

(Engineering) Education for the Age of AI



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Charles Fadel

Founder and chairman

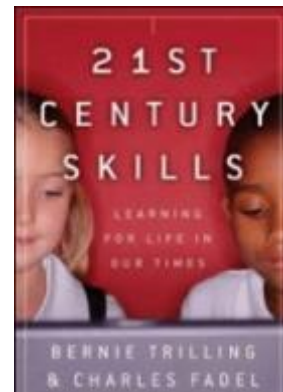
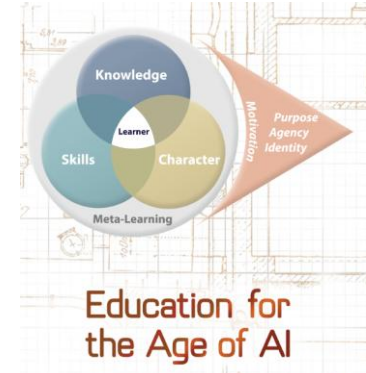
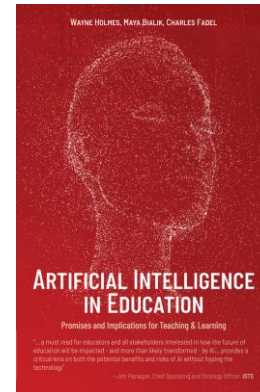
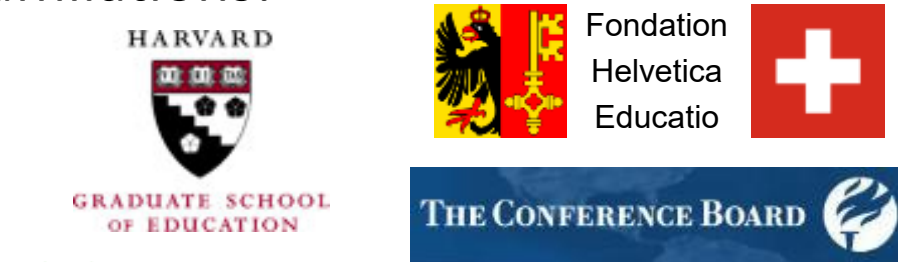


4 Books

Present affiliations:



Past affiliations:

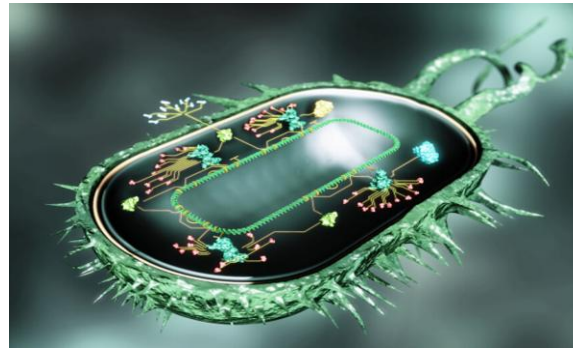


Neurodyne AI

BSEE, MBA,
7 Patents + 1 pending

The New (Tech) World Order

Energy is abundant
Biology is programmable
Intelligence is a commodity



Impact of Technologies Through the Centuries

Category	Common Benefits	Common Losses	Illustrative Cases
Durability & Transmission	Knowledge preserved and extended beyond human lifespan	Loss of oral memory, experiential immediacy	Writing, Printing
Precision & Standardization	Predictable measurement, shared baselines	Oversimplification, exclusion of qualitative nuance	Clocks, Engineering
Expansion of Cognitive Reach	Enhanced planning, forecasting, computation	Cognitive dependence, automation bias	Agriculture, AI
Social Integration	Wider access, collective coordination	Centralization of authority, epistemic inequality	Printing, Digital networks
Symbolic Abstraction	Creation of new representational languages (mathematics, code)	Alienation from embodied experience	Perspective, Computing

Questions to Address

EDUCATION :

1. How may AI change the relationship between schools, teachers, parents and the community ?
2. Who owns the data by what students have learned over AI ? Can the teacher still decide what is right or wrong ?
3. How will AI alter the role and responsibility of teachers ... is it going to imply deskilling the profession ?
4. Will AI widen or reduce learning gaps between students and industry requirements ?
5. Will AI literacy become a core subject in curricula, like “writing, reading, math, etc.” ?
6. **What knowledge is about to become less important when AI can generate it in seconds ?**
7. ***What is the renewed importance of Technology & Engineering during schooling?***
8. **In which way will AI affect future student’s motivation, curiosity and independence ?**

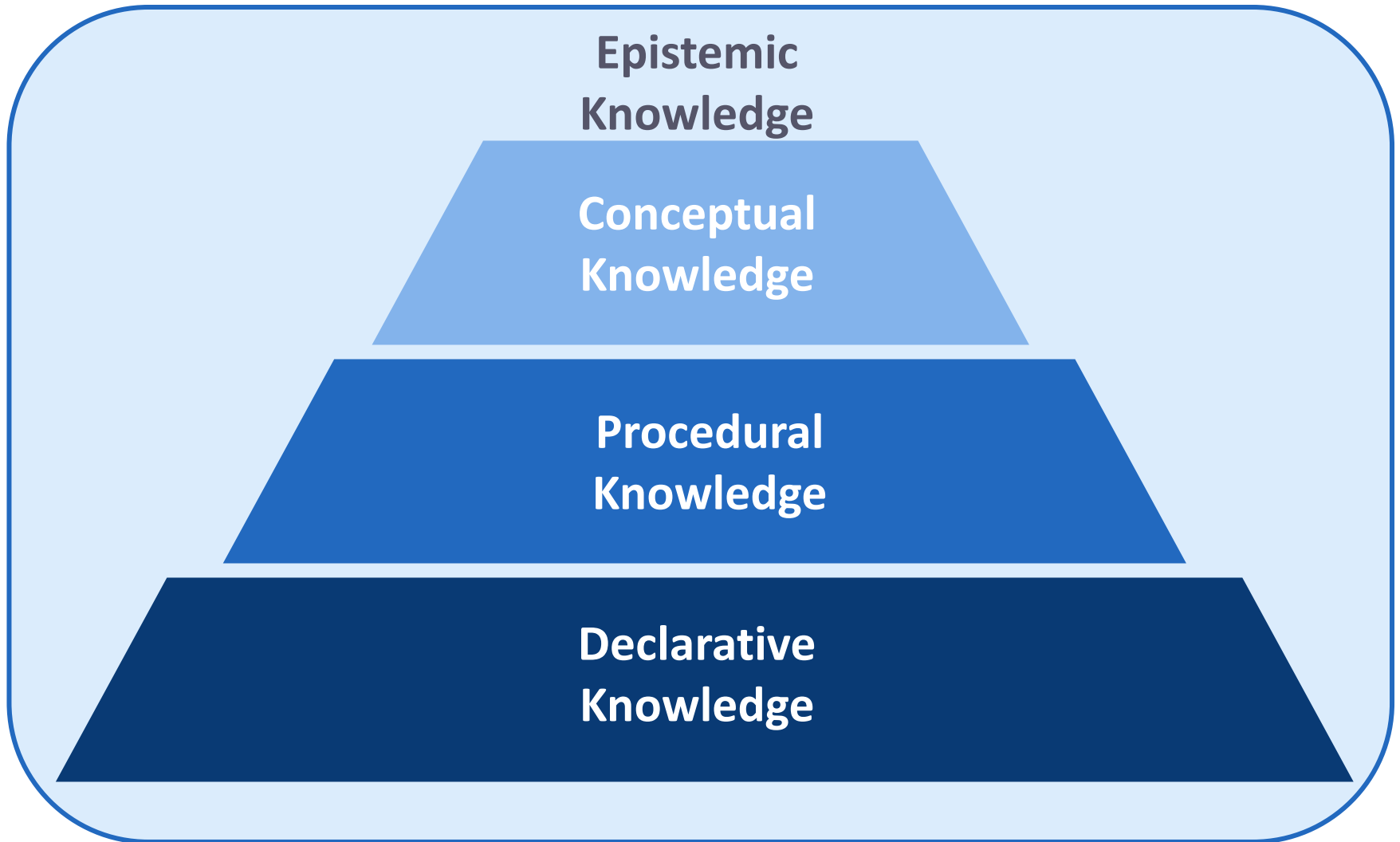
INDUSTRY :

1. What risks arise from dependence on US or Chinese AI platforms and cloud infrastructures ?
2. Will European SME’s have access to sufficient “high-quality data” to benefit from AI in that sense ?
3. Can regulation become a competitive advantage and for whom (trustworthy AI for tomorrow ?)

Questions to Address

What knowledge is about to become less important when AI can generate it in seconds ?

Ladder to Expertise and Transfer

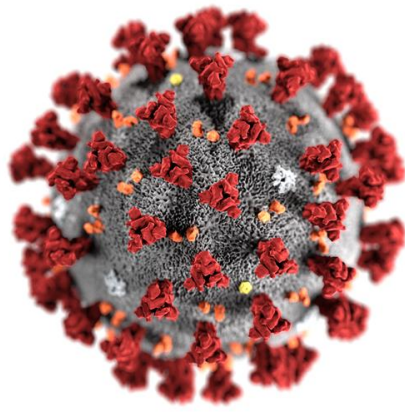


Core Concepts → Transfer to Real Life

Impact

“Three Words Worth Trillion\$”

Explosive”



Concept: “Deceiving then

Content: $F(x) = e^x$

Time

Five-Layer Framework of Educational Competence

Layer 5: Epistemic meta-competence

Adaptability, judgement, verification

What education should do

Teach explicitly

Classroom example

Students fact-check an AI-generated answer using primary sources and justify confidence.

Layer 4: Integrative sensemaking

Cross-domain transfer, structured breadth

What education should do

Build integrative sensemaking

Classroom example

Students compare climate, health and finance systems using the same feedback-loop model.

Layer 3: Conceptual & structural understanding

Models, causal explanation, abstraction, transfer within domains

What education should do

Deepen understanding
(primary target)

Classroom example

Students explain why a math procedure works and apply it to a novel problem.

Layer 2: Procedural & declarative knowledge

Calculation, drafting, searching, routine execution (automatable)

What education should do

Strategically automate
(with grounding)

Classroom example

Students practice solving equations fluently before using a calculator or CAS tool.

Layer 1: Foundational human capacities

Attention, memory formation, spatial & temporal orientation

What education should do

Preserve & cultivate
(non-delegable)

Classroom example

Students do device-free reading and recall, followed by a short written reflection.

Question to Address

What is the renewed importance of Technology & Engineering during schooling?

Engineering is Applicability

Seeks self-consistency
within an imagined world

MATHEMATICS
(Develops certain
knowledge of ideal entities,
using deductive logic, in the
theoretical realm)

Applied in

Applied in

SCIENCE
(Develops provisional
knowledge of natural
phenomena, using
deductive & inductive logic;
moves empirically between
theory and testing)

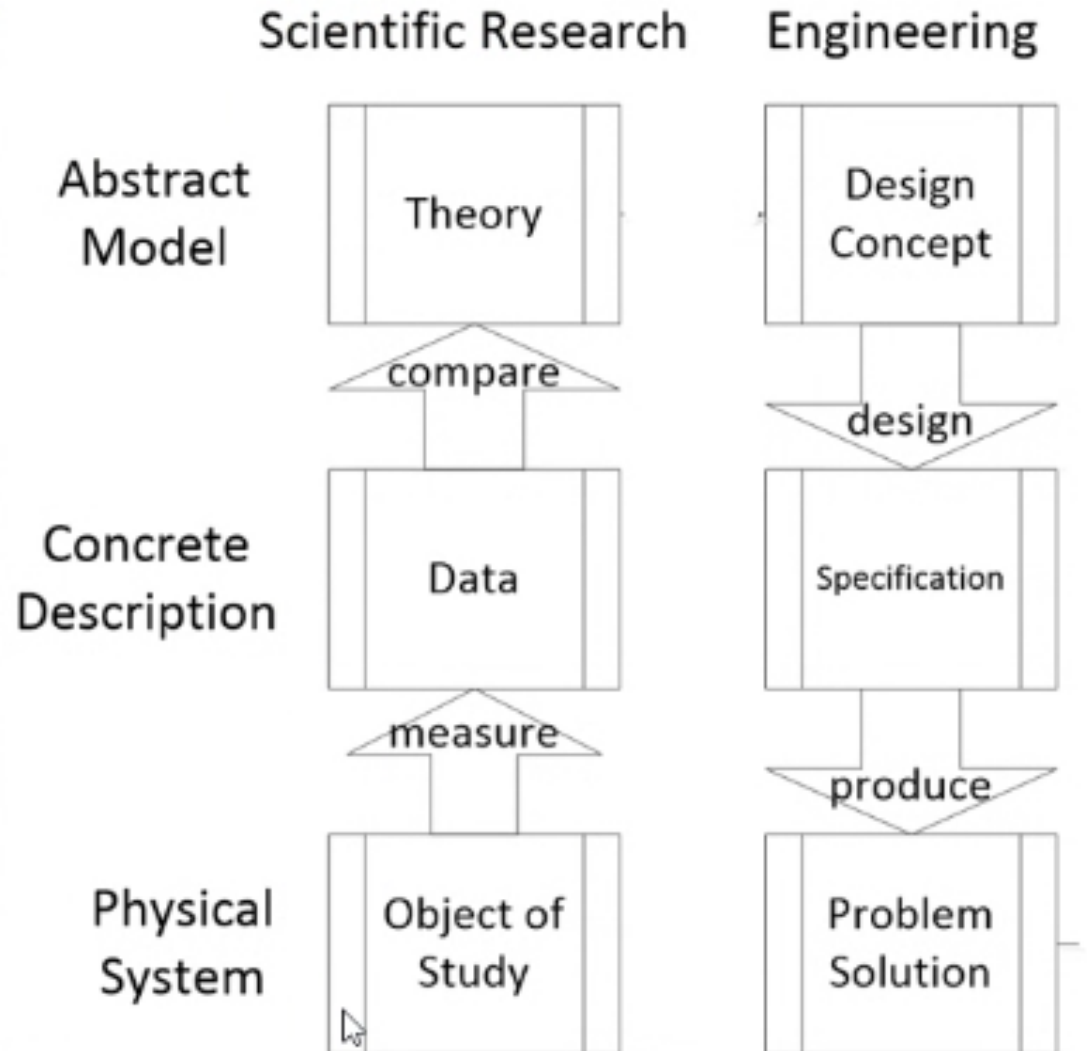
Applied in

**TECHNOLOGY &
ENGINEERING**
(Real-world products,
evaluated pragmatically,
addresses social needs &
problems)

Seeks consistency between
an imagined world and
empirical experience

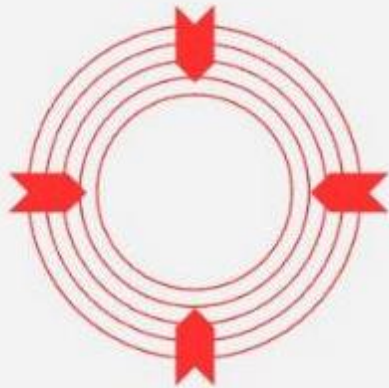
Seeks consistency between
imagined solution and practical
outcome

Engineering is Applicability (2)



Three Responses to the Present Mess

walls • tariffs • retreat



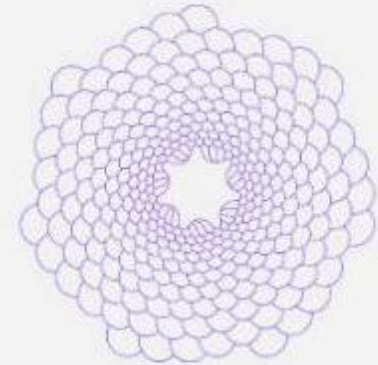
HOARDER

redistribute • optimize



MANAGER

accelerate • abundance



BUILDER

Why Tech & Engineering? FUTURE JOBS

AI revolution



Artificial Intelligence



Agentic AI

Compute and connectivity frontiers



Cloud and edge computing



Immersive reality technologies



Digital trust and cybersecurity



Advanced connectivity



Quantum technologies



Application-specific Semiconductors

Cutting edge engineering



Future of robotics



Future of bioengineering



Future of space technologies



Future of mobility



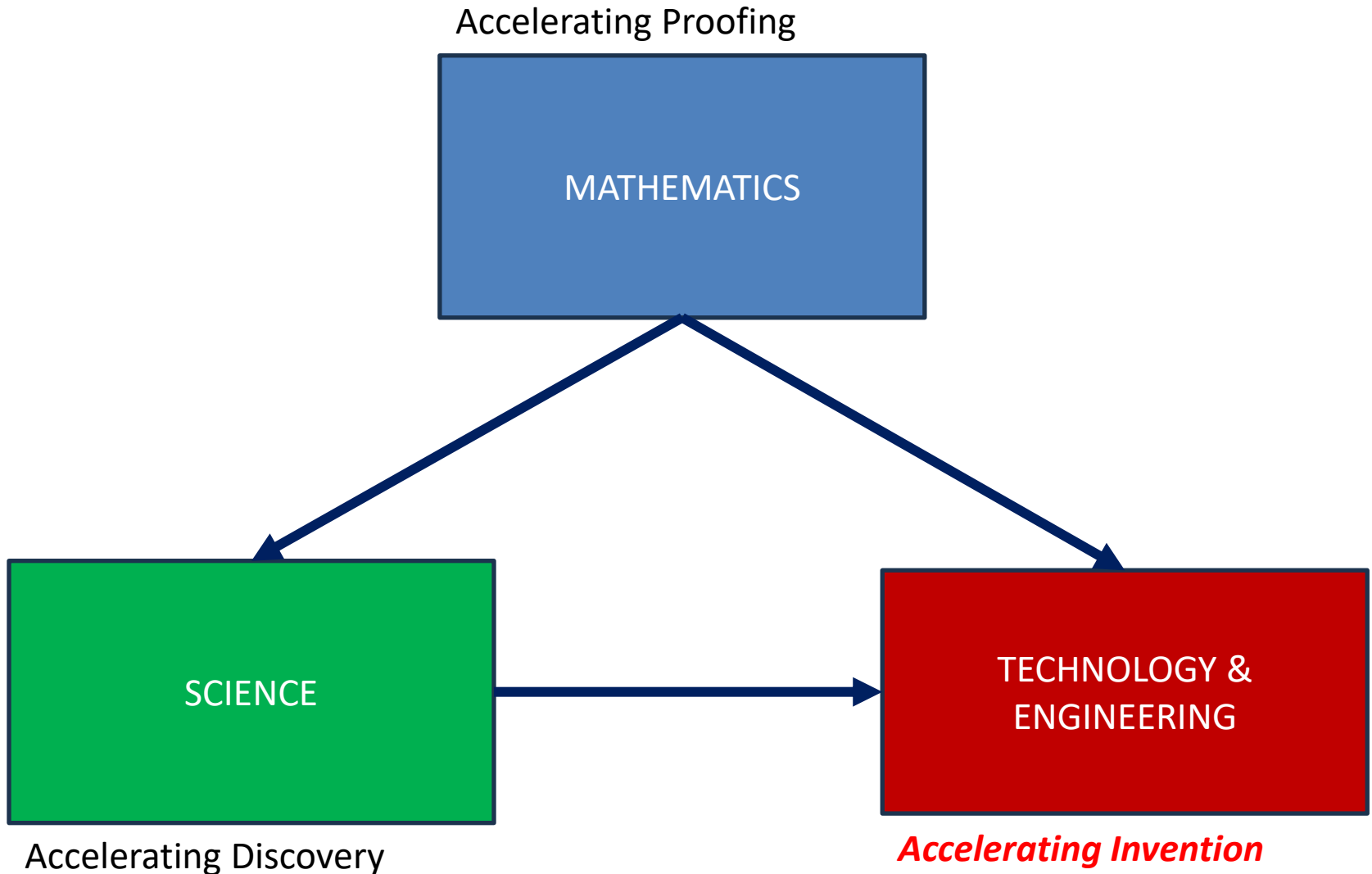
Future of energy and sustainable technologies

STEM not St_M

Modern Disciplines:

- Technology & Engineering:
 - K-8: Civil, Design, Electrical, Mechanical, Manufacturing
 - 9-12: Computer Science, Biotech, Cleantech, Nanotech
- Social Sciences: Psychology, Sociology, Anthropology
- Entrepreneurship & Business

Role of AI



Question to Address

In which way will AI affect future student's motivation, curiosity and independence ?

Homework: Essential Movies & Books

Movies:

- 2001, A Space Odyssey
- Wargames
- Minority Report
- Her
- Ex Machina
- HUMANS (TV – 1st season only)
- DeepMind AlphaGo documentary
- The Last Screenwriter (written by AI)

Books:

- I, Robot
- Annie Bot
- Love and Sex with Robots

“I feel privileged to write the prologue...
The combination of theory and practice is
the beauty of what CCR has been doing for
over a decade.”

- Olli-Pekka Heinonen
International Baccalaureate

“...exceptionally deep and exceptionally
broad...”

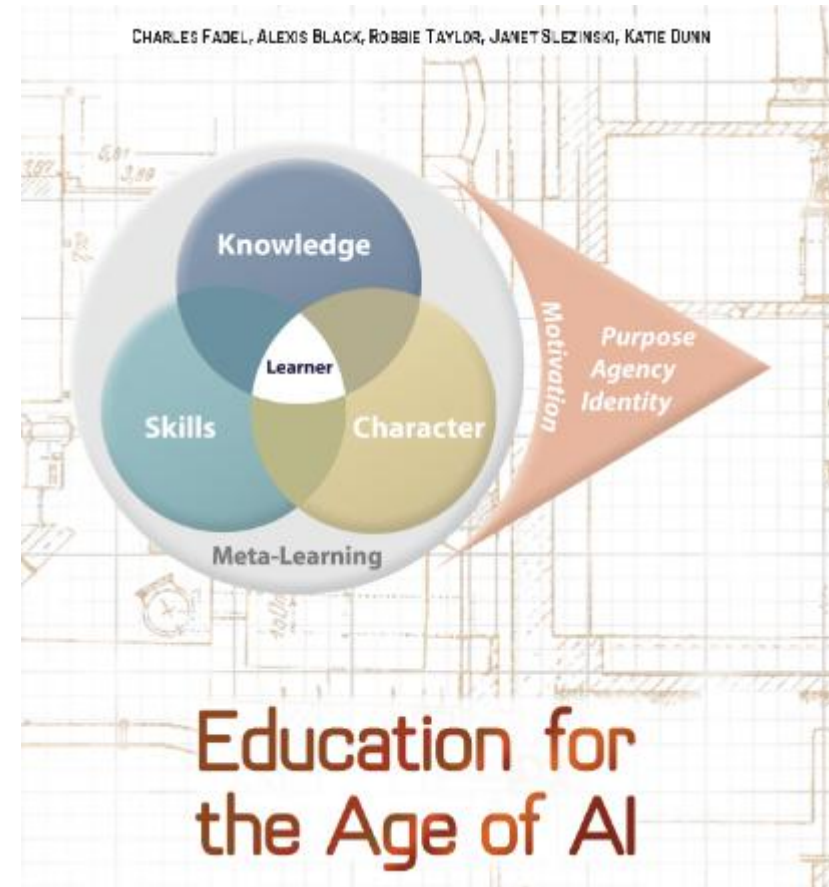
- Dr. Chris Dede
Harvard Graduate School of Education

“...a stunning and fantastic journey into
our new world of... Education.”

- Dr. Michael Fullan
University Of Toronto

“I truly enjoyed reading *Education for the
Age of AI.*”

- Andreas Schleicher
OECD



<http://bit.ly/CCR-4D4AI>



Thank You



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