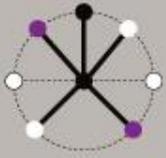


# Development of educators' data literacy through the data use intervention

Learning how to use data: data literacy,  
personal knowledge, and beliefs

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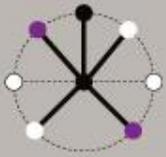
ICSEI, Ottawa, January 7<sup>th</sup>, 2017



## Introduction

- Data-based decision making (Ikemoto & Marsh, 2007; Schildkamp & Lai, 2013)
  - making educational decisions
  - based on data
- using data in a formative way
- adapting education
- can enhance student achievement

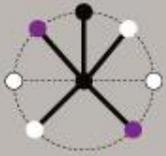
(Hoogland et al., 2016; Lai, Wilson, McNaughton, & Hsiao, 2014; Van der Kleij, Vermeulen, Schildkamp, & Eggen, 2015; Van Geel, Keuning, Visscher, & Fox, 2016)



## Introduction

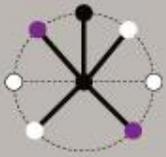
- Data literacy: broad and complex concept, no consensus yet
- Educators' ability to
  - set goals,
  - collect data,
  - analyze data,
  - interpret data,
  - take actions.

(Hamilton et al., 2009; Keuning & van Geel, 2016; Lai & Schildkamp, 2013; Mandinach & Gummer, 2016a; 2016b)

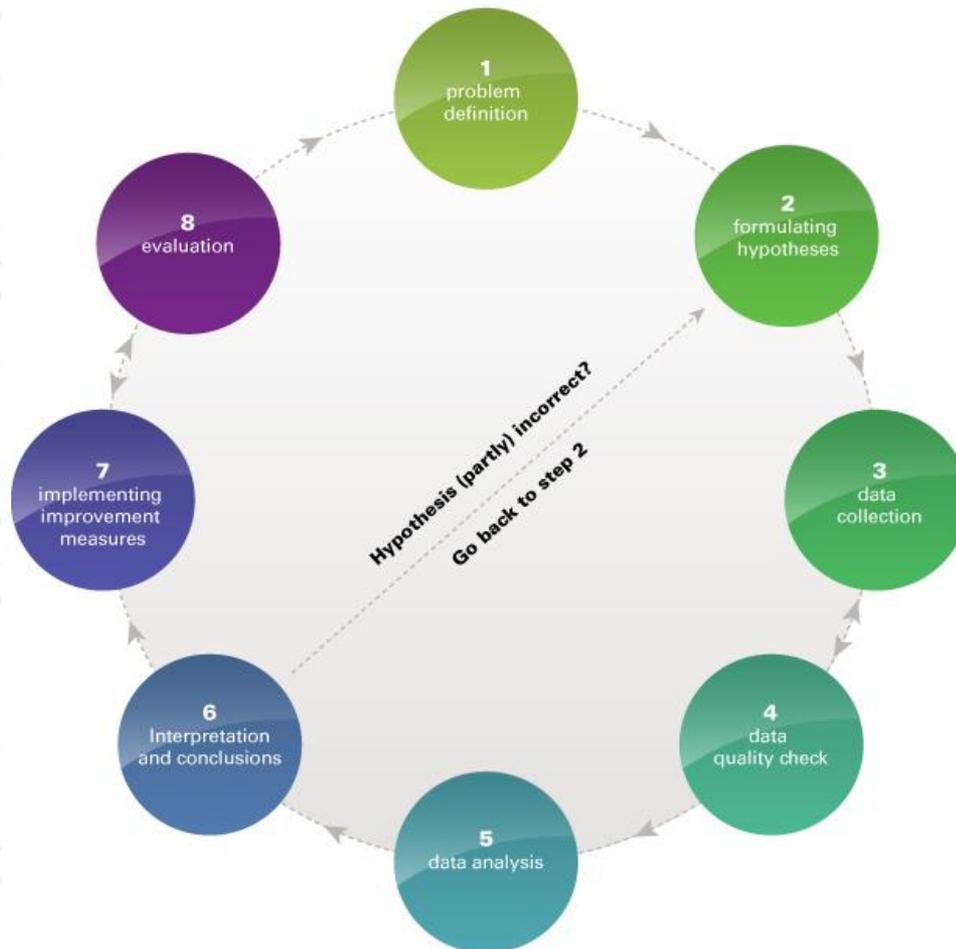


## Introduction

- Problem statement
  - little attention for data literacy in teacher training colleges
  - many educators are not data literate
  - research on data literacy development is scarce
- Aim
  - obtain more detailed insight into data literacy components
  - more precise description of educators' data literacy development through and during a data use intervention

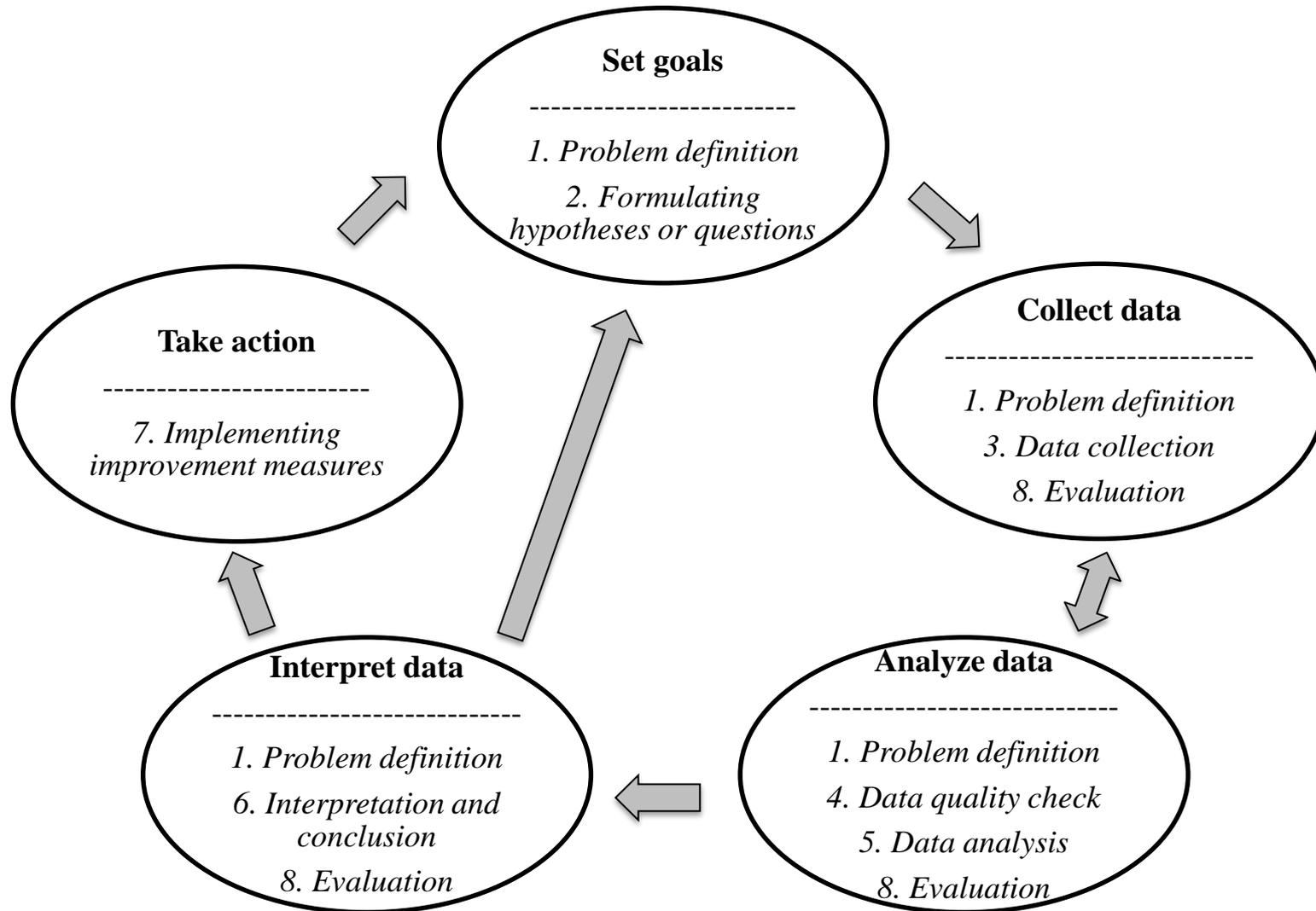


## Theoretical framework



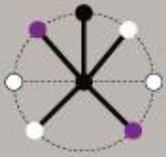
- Teams 4-6 teachers, 1-2 school leaders, and data expert
- Work on a problem: e.g., poor final examination results, low student achievement in 3<sup>rd</sup> grade
- Supported by a coach, every 3 weeks, manual guide,
- One year data use intervention

# Theoretical framework



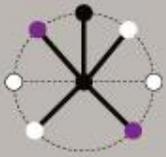
Bocala & Boudett, 2015; Coburn & Turner, 2011; Earl & Katz, 2006; Hamilton et al., 2009; Keuning & van Geel, 2016; Lai & Schildkamp, 2013; Mandinach & Gummer, 2016a; 2016b; Marsh, 2012; Means, Chen, DeBarger, & Padilla, 2011)

**FIGURE 1.** LINK BETWEEN DATA LITERACY CONCEPT AND DATA USE INTERVENTION



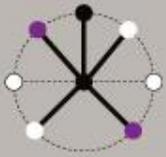
# Theoretical framework

Research question: How does educators' data literacy develop during the data use intervention?



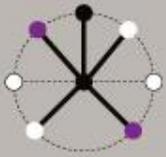
## Method

- Mixed-methods approach
- Single-group pre-post research design
- 6 Dutch schools: September 2015 – October 2016
  
- Data literacy test: prior to and after intervention (27 data team members)
- Logbooks: during intervention (coach)
- Data team evaluations: half-way intervention (33 data team members)
- Interviews: after intervention (12 data team members)



## Method

- Descriptive analyses: logbooks, data team evaluations, interviews
  - Coding scheme
  - Atlas.ti
  - Substantial Cohen's Kappa of 0.71
- Paired samples t-test: data literacy test
  - SPSS
  - Substantial Cohen's Kappa of 0.68



## Results

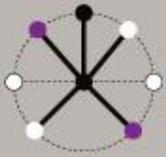
- Data team members scored significantly higher (M=10.4; SD=2.58) on the posttest than pretest (M=8.4; SD=3.04)
  - P = .005 (significant)
  - Effect size = 0.59 (medium)

**Data literacy pre-test**

M = 8.4 (SD=3.04)

**Data literacy post-test**

M = 10.4 (SD=2.58)



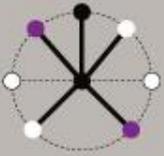
## Results – Set goals

Educators learned to:

- Start with goals, before collecting data, otherwise you get lost in the amount of data
- Formulate when you are dissatisfied
- Define concepts, otherwise you cannot measure it
- Formulate concrete goals, include target group and time frame
- Formulate measurable goals, include numbers or percentages
- Involve colleagues in setting goals

*'Where are we going?  
What is the goal, and  
when do we want to  
reach the goal?'*

*'What is disappointing?  
Is it that 10% of students  
score insufficient? Is it  
50%?'*

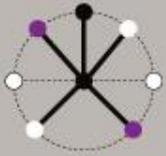


## Results – Collect data

*'Filter the correct cohort, class of students, subject area, and tests'*

Educators learned to:

- Collect enough data, are several cohorts used?
- Collect existing data, what data are available in the school?
- Identify various data sources, e.g., student monitoring system
- Find accurate data, where are the data about?
- Distinguish between quantitative and qualitative data
- Develop a consolidation table, to display the data
- Generate data, e.g., developing questionnaires and interviews
- Make arrangements: who collects the data? When?

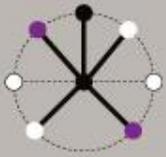


## Results – Analyze data

*'That you should judge the data (...)  
is the data reliable, valid?'*

Educators learned to:

- Look at the data, what do you notice at first glance?
- Create a data table in Excel
- Use statistical functions in Excel, e.g., correlation, minimum, maximum, median, mean, standard deviation
- Control the quality of data, e.g., reliability and validity
- Summarize interview data



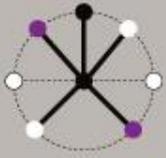
## Results – Interpret data

Educators learned to:

- Give meaning to data
- Not use intuition when interpreting data
- Interpret with other data team members, different insights?
- Draw conclusions, check whether goals are reached
- Refute misconceptions

*'After doing research, we found out that it [assumption] was not true'*

*'We identify the impact on the average level for reading literacy'*



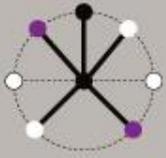
## Results – Take action

Educators learned to:

- Focus on one action at a time
- Implement actions that are concrete and feasible
- Implement actions that not necessary have to lead to *huge* changes in classrooms
- Implement actions that are linked to the goals
- Use various sources of information to choose the action, e.g., literature, teachers of other schools, colleagues
- Involve other colleagues in taking action, communicate

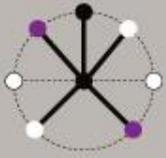
*'The action does not have to be drastic (...)  
small things can also affect'*

*'You must have support from other colleagues to take action'*



## Conclusion and discussion

- Educators developed their data literacy: knowledge test showed medium effect, qualitative data showed learning on the five components of data literacy
- Role of teacher training college in developing educators' data literacy
- Effects on actions educators take in the classroom
- Effects on student achievement
- Sustainability of data use/data literacy



# Thank you for your attention

- Any questions?
- For further questions please contact [w.b.kippers@utwente.nl](mailto:w.b.kippers@utwente.nl)