# neuroimaging and personalized learning:
## reflections with societal stakeholders

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# Introduction

- Neuroeducation & neuroimaging
- Value plurality and dynamics

# Introduction

- Responsible innovation: moving beyond conventional ethical review
  - Inclusive, value sensitive research
  - Stakeholder involvement

A pragmatic approach to ethics should:

"allow for the contribution of all those that have a stake in the matter and decisions to be made on the basis of a careful consideration of all relevant conflicting moral claims" (Keulartz *et al.* 2004).

# Approach



1. Who should be involved?
   - Scientists & Future Users

1. How to design the process?
   - Vision Assessment (Grin and Grundwald 2000, Roelofsen *et al.* 2008)

2. How to carefully consider different moral arguments?
   - Frame analysis

"allow for the contribution of all those that have a stake in the matter and decisions to be made on the basis of a careful consideration of all relevant conflicting moral claims" (Keulartz *et al.* 2004).

# Guiding Visions Scientists

- 2 main visions:
  - Evidence based learning
  - Personalized learning

"Yes, ideally, in 50 years I would like to put someone in the scanner and know exactly how much coffee that person has to drink, what he should eat and how much physical exercise he should do in order to be able to learn optimally."

# Focus groups



- 10 focus groups
  - 3 with parents
  - 3 with teachers
  - 4 with secondary school children (5VWO)

- Design
  - Phase 1: personalized learning
  - Phase 2: introduction of technology
  - Associations
    - Drawing

# Results

– Similarity views of teachers, parents and students

– Personalized Learning

  • Adaptation to    motivation    learning pace
                  competences    learning style

  →Equity and beneficence

  • Practical problems, unrealistic idea

# Frames of meaning

(Schön and Rein 1995)

– Structures of belief, perception and appreciation

– Controversy
  • How should a problem be solved?
    →What is the problem?

– Two main questions:
    – How to approach the learning child?
    – What do brain scans measure?

# How to approach the learning child?

– Equity and equality

- Equal as human beings
- But everyone learns differently

- Equal exam requirements
- Equal capacities

# How to approach the learning child?

– Personalized learning and social learning

- Individual, but not personal

- Social learning
  – Fun
  – Important component of learning

# How to approach the learning child?

– Freedom and determinism

  • "optimized education"
    – Learn from mistakes

  • Determinism
    – Knowing your capacities

Participant 1: When you start to do something like this… You are sentenced for life, you have a criminal record because your brain does or does not function well. Similar to what we have now, a white school and a black school and whatever. You get a stamp with 'small brain' or 'large brain'.

# What do brain scans measure?

– Objective measurement

- No interpretation
- No lazy answers
- "naked"

# What do brain scans measure?

- Reduction of a child to a scan
  - Captures one moment
  - Complexity of humans
  - Complexity of environment

"I wrote down the 'sweet child'. The scan must know if a child can learn, can talk, can think, can love, can believe, can do, can be creative, unconscious reactions, can DO something and can WANT something. A scan cannot do that. I don't believe a word of it. (…) All these things, are the essence of a human. A machine cannot do that."

# What do brain scans measure?

– Reduction of performance to the brain

- Different forms of intelligence
  - Narrow definition

# Discussion

- Different framings lead to different ideas about potential applications
    - For example: reductionism "a child is more his/her scan"

    - Machine cannot capture child → only learning disorders
    - Reduction of child to achievement → no applications
    - Narrow definition intelligence → look only at possibilities

# Discussion

- Next phase: dialogue sessions
  - Frame reflection
  - Key areas of conflict and misunderstanding
  - Integrated frame construction

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