What should students learn in the 21st century?
Wrong Model
Roger Schank’s view

CCR’s focus is on “What”
and the interplay with “How”
The Perfect Storm

Globalization
Financial Meltdown
Overconsumption
Global Warming

Source: “In the Hollow of a Wave off the Coast at Kanagawa” 18th century by Katsushika Hokusai, Metropolitan Museum, NY
And the consequences can be dire...

War is peace
Freedom is slavery
Ignorance is strength.

George Orwell, “1984”
We aspire to life satisfaction

Source: OECD Better Life index

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Improving supplementing

Existing Providers
Formal Learning
digital technologies
Informal Learning

Improving

supplementing

learner ownership

reinventing

New paradigm

New Entrants

Source: Innovation Unit
Imagine if we rethink *What* is taught
Age-Old Debate

Practical Subjects

Theoretical Subjects

Economic argument - Psychosocial argument
Schooling vs Real-World

“...school learning is abstract, theoretical and organized by disciplines while work is concrete, specific to the task, and organized by problems and projects...”

Source: OECD, “Learning for Jobs” 2009

This is true of life, not just work...
Prescription vs. Choice

- % Prescribed by Society
- % Chosen by Individual

Child | Adolescent | Adult
Rebalance: AND not OR

Knowledge + Skills + Character
+ Meta-Layer

Inspired by an inscription used by Charles Voysey, Britain 1896
Ratio of Subjects – OECD Average

What should be the ratios?
What other topics should be there?
STEM Education – OECD average

Why so little Technology?
Why is Engineering only a College discipline?
Begging for Relevance

“Please, Ms. Sweeney, may I ask where you’re going with all this?”
Testimonial from our 24-year-old webmaster

Introducing the website for the Center for Curriculum Redesign, an organization dedicated to the improvement of school curriculum for the modern world.

While I was never the kid to bemoan the uselessness of school curricula, at this point I might say I feel positively bamboozled by it; when it comes to making a living, I feel ill-advised and ill-prepared. So it’s an honor—and perhaps validation—to have been given the opportunity to work with the organization whose purpose is to revamp an education that left so many of us stranded.

You can check out the website I made for them here: The Center for Curriculum Redesign

http://leeviathan.com/
This is not a new debate

British Grammar School Subjects c. 1800
- Latin
- Greek
- English*
- Reading*
- Writing*
- Arithmetic*

Benjamin Franklin’s Philadelphia Academy Subjects
- French
- German
- Spanish
- Handwriting
- Bookkeeping
- Drawing
- Geometry
- Astronomy
- Geography
- Rhetoric
- Oratory
- Morality
- Natural Philosophy
- History
- Natural History
- Mechanics
- Gardening

* usually optional
Example: Ancient Greece
## Relevance is a choice

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<td>Matrices, Operations, Vectors etc</td>
<td>Complex systems, Control, Game theory, etc</td>
<td>Analysis, Transforms, Polynomials, etc</td>
<td>Automata, Graphs, Computational maths etc</td>
<td>Sets, Logic etc</td>
<td>Curves, Dimensions, Transformations, Trigonometry, etc</td>
<td>Arithmetic operations, Fractions, Sequences, etc</td>
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“Numbers and probability provide the basis for statistics, which, together with Logic, constitute the foundation of the Scientific Method”

John Allen Paulos
Redesigning education standards
(Math as example here)
What else is needed?

Psychology/Sociology/Anthropology?
Personal Finance/Economics?
Entrepreneurship?
Engineering? Robotics? Programming?
Recreational Maths in lower grades?
Linguistics?
Mythology? Philosophy?
Woodworking? Gardening? 3D Printing?
Career management?
Resourcefulness?
Project management?
Processes?

Etc.
So...

What do we remove?

→ Deep re-examination of every single discipline’s branches, topics, items…
Rethinking Skills
Mechanical Engineering

Did not learn
Learned elsewhere
Learned on the job
Graduate school
MIT undergrad

Learned at MIT
Used pervasively

Mechanical Engineering Core
Professional Skills
How & Why

Expanding the Mindset

What is engineering?

People
- Problem
- Concept
- Specifications
- Design
- Prototype
- Product
- Market

User-Oriented Design

Design Nature

Modeling Compartment Systems

Fundamentals of Entrepreneurship

Courtesy of Olin President Richard Miller
21st Century Framework

21st Century Student Outcomes and Support Systems

- Learning and Innovation Skills
- Information, Media, and Technology Skills
- Core Subjects and 21st Century Themes
- Life and Career Skills

Standards and Assessments
- Curriculum and Instruction
- Professional Development
- Learning Environments
Framework

Learning & Innovation Skills

- Critical Thinking & Problem Solving
- Creativity & Innovation
- Communication
- Collaboration

Information, Media & Technology Skills

- Information Literacy
- Media Literacy
- ICT (Information, Communications & Technology)

Life & Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Productivity & Accountability
- Leadership & Responsibility

Interdisciplinarity:

- Global
- Environmental
- Civic
- Health
- Financial
The Role of “Character”
“We have evolved traits [such as group selfishness] that will lead to humanity's extinction – so we must learn how to overcome them”

Christian de Duve
Nobel prize in Medicine 1974
“Genetics of original sin”
Yale University Press
Unsustainable

Source: WWF - World Footprint Network
Divergence Between Technology & Culture

Source: Professor SHIH Choon Fong, President, National University of Singapore, 2007
Why Character Education?

Benefit to a civil and civic society:

1. Inevitability (through the education system)
2. Intellectual authorities’ call through history
3. Public support generally widespread
4. Law-based - many countries have supportive laws/codes
5. Cultural indicators (violence, divorce, etc and the impact of the media)

“Character” (behaviors, attitudes, values, dispositions) classification (1)

Performance “character”: one’s mastery and thrust for excellence in life, school, and the workplace

<table>
<thead>
<tr>
<th>Trait</th>
<th>Related Traits and concepts</th>
</tr>
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<tbody>
<tr>
<td>Adaptability</td>
<td>Flexibility, dealing with ambiguity, feedback…</td>
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<tr>
<td>Resilience</td>
<td>Diligence, discipline, perseverance, patience, effort, grit…</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Open-mindedness, inquisitiveness, playfulness…</td>
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<tr>
<td>Initiative</td>
<td>Self-direction, self-discipline, self-control, timing…</td>
</tr>
<tr>
<td>Socialization</td>
<td>Cross-cultural, diversity, listening, speaking…</td>
</tr>
<tr>
<td>Productivity</td>
<td>Accountability, efficiency, project /program management, results-orientation, multi-tasking, precision, …</td>
</tr>
<tr>
<td>Leadership</td>
<td>Responsibility, decisiveness, consistency, inspiration, leading via example, selflessness, mentorship, goal-orientation…</td>
</tr>
</tbody>
</table>

Composite of: P21, CharacterEd.Net, Singapore documents, Character Education Partnership, Young Foundation, Success DNA, KIPP, etc
“Character” (behaviors, attitudes, values, dispositions) classification (2)

**Moral** “character” (relational and ethical): how one treats oneself and others in interpersonal and social matters

<table>
<thead>
<tr>
<th>Trait</th>
<th>Related Traits and Concepts</th>
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<tbody>
<tr>
<td>Honesty</td>
<td>Truthfulness, trustworthiness, loyalty, integrity, authenticity, genuineness, conscientiousness…</td>
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<tr>
<td>Civic-mindedness</td>
<td>Fairness, equity, sportsmanship, ethics, justice, citizenship, inclusiveness, belonging, social perspective…</td>
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<tr>
<td>Respect</td>
<td>Self-respect, respect for others, honor, reverential, humility…</td>
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<tr>
<td>Courage</td>
<td>Fortitude, determination, resilience, grit, confidence, stability, bravery…</td>
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<tr>
<td>Zest</td>
<td>Gratitude, optimism, passion, inspiration, enthusiasm…</td>
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<tr>
<td>Care</td>
<td>Kindness, compassion, tolerance, generosity, charity, cheerfulness, helpfulness, empathy, devotion, love, camaraderie, forgiveness…</td>
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<tr>
<td>Awareness</td>
<td>Mindfulness, consciousness, presence, tranquility, spirituality, balance, wisdom, self-actualization, existential…</td>
</tr>
</tbody>
</table>
Meta-Layer
A prescient view

“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”

Alvin Toffler
Meta-layer elements

- Interdisciplinarity
- Learning how to learn (understanding how You learn, and what processes you learn to use)
- Self-directed Learning (ability to leverage Learning how to learn)
Operating at the meta- and macro-level,

<table>
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<th>Level</th>
<th>Type</th>
<th>Example</th>
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<tr>
<td>Meta level</td>
<td>International</td>
<td>CCR, PISA</td>
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<tr>
<td>Macro level</td>
<td>System/society/nation/state/jurisdiction</td>
<td>National standards or curriculum</td>
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<tr>
<td>Meso level</td>
<td>School/institution/sub-system</td>
<td>School- or district-specific curriculum</td>
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<td>Micro level</td>
<td>Classroom</td>
<td>Instructional plan and materials</td>
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<tr>
<td>Nano level</td>
<td>Individual/personal</td>
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Gathering global views & socializing

- 100 essays
  - Publish online and as book

- 10,000 teachers
- 100,000 students
- 1 Million parents
  - Web-based surveys, publish online

- 1 Billion items
  - Analysis of tweets, blogs, searches etc.
  - Publish online
Deeply embedding modern needs
(Math as example here)

Board of Advisors
(Incl. Jurisdictions)

Math SME organizations:
- IMU
- NCTM
- MAA
- AMS
- EMS

5 Math Curriculum Experts (3x, 1 reporting):
- Algebra
- Arithmetic
- Calculus
- Geometry
- Stats & Probs

5 Star Math Teachers:
- Algebra
- Arithmetic
- Calculus
- Geometry
- Stats & Probs

5 Star Academics: (will represent disciplines broadly)
- Biology/Biotech/Chemistry
- Economics/Business
- Philosophy/Literature
- Physics/Engineering
- Psychology/Sociology

20 Successful Practitioners:
- Art/Design
- Art/Performing
- Business (entrepreneur)
- Communications/Media
- Construction/Architecture
- Engineering (EE or ME)
- Farming/Fishing/Forestry
- Finance
- Law
- Manufacturing
- Medicine/Nursing
- Retail (owner)
- Transportation/Logistics
Adoption & Scaling

Significant, high profile end-users are part of the design:

Top-down via all involved key jurisdictions (Alberta, Finland, Korea, Massachusetts, Ontario, Singapore, etc)
2012 Timing

Winter through Fall:
Preparatory pillars:
• Futurists
  • Human capital
• Neuroscience
  • Assessments
  • EdTech

Summer & Fall:
Larger scope:
• Plenary (top-down)
• Subject One (Maths)
Process Timing

2012 (ongoing):
- Definition
- Funding
- Team building
- Top-down design start
- Subject One start

Year Two:
- Pilot one subject
- Team building for next subjects

Year Three:
- Build all subjects
- Start Scale effort

Year Four:
- Scale effort

Deliverables: frameworks and example implementations
Ancient Wisdom

Confucius (~551-479 BC):
“I hear and I forget, I see and I remember, I do and I understand”

Socrates (~469– 399 BC):
“Education is the kindling of a flame, not the filling of a vessel”

Michel de Montaigne (1533-1592 AD):
“rather a mind shaped than a head full”
Leadership lessons from the dancing guy
Let’s Be Our Versatile Selves

Open-minded and open-hearted
Global and altruistic
Candid and respectful
Thorough yet concise
Deep and broad
Joyful and humorous

"The important thing is… to be able at any moment to sacrifice what we are for what we could become."

Charles Du Bos
Thank You