CT, DS, AND AI IN FINLAND

Markku S. Hannula

University of Helsinki
FINLAND

OVERVIEW

- Mind is more complex than we think and so is learning

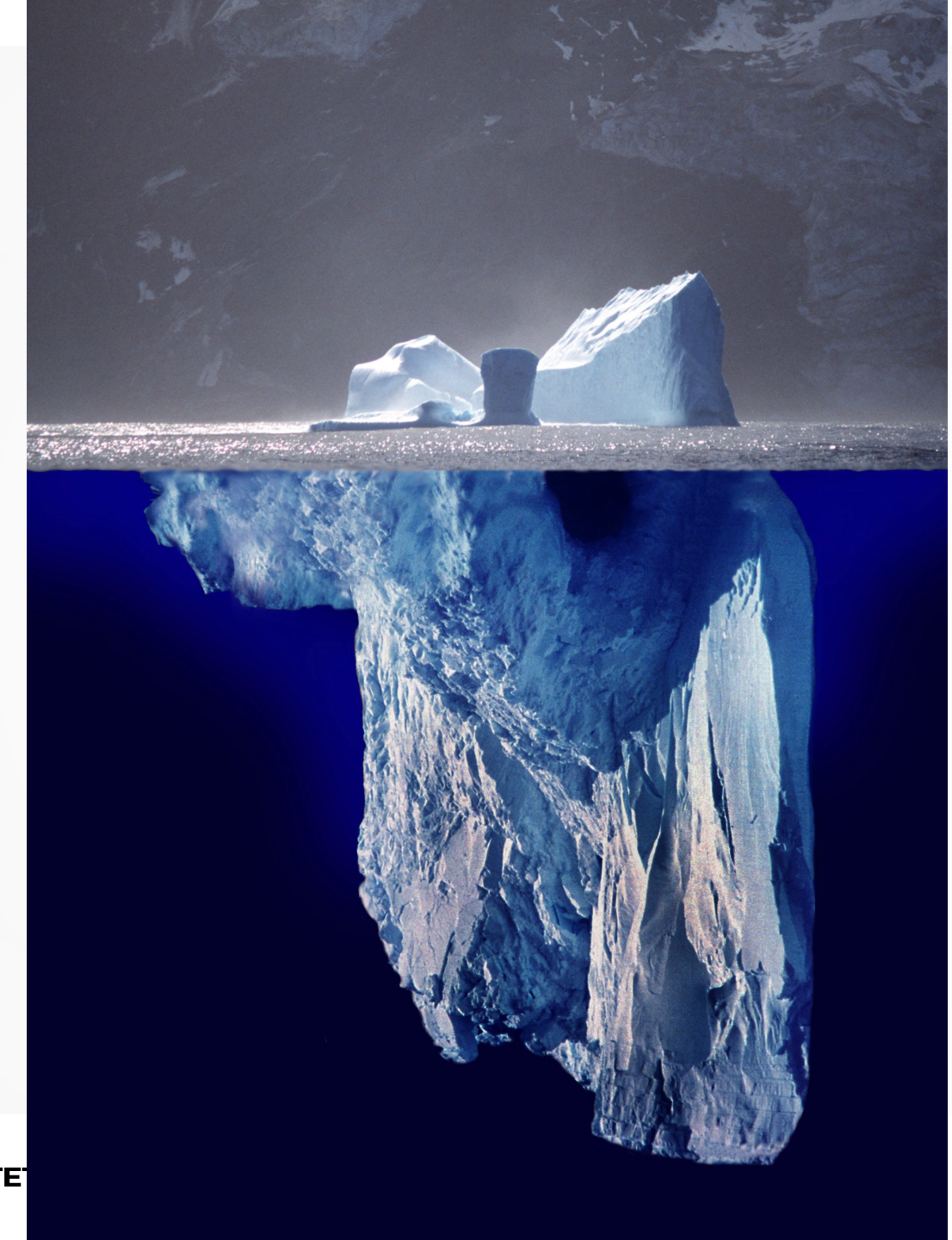
Observable behavior

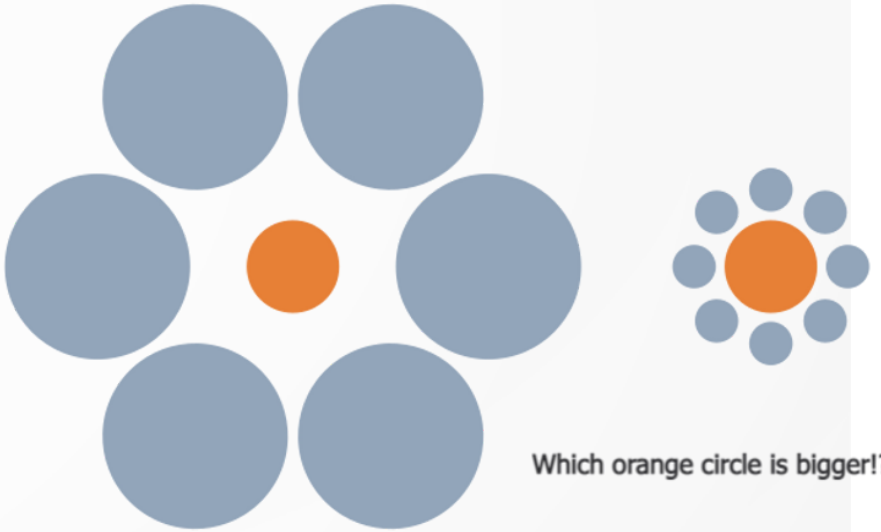
Awareness

Accessible to introspection

Intuition

Inaccessible cognitive processing (> 90%)





LEARNING IS EMBODIED AND SOCIAL

- Brain processes abstract concepts with the sensory-motor areas
- Learning and knowing is essentially social

➢ Learning happens with and through a body, with and through social interaction

LEARNING IN A MOVING TRAIN

AI, CT, and DS (and the related tool) are rapidly developing

- Any knowledge will be outdated soon
- Process competences are increasingly important
- Learning to learn is essential

AI, DS, AND CT IN THE FINNISH MATHEMATICS CURRICULUM

- In addition to content knowledge
  - Positive disposition
  - Problem solving and thinking competences
    - Includes algorithmic thinking and programming
  - Learning to learn, including use of technology
- In practice, technology often receives little attention and time in basic education

AI, DS, AND CT IN THE FINNISH ASSESSMENT PRACTICES

- Assessment in basic education (K-9) by the teacher
  - Presumably little role for AI, DS, and CT
- Digital assessment platform ABITTI used in upper secondary school general track, also the final national exam
  - Includes spreadsheets, dynamic geometry, and symbolic calculator
  - Most tasks reguire constructed response with justifications
  - Some tasks require coding

EXAMPLE TASK
ADVANCED MATHEMATICS, SPRING 2021

8. Estimating area through a simulation 12 p.

Points (x , y) on plane A are determined by unequalities $0 \leq x \leq 2$, $0 \leq y \leq 4$, and $y \geq x\,2$. In this task the goal is to estimate the area of the set A through a simulation and by using the knowledge that a propability is directly proportional to area.

Randomly take points (x , y) from a rectangle B, which is determined by unequalities $0 \leq x \leq 2$ and $0 \leq y \leq 4$.

1. Make a code with a suitable program that draws randomly 1 000 points in the rectangle B and gives the number of points that belong to the set A as an output. Explain verbally or with screen captures, how you implemented your code. (Tip: You can use, for example, the random number generator in the spreadsheet.) **(6 p.)**

2. Hille executed 10 times the code made in phase 1 and received the following numbers. Compute the average or outputs and use this to estimate the area of A. **(6 p.)**

Output of Hille's code: 673, 664, 672, 679, 667, 650, 640, 678, 660, 667

AI NOT IN THE CURRICULUM (YET)

- Different local decisions, e.g. complete ban of AI

POTENTIAL AND RISKS OF AI IN EDUCATION

- AI as teacher's assistant (task design, lesson planning etc.)
- AI as an assistant teacher (in the service of the student/parent)
  - Patient
  - Present all the time
  - Adaptive to student needs
- Student using AI as an answering machine
- Teacher letting AI take charge
- AI can not replace human contact