Informationsinfrastrukturen als Akteure in der Bildungspolitik

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Theoretical background: Technologies as institutions

- Basic assumptions in Science and Technology Studies (STS):
  - Social processes shape technologies (social determinism) as a reaction to technological determinism (e.g. Bijker, Collins, Pinch, Wajcman, Weingart etc.).
  - Large-technical systems (Weingart 1989) like information infrastructures need to be regarded as socio-technical systems and have their own social genesis (Rammert 1993).
- Information infrastructures are “institutions” as they “... constitute the background condition for action, enforcing constraints, giving direction and meaning, and setting the range of opportunities for undertaking action” (Ciborra & Hanseth 1998).
Science and Technology Studies: Actor-network theory (Latour et al.)

Intermediate perspective: Technology is socially shaped and participates itself as actor in (heterogeneous) networks ( mouseClicked “actants”).
What are Information Infrastructures?

• Large-scale socio-technical systems, consisting of telecommunication investments, human resources and application development (Blanning et al. 1997).

• Similar to physical infrastructures of cities or states with canals, traffic and street intersections, as well as rules and norms and underlying assumptions about its use.

• Based on software, i.e. data structures and algorithms

• Some Examples ...
Information infrastructures for accountability

“[A]ssemblage of people, technology and policy” (Anagnostopoulos 2013)

... based on software.
Information infrastructures and the power of software

• What is software?
• “something that is constituted by code, written in specific programming languages, and structured and operationalized through algorithms [...] that can be automatically read and translated by a machine in order to do something“ (Williamson 2014)
• “the manifestation of a system of thought – an expression of how the world can be captured, represented, processed, and modelled computationally“ (Kitchin & Dodge 2011)
• Software is a “vital source of social power“ (Kitchin & Dodge 2011)
Social life of algorithms and data structures

**Definition of variables**

```
#include <stdio.h>
define gen1 char
define gen2 boolean
define gen3 [4]

ANA_MODULE(scalable) {
    ...
    //calculation of SES
}
```

**Definition of search function**

```
...  
RANK_MODULE(x) {
    LeftSearch (institution, publication): affiliation
    ...
}
```

Who decides?
Who controls?
Software developer, project manager, requirements engineer, user, client
Data-related communication *practices*

• Data do not just exist but rather data are ‘generated’
• ‘Data need to be imagined as data to exist and function as such, and the imagination of data entails an interpretive base’ (Gitelman and Jackson 2013, p. 3).
  • Process perspective: Data help to frame a phenomenon by demarcating boundaries in space and time.
  • Interpretations of data as representation of e.g. learning outcomes elicit particular social imaginaries of learning and teaching, and are as such deeply normative and political.
Case #1: Student assessment and digital data practices

The Grow Class Report
Using Assessment to Help Students Grow

Dear Teacher,
Student assessment is most effective when the data are interpreted and used as a roadmap, rather than a roadblock. Please instruct.

This is a student's report. Your tools are:

New tools enable you to better understand your students. These tools enable you to better understand your students.

Below Standards
LEVEL 2: 610-655

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How did my students do?

What do they need to learn?

What tools are on the web?

NY State Standards

Information and Understanding
Stated Information
Words and Phrases in Context
Sequence

Literary Response and Expression
Genre and Literary Terms
Character
Writing Strategies

Critical Analysis
Main Idea and Theme
Fact vs. Opinion
Author's Purpose

Meet Standards
LEVEL 3: 656-700

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Case #2: Teacher value-added database

Los Angeles Teacher Ratings

About 11,500 Los Angeles Unified elementary school teachers and 470 elementary schools are included in The Times' updated database of "value-added" ratings.

Most third-, fourth- and fifth-grade instructors who taught at any point during the 2004-05 through 2009-10 academic years were given ratings in the Times analysis. Most district elementary schools are included. Test scores for most charter schools were not available.

A teacher's value-added rating is based on his or her students' progress on the California Standards Tests for English and math. The difference between a student's expected growth and actual performance is the "value" a teacher added or subtracted during the year. A school's value-added rating is based on the performance of all students tested there. Small differences in ratings are not statistically significant, particularly for those rated near the average.

Although value-added measures do not capture everything about a teacher or school's performance, The Times decided to make the ratings available because they bear on the work of public employees who provide an important service, and in the belief that parents and the public have a right to the information.

Find a teacher…
Search

Or, find a school
Search

Amy P. Miller
A 5th grade teacher at Park Western Place Elementary in 2010

These graphs show a teacher's "value-added" rating based on his or her students' progress on the California Standards Tests in math and English. The Times' analysis used all valid student scores available for this teacher from the 2003-04 through 2009-10 academic years. The value-added scores reflect a teacher's effectiveness at raising standardized test scores and, as such, capture only one aspect of a teacher's work.
The black box (algorithm) behind the value-added model
Brief Analysis

• In case #1:
  • Results are not mere representation but invite teachers to reflect about their work; they become an engagement tool that is only meaningful when embedded in a teachers’ web of work practices such as observations and conversations; this leads to new teaching practices (e.g. ‘bubble kids’)

• In case #2:
  • Data are detached from these practices; data are not mere representation of students’ performance but also of the teachers work; this leads to new teaching practices (e.g. teaching to the test)
Conclusions

• The very systems meant to improve schooling have become (effective) control instruments (‘infrastructures of accountability’)

• These ‘technologies of governance’ transform the classroom from a physically bounded place into a transparent and visible space.

• Important ethical and political consequences as such evaluation technologies are not value neutral

⇒ Information infrastructures have become powerful actors in educational policy