Content of this presentation

• Data-based decision making
• The datateam® procedure
• Research results data teams
Data-based decision making (DBDM)

- The use of data, such as assessment results, to improve education (Schildkamp & Kuiper, 2010)
- Systematically collecting
- Analyzing and interpreting data
- Using this information to improve education
- Quantitative data (e.g., assessment results, surveys) and qualitative data (e.g., classroom observations, interviews)

True or false?

Data-based decision making can lead to increased student achievement

A. True
B. False
True!

- Gut feeling and instinct not always correct
- Data can pinpoint strengths and weaknesses of your education
- Making high quality decisions based on data in combination with experience to improve weaknesses
- Using data to determine learning needs of students and adapt instruction accordingly
- Improved education for students and increased student achievements


Too many data: where to start?

If I'd known they wanted me to use all this info - I would never have asked for it!
How problems often are solved

The datateam® procedure

- Teams 6-8 teachers and school leaders
- Educational problem: low student achievement, safety
- Goals: professional development and school improvement
- Coach guides them through the eight steps (two years)
- Data analysis courses
- Teams in The Netherlands, Sweden, and Belgium
Step 1: Problem definition

• Identify a current problem in the school
  • School-wide or subject-specific

• Proof that you have a problem
  • Collect data on current situation and desired situation
  • Three cohorts/years

• Example:
  • Current situation: ‘35% of our 6th grade students is failing mathematics’
  • Desired situation: ‘Next year no more than 25% of our 6th grade students is failing, the year after that no more than 15%.’

Step 1 examples

• Topics in the Netherlands, all in the cognitive domain:
  • Student achievement in a specific subject
  • Final examination results
  • Grade repetition

• Topics in Sweden, in the cognitive and social domain:
  • Student achievement in a specific subject
  • Stress
  • Safety
  • Classroom climate
Step 2: Formulating hypothesis

- Brainstorm possible causes
  - Ask colleagues for input
  - Make a list
- Choose a hypothesis
  - Based on criteria, such as: what can we influence as a school? Which hypothesis do a lot of colleagues believe to be true? What is according to the literature a possible cause?
- Formulate a hypothesis
  - Concrete
  - Measurable

Step 2 examples

- Netherlands:
  - Students that passed have a significantly lower number of missed classes than students that did not pass.
  - Several students are failing, because the learning goals are not clear at the start of every lesson

- Sweden:
  - Students that do not qualify for upper secondary school have lower language skills than students that qualify.
  - The presence of adults during breaks promotes students feeling safe.
Step 3: Data collection

- Available data
- Existing instruments
- Quantitative and qualitative

Examples:
- Student achievement data
- Surveys: motivation, feedback, curriculum coherence
- Classroom observations
- Student interviews, teacher interviews

Step 4: Data quality check

- Reliability and validity of the data
- Crucial step: not all available data are reliable and/or valid!

Examples:
- Validity problems with survey
- Missing data
- Data of one year only
Step 5: Data analysis

- Qualitative and quantitative
- From simple to complex
- Extra support: course data analysis

- Examples:
  - Average, standard deviation
  - Percentages
  - Comparing two groups: t-test
  - Qualitative analyses of interviews and observations

Step 6: Interpretation and conclusions

- Is our hypothesis rejected or confirmed?
  - Rejected: go back/ further to step 2
  - Accepted: continue with step 7

- Example of 32 data teams:
  - 33 hypotheses: accepted
  - 45 hypotheses: rejected
  - 13 (qualitative) research questions
  - 13 hypotheses: no conclusion due to limitations of the dataset
Step 7: Implementing measures

- Develop an action plan:
  - Smart goals
  - Task division and deadlines
  - Means
- Monitoring progress: how, who, which data?

Step 7 examples

- Netherlands
  - Curriculum development teams
  - Implementation of formative assessment
  - Instructional changes, such as improvement of feedback
- Sweden
  - Improvement of data collection and data sharing
  - Increased monitoring and follow-up of student absence
  - Improve the safety in places where students reported feeling unsafe
Step 8: Evaluation (process)

- Process evaluation
  - Are the measures implemented the way we want?
  - Are the measures implemented by everyone?

- Example process evaluation:
  - Measure: start every lesson with a short repetition of percentages in the form of a quiz to increase mathematic achievement
  - Interview students: this is boring, start to detest percentages!
  - Adjust measures: repeat percentages only once a week

Step 8: Evaluation (effect)

- Effect evaluation:
  - Is the problem solved?
  - Did we reach our goal as stated in step 1?

- Example effect evaluation:
  - Did our measure(s) results in increased mathematics achievement?
Research results

- How do data teams function?
- What are the influencing factors?
- What are the effects of data teams?

- Results are based on studies conducted in the Netherlands (Schildkamp, Handelzalts, & Poortman, 2015; Schildkamp & Poortman, 2015; Poortman & Schildlamp, 2016) and one study in Sweden (Schildkamp, Smit, & Blossing, 2016)

Data team functioning

- Difficult to make a measurable hypothesis
- Several rounds of hypotheses: first hypotheses often wrong
- Often external attribution: problem is caused by primary schools, by policy etc.
- However, this is necessary: need to create trust; practice with the eight step procedure; learning starts when you make mistakes; shows the importance of data
- From external to internal attribution
Influencing factors: Data characteristics

Enabling factors
- Availability of data
- Relevant data
- Good quality data

Hindering factors
- Lack of data
- Data overload
- Lack of quality

Influencing factors: Team and user characteristics

Enabling factors
- Data literacy
- PCK
- Positive attitude
- Shared problem
- Collaboration
- Heterogeneity
- Regular participation

Hindering factors
- Lack of data literacy
- Lack of PCK
- Negative attitude
- Problem not shared
- Lack of collaboration
- Homogeneity
- Frequent absence
Influencing factors: school organizational characteristics

Enabling factors
- Facilitation
- Distributed leadership
- Encouraging school leader
- Clear goals
- No turnover of staff
- Clear vision

Hindering factors
- Lack of facilitation
- Hierarchical leadership
- Lack of encouragement
- Lack of clear goals
- Staff turnover
- Lack of a clear vision

Influencing factors: Policy

Enabling factors
- Pressure and support
- Data team coaching
- Collaboration between schools

Hindering factors
- Lack of pressure and support
- Too much or too little coaching
- Lack of collaboration
### Effects (NL)

<table>
<thead>
<tr>
<th>Effects level</th>
<th>Instrument(s)</th>
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| Level 1: satisfaction         | • (very) satisfied about support external facilitator  
• moderately satisfied about process and progress  
• ‘good’; ‘fun’ |
| Level 2: knowledge, skills & attitudes | • Knowledge and skills increased significantly  
• ‘learnt how to use calculations in Excel’; what + how of qualitative analysis; ‘you really need evidence’ |
| Level 3: use of learning      | • Data use for instruction: examples of use in interviews, e.g. comparing and discussing exam results and prepare students better for particular exam questions (explanation and practice) |

### Some quotations

- You really need evidence
- Our gut feeling is often wrong
- You want to take decisions based on assumptions, that is not the way we work here anymore.
- We used to be talking ‘on an island, now we will also share our findings with colleagues.
- To talk about education with colleagues in the data team, and develop new insights (…) into why we do things.
- It brings added value to the school
- Taking a look at the impact of our teaching.
Effects (NL) achievement

Nine schools

4: Problem not solved (yet/completely)
- 1 team: no longer facilitated at their school
- 3 teams: still active and/or implementing measures

5: Problem solved!
- 5 teams: significant progress in student achievement

Conclusion and discussion

- Using the datateam® procedure takes time, but has effect
- It starts with an attitude change: “data are important”
- Knowledge and skills required: from data analysis to interventions, from ‘intuition-based decision making’ to ‘data-based decision making’
- It can lead to a change in school culture: “You want to take decisions based on assumptions, that is not the way we work here anymore” and “teachers are coming to me asking for data, that has never happened before”
- It can lead to increased student learning
- Next study: sustainability
THANK YOU FOR YOUR ATTENTION!

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https://www.utwente.nl/en/bms/elan/datateams/

References

This presentation was largely based on the following publications:

- Schildkamp, K., & Poortman, C.L. (2015). Factors influencing the functioning of data teams. Teachers College Record.