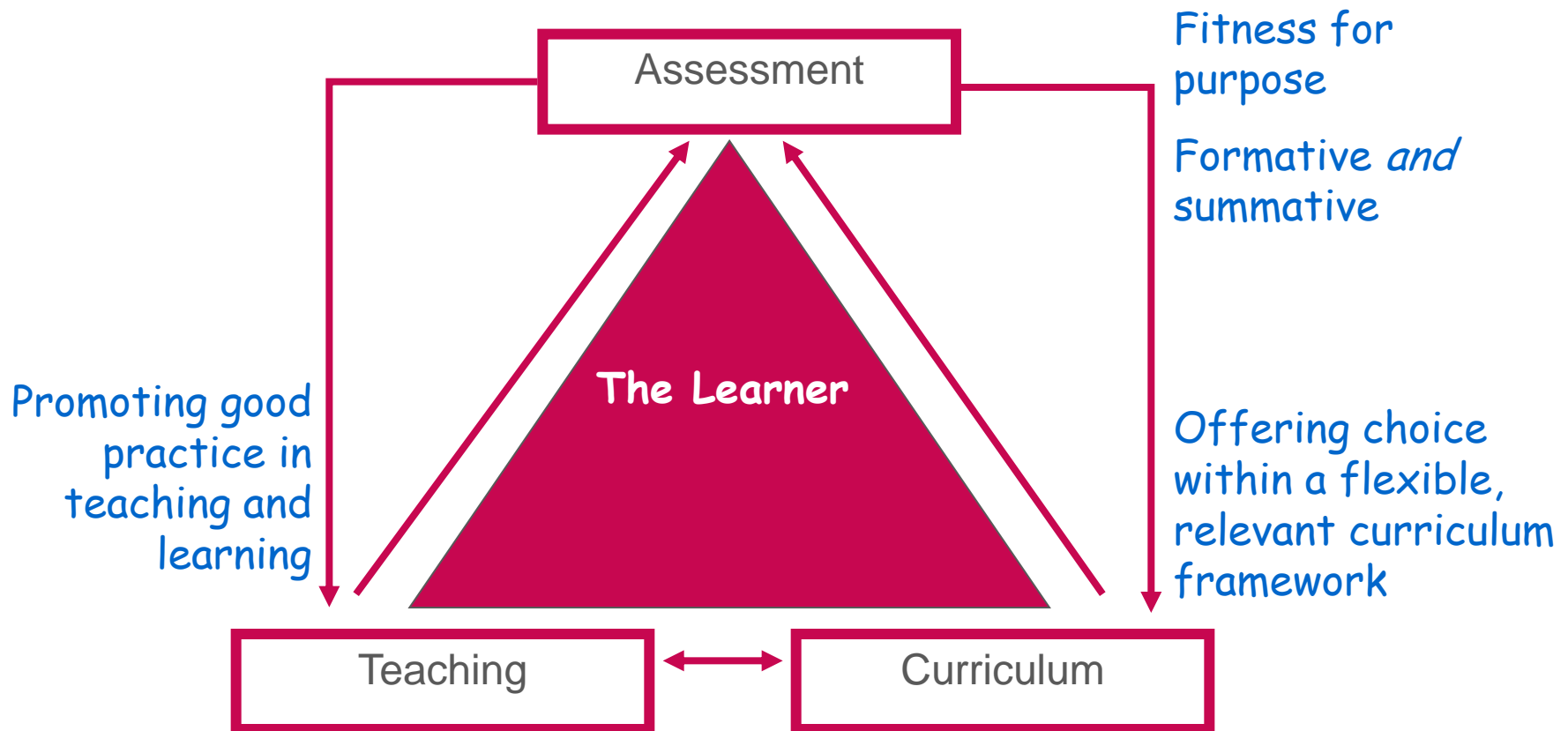
[see Abadzi, H. (2015). Training the 21<sup>st</sup> century worker. Policy advice from the dark world of implicit memory. IBE Working papers on curriculum issues No16. UNESCO International Bureau of education. Geneva, Switzerland]

What are the implications for the curriculum?

Benchmark to clear **international standards**

Have high expectations and expect high standards from all students

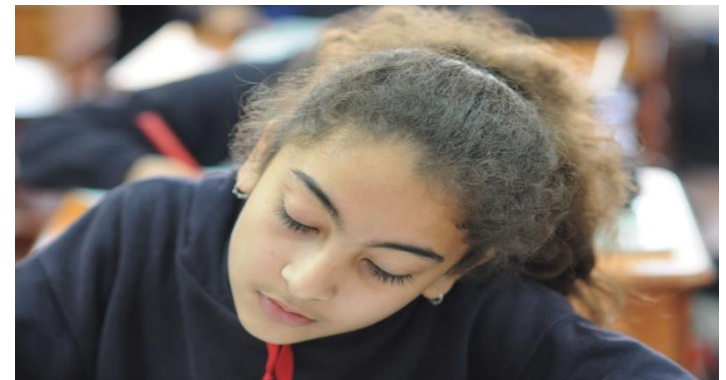
## Assessing what we value not just valuing what we assess



What are the implications for the curriculum ?

# Most assessment should be about making learning and thinking visible to help guide future learning

- ▶ Criteria help to identify what matters, to ***define what excellence looks like***
- ▶ When summative assessment is used we need to **assess what we value.**
- ▶ The power of well constructed self-evaluation



# Making learning and thinking visible: What does a good one look like?

Through assessment for learning, the learner:

1. comes to hold a concept of performance similar to that held by the teacher
  - ▶ *i.e. develops the notion of a standard*
2. monitors the quality of his/her own performance
  - ▶ *i.e. can compare own performance with the standard*
3. sees how the quality of performance can be improved
  - ▶ *i.e. engages in the action that closes the gap between own performance and the standard*

[adapted from Professor David Hargreaves]



# The central role of the teacher as a creative professional

*“Evidence is accumulating from around the world that the single most significant means of improving the performance of national education systems is through excellent teaching....the quality of pedagogy, of what teachers actually do, is thus firmly on the contemporary agenda”.*

Pollard, A. [Ed] [2010] Professionalism and Pedagogy: A contemporary opportunity. A commentary by TLRP and GTCE. London:TLRP

*“Educational Change depends on what teachers do and think. It’s as simple and complex as that.”*

Fullan, M. [1982] The meaning of educational change. New York: Teachers College Press.

*“Excellence in teaching is the single most powerful influence on achievement.”*

Hattie, J. [2003] Teachers make a difference: What is research evidence? Paper for conference on building teacher quality; ACER

“

# Examples of false or simplistic statements about effective practice for the 21<sup>st</sup> century

- ▶ “Constructivism is an approach to teaching based on student led inquiry with the teacher as facilitator which better prepares students for the 21<sup>st</sup> century.”
- ▶ “We need to focus on 21<sup>st</sup> century skills not knowledge.”
- ▶ “The curriculum should be designed around ‘phenomenon based learning’ as this better reflects the world we live in.....Interdisciplinary understanding is more important than disciplinary understanding.”
- ▶ “Computers can provide information and do skills tasks. Children do not need to remember information or facts any more.”
- ▶ “Children should be taught differently depending on the preferred learning style and multiple intelligence profile.”
- ▶ “Assessment should always be as authentic as possible.”

“Computers can provide information and do skills tasks. Children do not need to remember information or facts any more”

*Ensuring that every child reaches a baseline level of proficiency in reading and mathematics will do more to create equal opportunities in a digital world than solely expanding or subsidising access to high-tech devices and services.*

*Students who use computers moderately at school tend to have somewhat better learning outcomes than students who use computers rarely. **But students who use computers very frequently at school do much worse, even after accounting for social background and student demographics.***”

OECD (2015) *Students, Computers and Learning: Making The Connection*. Accessed 16<sup>th</sup> September 2015.  
<http://www.oecd.org/education/new-approach-needed-to-deliver-on-technologys-potential-in-schools.htm>

# Beware of neuro-myths



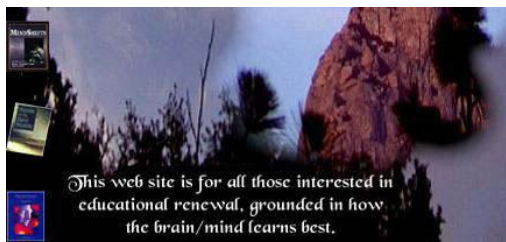
**The School of  
Accelerated Learning**



**ZOOM LEARNING**



**Left Brain  
Learning**



Leaning styles (VAK) Visual, auditory, kinaesthetic  
(Kratzig and Arbuthnott, 2006):

no benefit of having material presented in one's preferred learning style, concluding that attempts to focus on learning styles were "wasted effort"

**does not detract from the general value for all learners when teachers present learning materials using a full range of forms and different media**

## “Children should be taught differently depending on the preferred learning style and multiple intelligence profile”

*“Students may have preferences about how to learn, but no evidence suggests that catering to those preferences will lead to better learning. A careful review of literature suggests that, while learning styles are prominent in education, there is nearly no supporting evidence of their existence, and that the theory should not be used in education.”*

Riener C., Willingham D. (2010). The myth of learning styles. *Change* 42 32–35.

See also:

- ▶ The Learning Styles Myth is Thriving in Higher Education [Newton in Frontiers in Psychology]  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4678182/>
- ▶ Learning styles concepts and evidence. Pasler et al in Aps journal available at:  
[montana.edu/facultyexcellence/documents/mar7\\_Pashlerarticle.pdf](http://montana.edu/facultyexcellence/documents/mar7_Pashlerarticle.pdf)

## Caution

“Assessment should be as authentic as possible.”

Inquiry is central to active learning but there is a danger with ***too much or poorly designed*** project work. Students may be engaged but will not building the foundational skills they need and can learn to be confidently incompetent.

Critical thinking, creativity, communication and collaboration “*depend on complex reasoning as well as **multiple low-level skills that first must be automated.***”  
[Abadzi 2015, p35].

The assumption is often that component skills are best developed through ‘authentic’ learning activities that are as much like the desired end product as possible. This may not actually be a good way to develop the component skills.

[Christodoulou, 2017. Making Good Progress? The future of Assessment for Learning. OUP].





**Any questions?**