Contents of this talk

WHY?

1. Science has come to depend on computing

I) New tools for science

II) New scientific methods
III) New epistemology: Limits of computing = limits of knowledge

IV) New epistemology: Probably approximately correct

V) New ways of collaborating

VI) New ontology

GLOBAL WARMING: MODEL 1

GLOBAL WARMING: MODEL 2

Bioinformatics

OUR “GENETIC CODE”

Computational physics
3. Transformation of routine jobs

RENTAL SERVICES

BANKING

WAREHOUSING

4. Transformation of knowledge work

RETAIL

FAST FOOD

HOTELS

ACCOUNTING
Now we have:

- New means of knowledge production
- New epistemology of science
- Rapid digitalization of societal structures and processes
- New ways of automating knowledge work

Computational thinking

- Ability to see the world as information flows
- Skills to make computers do jobs for us
- Ability to design for people, with people

A Computational Thinking

What?

Company annual reports

Transportation

Customer service

Journalism
HOW DO WE TEACH CT TO CHILDREN

HOW?
CREATING VISUAL PROGRAMS

USING COMPUTING IN OTHER SUBJECTS

BUILDING AND CONTROLLING MACHINERY

PLAYING PUZZLE GAMES

PLAYING GAMES WITHOUT A COMPUTER

VISUAL PROGRAMMING

DESIGNING SYSTEMS FOR HUMANS

CREATING AND MAKING E-TEXTILES

TEACHING MACHINE LEARNING SYSTEMS
TEACHING IMAGE RECOGNITION

SOME CHALLENGES OF

CHALLENGE 1: “CODING” IS LOW AMBITION
- EPistemological revolution
- Pedagogical revolution
- Scientific revolution

CHALLENGE 2: DOGMATISM VS. PLURALISM
- Avoid “computational chauvinism”
- Involve more fields in it

CHALLENGE 3: ROLE OF PROGRAMMING
- Computational thinking
- Programming skill

CHALLENGE 4: BUILD AN EVIDENCE BASE
- Test claims before overselling CT

CHALLENGE 5: WHAT TO TEACH, HOW, AND AT WHAT AGE?

CHALLENGE 6: WHAT TO TEST AND HOW
- Competences
- Knowledge of concepts
- Communication of ideas
- Design skills
- Etc.
CHALLENGE 7: 
TRAINING THE TEACHERS

CHALLENGE 8: 
RENEWING WITH THE FIELD
- COMMODIFICATION OF MACHINE LEARNING
- AUTOMATION OF CODING
- THE RISE OF DESIGN

HOW DO WE DEAL WITH THE OTHER

TRACKING REVEALS EXACTLY WHAT YOU DID LAST SUMMER

MODELING REVEALS WHAT YOU WILL DO NEXT SUMMER

PROFILING REVEALS WHAT YOU TRIED TO KEEP SECRET

EMOTION FARMING IS FOCUSED ON HOW TO MAKE YOU HAPPY, SAD, AND ANGRY

ATTENTION ENGINEERING FOCUSES ON HOW TO GET YOU ADDICTED

BEHAVIOR ENGINEERING IS FOCUSED ON HOW TO MAKE YOU DO SOMETHING
AUTHORSHIP IDENTIFICATION ENSURES THERE'S NO ANONYMITY

THERE ARE 70 MILLION DATA POINTS ON CHILDREN BY THE TIME THEY TURN 13 YEARS OLD.

WHAT KIND OF COMPUTING

Questions, comments?
Thanks!

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