Datafying education:
Data practices and the organisation of learning

Juliane Jarke
Andreas Breiter
Datafication of (social) life

- Increasing trend to capture social life in numbers
- Data for sense-making, accounting, and evidence-based decision making affect e.g. in education:
  - the organisation of teaching and learning,
  - school choice,
  - recruitment,
  - educational governance
  - policy discourses
Datafying education

- Schools as ‘data platforms’ (Williamson 2015)
- Assessment and ranking activities have become key aspects of national and international educational policy-making (Selwyn 2015)
- Rankings
  - ‘do more than simply describe a setting but [...] also intervene within a situation’ (Pollock 2012, p. 94).
  - ‘are reactive because they change how people make sense of situations’ (Espeland & Sauder 2007, p.10).
Case #1: Student assessment and digital data practices

- 2001, NYC department of education contracted Grow to 1,200 schools
- Data-driven decision support system to teachers, district and school management
- Improve standards-based learning in the classroom

Source: Author paper copy of Grow reports
Case #1: Student assessment and digital data practices

Assessment results
- are not mere representation but invite teachers to reflect about their work
- become an engagement tool that is only meaningful when embedded in a teachers’ web of work practices such as observations and conversations
- are only meaningful in relation to practices outside the digital assessment apparatus

Source: Author paper copy of Grow reports
Data 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 #2: Teacher value-added

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... 

Or, find a school

Source: www.projects.latimes.com/value-added
Case #2: Teacher value-added

Box 1. A Value-Added Model for a Given Subject, Grade, and Year

$Y_{ti} = \zeta + \lambda Y_{0i} + \beta' X_i + \sum_{l(\text{district})} \sum_{k(\text{school})} \sum_{j(\text{class})} \{ \alpha_{ijkl}^{\text{class}} I_{ijkl}^{\text{class}} + \alpha_{kl}^{\text{school}} I_{skl}^{\text{school}} + \alpha_{l}^{\text{district}} I_{Dil}^{\text{district}} \} + \epsilon_i$

- Posttest
- Pretest
- True Total Classroom Effect
- True Total School Effect
- True Total District Effect
- Stud. Error Term
- Student Characteristics
- Classroom Participation Indicator
- School Participation Indicator
- District Participation Indicator

Source New York Times, 7th March 2011
Case #2: Teacher value-added

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...

Or, find a school

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.

Source: www.projects.latimes.com/value-added
Data & algorithms

- Digital data are stored, processed, produced in software which is fundamentally composed of algorithms.

- We’re living in a world now where algorithms adjudicate more and more consequential decisions in our lives... Algorithms, driven by vast troves of data, are the new power brokers in society’ (Diakopoulos 2013, p.2).

Source: www.projects.latimes.com/value-added
Algorithms & control

The meaning of an algorithm is quite similar to that of *recipe, process, method, technique, procedure, routine*, except that the word 'algorithm' connotes something just a little different. Besides merely being a finite set of rules which gives a sequence of operations for solving a specific type of problem, an algorithm has five important features” (Knuth 1986)

- **Finiteness**
- **Definiteness**
- **Input**
- **Output**
- **Effectiveness**

**Algorithm** express the computational solution:

- **logical conditions** (knowledge about the problem) and
- **structures of control** (strategies for solving the problem)

Recursivity of data 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).

Emergence of
- ‘bubble kids’ (Breiter & Light 2006)
- an ‘education triage’ (Gillborn & Youdell 2000)
Trends and their ambivalent consequences

• New forms and possibilities for participation
  ... depend on data literacy
  ... may lead to new inequalities /reinforces existing inequalities

• Spatial extension transforms translocal relations

• Software systems disguise human agency

• New forms of surveillance (but also transparency)
  ... the very systems meant to improve schooling have become effective control instruments