ICSEI 2012 Symposium: Using Data for Improving School and Student Performance

The Use of Data Across Countries: Development of a Data Use Framework

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1.   Introduction and theoretical framework

This report focuses on the use of data for school improvement, as well as the factors influencing the use of data. Three research questions underlie this study:

1.   How does a country's policy influence data use?
2.   For which purposes do school leaders and teachers use data?
3.   Which factors influence the use of data?

The main objective of this comparative study is to come up with a data use framework we can use in our Comenius project. Since a generally accepted "data use" framework is missing, we developed our own framework (see Figure 1) by conducting an extensive literature review on data use and related fields (see all the references at the end of this paper). Versions of this framework were published in Schildkamp and Kuiper (2010) and Schildkamp, Lai & Earl (in press).

In the theoretical framework, it is hypothesized that several variables with regard to organizational-, data- and user characteristics influence the use of data. The policy context (such as pressure for achievement) may also influence data use within schools. Teachers and school leaders can use data, such as assessment and survey data, for different purposes (Breiter & Light, 2006; Brunner et al., 2005; Coburn & Talbert, 2006; Diamond & Spillan, 2004; Kerr et al, 2006; Wayman & Stringfiedl, 2006; Young, 2006):

- for instructional purposes;
- to support conversations with parents, students, (fellow) teachers, and (fellow) administrators;
- to shape professional development;
- for encouraging self-directed learning by giving the data to students;
- for policy development and planning;
- for meeting accountability demands or complying with regulations;
- for legitimizing existing or enacted programs;
- for motivating students and staff;
- for decisions related to personnel (e.g. evaluating team performance and determining and refining topics for professional development).
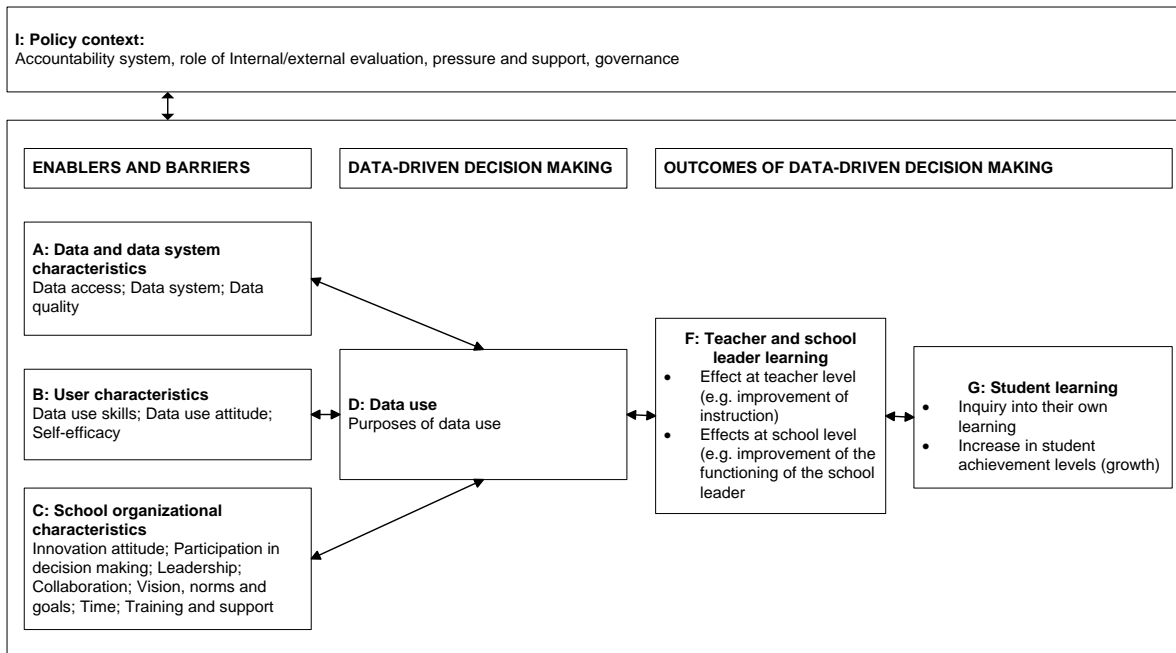
| I: Policy context: |
| Accountability system, role of Internal/external evaluation, pressure and support, governance |

Figure 1   A comparative study into data use: Theoretical framework

The use of data may lead to an effect on teacher-, school leader-, and student learning. Teacher and school leader learning is in this study defined as changes in attitude (e.g. towards data use), knowledge (e.g. pedagogic knowledge) and behavior (instructional or leadership strategies) (Guskey, 1989). For example, a teacher who is not satisfied with certain assessment results may decide to analyze the test results more critically. Based on these data he may come to the conclusion that he should make changes in his teaching. As a result, he may start using different instructional strategies (teacher learning: behavior). Data on the next test results can tell him whether or not his changes were successful in terms of that they led to higher student achievement results (student learning) (Boudett & Steele, 2007). However, data use may also have unintended effects, such as stress and de-motivation among school staff as data may give the (surface) impression that they are performing poorly in some aspect of their practice.

2. Method

In all five countries, a replication of the Schildkamp and Kuiper study (2010) took place on a smaller scale. interviews were held with teachers and (assistant) school leaders, using the same interview schedule . Interviews in all schools were conducted to determine the applicability of the framework. We studied in all the countries for which purposes school leaders and teachers use data, and which variables promote and hinder the use of data. The interviews started with an open question with regard to current school-wide school improvement initiatives, and whether or not data played a role in these activities, and, if yes, how. Secondly, respondents were asked whether or not they used several data sources, such as assessment data.

In each country (Germany, The Netherlands, Lithuania, Poland, and England) as least respondent of two schools were interviewed. In Germany, 6 teachers and 6 (assistant) school leaders of two schools were interviewed. In the Netherlands, 11 teachers and 21 (assistant) school leaders of six schools were interviewed. In Lithuania, 15 (assistant)

school leaders of two schools were interviewed. In Poland, 11 teachers and 2 (assistant) school leaders of two schools were interviewed. In England, 6 teachers and 8 (assistant) school leaders of four schools were interviewed.

Documents (e.g. policy plans, literature, and OECD reports) were collected to describe the educational policy (related to data use) in each of the countries. In this study reliability was fostered by using a systematized approach to data collection that is consistent with the research questions (Riege, 2003). We used a protocol, which described the research questions, data collection method and instruments, and analysis planned. Internal validity was enhanced by highlighting major patterns of similarities and differences betweens respondents' experiences and beliefs in tables. For enhancing construct validity, multiple sources of evidence or triangulation (i.e., interviews and different types of documents) where used. External validity was realized by providing case-specific and cross-case descriptions, and describing the congruence with the theoretical framework (see also Poortman & Schildkamp, in press).

3.   Results

3.1   Results Germany:

The exact results of the German case studies (by Andreas Breiter, Louisa Karbautzi, and Angelina Lange) and can be found on our webiste: www.datauseproject.eu. Germany has 16 different states, and each state is responsible for providing education. The federal Ministry is mainly concerned with education research, and educational planning. Cross-state coordination is provided by the Joint Commission of the State Education Ministers (KMK). Within the states, schools are centrally organized, and very limited autonomy exists for schools. Decisions are mostly taken at the Sate, provincial/regional level and local level (OECD, 2008; 2010). Only with regard to organization of instruction has the school autonomy regarding decision making. Schools can choose the text books they want to use, but have to refer to a framework at state level. The state design and selects the programs that are offered and determines the range of subjects taught and the course content (OECD, 2008). Germany has a standard curriculum or partly standardized curriculum that is required, as well as mandatory national examinations and assessments (OECD, 2010).

Table 1   *Educational policy and Available data in Germany*

German policy	- Federal Ministry mainly concerned with education research, educational planning, and cross-state coordination by a Joint Commission (KMK) 16 states, each state is responsible for providing education - Within the states schools are centrally organized, very limited autonomy for schools - Local education authorities provide school's infrastructure (e.g. facility management, administration and IT) - Since 2008 national education standards (German, Mathematics and Science), translated by states into state standards. These standards are assessed by means of central assessments. - School supervisory boards regulate internal issues by law and are responsible for planning, organization, steering and supervision of the education system (for example, regulation of compulsory education, content of courses, school locations). In some states these boards also conduct school inspections - States have their own student achievement testing systems - Internal evaluations are not compulsory, but school boards and other organizations offer tools and support - Types of data available differs per state: all have student achievement results, some have inspection and self-evaluation results - Little to no support for schools in the use of data
German data	- School inspection report - School information brochure - School policy plan - Self-evaluation results - Administration data (intake, school leavers, class lists, absentees, contact data) - Student demographic data - Assessment/achievement data - Report cards - Final examination results - Individual monitoring of student performance and behavior in a logbook - External process evaluation of pedagogical projects

Local education authorities provide school's infrastructure (e.g. facility management, administration and IT). Since 2008 national education standards exists (German, Mathematics and Science), translated by states into state standards. Standards are assessed by means of state-wide central tests in 9th/10th grade, as well as for Abitur (12th / 13th grade). Additionally, independent state-wide central assessments are conducted in K-1 and 3rd and 8th grade. Internal evaluations are not compulsory, but school boards and other organizations offer tools and support. Types of data that are available differ per state: all have student achievement results, some have inspection and self-evaluation results. Little to no support exists for schools in the use of data. Training in data use happens sporadically and is usually linked to studies. In Table 1, the German educational policy as well as data that are available in German schools is summarized.

Although regarded as advanced schools, the use of data is limited in both schools included in this study. In both schools, a lot of data are collected, but are not systematically used. School leaders mainly use data for administrative purposes. Teachers use data to monitor progress of students and to determine the need for individual student support or instructional changes. Data are usually discussed in subject meetings. The biggest deficit in Germany's school system is a missing general strategy of the education authorities with regard to data use. As schools have only limited *access* to data and no real *autonomy*, the data-driven decision-making process is either done on a different

level, or it is not done at all. Schools have to collect data and transfer it to the education authorities, which requires a lot of effort and time. But the data is not fed back (e.g. *availability*) to the schools and the decisions based on this data are not transparent. Moreover, the data collection for the national learning performance measurements is carried out within the school and is very error-probe, resulting in *low quality* data.

There is a problem of interoperability between the different data sets. Hence, the relation between different data cannot be analyzed. There are no processes in place, which support the workflow and the roles between the different institutions. If in place, the *information systems* are heterogeneous and teachers select their own tools, which do not fit to the central information systems. There are no data standards and the ICT infrastructure for administrative purposes in schools does not allow collaborative or individual data use. So, *information logistics* is a necessary (although not sufficient) condition for data use in German schools.

In one of the schools data are used to evaluate teacher performance, but no specific instruction or targetable improvement values or *goals* have been formulated. Moreover, data, such as final

examination results are not always *timely* available, schools do not have enough *time* to analyze and use data themselves, teachers do not *collaborate* around data use, and lack data analyses and data use *skills*. Finally, a lack of *support* on local and state level may have resulted in a limited use of data.

3.2   Results UK (England)

The exact results of the English case studies (by Phil Bourne and Eva Kunst) can be found on our website. England works with published national data sets (League tables). Schools in England have a lot of autonomy. Almost all decisions are made at the level of the school (OECD, 2008; 2010). Schools decide which textbooks they want to use, they select the programs that they will offer, decide on the range of subject taught and the course content of these subjects (although they have to refer to a framework at the central level) (OECD, 2008). England does have a standard curriculum of partially standard curriculum that is required, but no mandatory national examination or assessments are required (OECD, 2010). However, schools are inspected by Ofsted, who provides schools with inspection reports. Internal evaluations, using lesson observation, perception questionnaires, attainment and achievement data, are highly recommended. External inspections from external evaluation agencies are optional, however Ofsted evaluations are mandated and the frequency of which is dependent upon the success of the school.

Schools are likely to feel *pressured* to use data as they are evaluated by Ofsted and their performance will appear in League tables. In terms of *support*, there is no national training in the use of data and, but many different types of *trainings* as well as data *tools* are available. There is an expectation that teachers will undertake continuous professional development activities and approximately 5 teaching days (out of 195) are allocated to this activity. No additional time or incentive is provided for additional training. Also, England has a national student database, and achievement and attainment tables, which makes a lot of needed information available in a systematic and largely accessible manner.

Probably partly due to this context, a wide range of different types of data (see Table 2) are used for different purposes by the four schools included in this study. Data are used for curriculum development; for placing students; for celebrating achievement and thereby motivating staff; to monitor and track student achievement; to evaluate and improve teacher performance; to set new targets for departments; to reward and motivate students; for policy development; to improve lessons; to improve the school's environment; to target instruction towards weak(er) and/or strong(er) students; and to improve communications with parents.

Table 2   *Educational policy and available data in England*

England policy	▪ External evaluations by Ofsted ▪ External evaluations from other external agencies are optional ▪ School self evaluation or internal evaluations (using lesson observations, perception questionnaires, attainment and achievement data) not mandatory, but recommended ▪ More frequent inspections for schools that are inadequate or satisfactory and longer intervals for those judged good ▪ Publication of school performance tables or league tables ▪ Schools provide a wide range of data (e.g. postcode, deprivation indices, ethnic origin, mobility indicators) through linked information management systems to the Government at set times in the year. This results in a national student data base and achievement and attainment tables ▪ Each student has an unique pupil number, and a significant amount of data is available for each student ▪ Availability of a broad range of tools that support schools in evaluation and target setting ▪ No mandated or national training, but a range of training opportunities ▪ Schools can compare themselves with other schools and against national performance
England data	▪ Different types of student achievement, performance, progress and attainment results ▪ Results from the primary school ▪ Class management information ▪ Attendance data ▪ Quality assurance of parents ▪ Lesson observations ▪ Ofsted inspection report ▪ Self-evaluations ▪ Purchased external evaluations ▪ Free school meals take up ▪ Time spend on subjects ▪ Exclusion rates ▪ Teenage pregnancy's

Table 2	*Educational policy and available data in England (Continued)*
England data	▪ Different pupil surveys (for example, an attitude to learning survey) ▪ Staff questionnaires ▪ Parent questionnaires ▪ School plan and prospectus ▪ Teacher performance data ▪ Special needs data ▪ Student's voice data ▪ Student behavior data ▪ Staff data, such as attendance, information and hours of work of teachers ▪ Data on intake, transfer and school leavers ▪ Information from exit interviews ▪ Historical data and trend data ▪ Information from the local authority ▪ Indicators on deprivation based on postcode

Although schools in England do complain that some data are not accessible or available timely, are not accurate (for example, they can not always use estimates of attainment, because they are influenced by deprivation factors), overall schools have *access* to a wide range of data and also have *tools* available to analyze and use data. Moreover, even though time and money are always an issue, schools also have
access to *training* on data use (*knowledge and skills*) and *data systems* and two of the schools even mention having a *data expert* or data manager in their schools. Finally, *collaboration* around data use (e.g. discussing performance data) and *having a clear vision and goals* seem to be important.

3.3   Results Lithuania

The exaxt results of the Lithuanian case studies (By Daiva Penkauskiene and Lina Grinyte**)** can be found on our website. In Lithuania, schools are evaluated both externally and internally. External evaluations are carried out by the National Agency for School Assessment. Internal evaluations are obliged as well. Schools can use the internal audit methodology developed by the National Agency for internal evaluation or use their own system. Internal evaluations are carried out by the school administration in cooperation with teachers. Schools are likely to feel some kind of *pressure* to use data, because they are evaluated thoroughly.
The results of the interviews in the two Lithuanian schools that schools would like to use data more extensively than that they currently are. Currently they mostly use different types of data (see Table 3) for monitoring the implementation of the school's mission, vision and goals; defining new/strategic aims and objectives; and monitoring achievement.

The fact that schools are not using data as widely as they want to might be due to the *availability* of the data (for example, schools in England have much more and different types of data available), the fact that data is not always *timely* available, and a lack of *knowledge and skills* on how to analyze and use data (e.g. schools indicate needing a *data expert* as well as *training*).
That Lithuanian schools are able to use data to some extent is probably due to the fact that both the external and internal evaluation result in *usable, relevant, reliable and accurate data*, teachers *collaborate* around data, and schools have a *clear vision and goals* and can use data to monitor the implementation of this vision and goals.

Table 3	*Educational policy and available data in Lithuania*
Lithuania policy	▪ External evaluations are carried out by the National Agency for School Assessment ▪ Self-evaluation is obliged ▪ Active participation of all community members in school governance and decision making ▪ Lithuanian education policy encourages implementation of transparent quality evaluation systems, resulting in schools conducting self evaluations all over the country ▪ Schools can use the internal audit methodology developed by the National Agency for School Assessment or use their own self-evaluation system ▪ Self-evaluations are carried out by the school administration in cooperation with teachers ▪ The National Agency for Schools Assessment provides pressure (e.g. schools are evaluated), but also support in terms of external experts
Lithuania data	▪ Subject based reports ▪ Methodical group reports ▪ Internal school audit ▪ Lesson observations ▪ Examination results ▪ Teacher and parent survey results ▪ School based strategic and action plans ▪ Demographic pupil data ▪ School attendance data ▪ Achievement data ▪ Research results

3.4   Results Poland

The exact results of the Polish case studies (By Małgorzata Marciniak) can be found on our website. An important act for Polish education is the Pedagogical Supervision Act passed in 2009, which lists three areas of school supervision: evaluation, control and support. The act provides also the requirements according to which all schools in Poland are externally evaluated by educational authorities. The Ministry of National Education provides curiculum standards, districts and municipalities control administration and financing, school directors choose which teachers to hire and teachers choose a curriculum from a pre-approved list. School directors have autonomy as far as the decision making around hiring teachers, approving programs and textbooks, conducting internal evaluations. Poland has mandatory national examinations and assessments coordinated and implemented by the Central and Regional Examination Commissions (OECD, 2010) for example the 6th (primary education), 9th (lower secondary education), and 12th grade (upper secondary education) exit exams. Schools are both (in theory) internally and externally evaluated. Schools are likely to feel some kind of *pressure* to use these results (see Table 4).

A lot of data are available; however these are mostly achievement data. These (value-added) data are also available online, to for example parents. Schools have electronic data systems in place and teachers can access these systems to find data on their students. These data are perceived to be *reliable, valid, and accurate*. Data are used for a wide range of purposes, including: grouping of students; monitoring progress of individual students and groups of students; monitoring the performance of teachers; identifying weak and strong aspects of schools, teachers, and programs; choosing an appropriate program of teaching; adjust lesson plans and goals according to needs of students.

Teachers *collaborate* around the use of data, usually in one subject specific team meeting, where student outcome data is analyzed, sometimes at the request of the *school leader*. However, most of the communication takes place by

e-mail or by informal communication. The school leader coordinates and supports the work of the teams in one of the schools. This school leader coordinates the work of the teams, provides structures, puts processes in place, participates in meetings, supports the development of an improvement plan, and monitors the implementation. In the other school, a *structured process for data use* and monitoring is lacking. Respondents in both schools *believe in the use of data*. Moreover, in one schools teachers certainly have the *knowledge and skills* needed to work with data, as these teachers are certified examiners. In the other school, teachers indicate lacking the skills to use value added data.

Professional development around the use of data is not a standard offering to teachers or directors. Only motivated and innovative teachers and school directors develop competencies in this area, mainly through pursuing conference participation or individual reading and on-the-job learning. However, the drive towards developing data use competencies is gradually increasing as the state exam data and value added data are gaining more attention and are subject of various regional or state-level analyses. Currently teachers do not recevie reductions of teaching hours related to pursuing professional development in the area of data use.

Table 4	*Educational policy and available data*
Poland policy	- Pedagogical SupervisionAct passed in 2009 sets evaluation requirements, introduces control and support measures, 16 Regional School Boards conduct external evaluations, districts and municipalities control administration and financing, school directors choose which teachers to hire and teachers choose a curriculum from a pre-approved list - Schools have autonomy regarding decisions related to the school's overall performance - National assessment exams at grade 6, 9, and 12 are administered by the Regional Examination Commission. - The Ministry requires that schools analyze data for school improvement (requirement 1.1 of the Pedagogical Supervision Act). This is checked during external evaluations. - External evaluations are carried out by a pedagogical supervision authority - Internal evaluations are carried out by headmasters in cooperation with teachers
Poland data	- School internal assessment data - Final exam results from primary education - Diagnostic entrance test - Mock final exams - State administered exams results - Value added data - Student demographic data - Student survey results - Graduate survey results - Internal and external evaluation results

3.5   Results Netherlands

The reference to the exact results of the Dutch case studies (by Kim Schildkamp and Wilmad Kuiper) can be found in on our website and are also published (Schildkamp & Kuiper, 2010). In the Netherlands, schools have a lot of autonomy. Similar to England, almost all decisions are made at the level of the school (OECD, 2008; 2010). Schools decides which textbooks they want to use, they select the programs that they will offer, decide on the range of subject taught and the course content of these subjects (although they have to refer to a framework at the central level) (OECD, 2008). The Netherlands do not have a standard curriculum of partially standard curriculum that is required; they do have mandatory national examinations, but no national assessments (OECD, 2010).

However, schools are held accountable for their functioning by the Dutch Inspectorate (e.g. *pressure*). As schools are responsible for the quality of education they provide, they have to conduct some kind of school self-evaluation to check their quality and improve if necessary (see Table 5). Different consultancy organizations offer data use trainings, but participation is up to schools. Also, schools decide for themselves if participation leads to hours of teaching reduction. Usually this is the case as lessons of these teachers have to be cancelled.

The results of the interviews in six Dutch schools show that, although a wide range of input, process and output data are available (see Table 8) the use of data is rather limited. Only in two of the schools, data were really being used by teachers and school leaders for school improvement purposes. Although several factors, such as a *lack of access* to *relevant* data that *coincides with the needs*, *a lack of time*, and a need for *training*, may have hindered even more effective data use, respondents of these schools were able to use data. Factors that may have led to this success include teacher *collaboration* and involvement, a *clear vision, norms and goals* for data use, and having a *designated data expert* within the school. Moreover, *school leader support* and a belief in the use of data are important.

Table 5   *Educational policy and available data in The Netherlands*

Netherlands policy	- Decentralization - Schools are responsible for the quality of education and need to engage in school self-evaluation - Schools are held accountable by the Dutch Inspectorate - School inspectors judge a school based on its self-evaluation and other types of data - Actual school inspection once every four year, but more frequent inspections for schools that are judged inadequate or satisfactory based on data - Schools are expected to provide their community and stakeholders with insight into their processes, choices, and results - Schools are supposed to provide their boards of supervision with insight into the adequacy of their management, policy, and steering - Difficult to sanction schools as long as they comply with legal requirements - At the end of secondary education students have to pass a final examination
Netherlands data	- School inspection data - School self-evaluation results - Data on intake, transfer, and school leavers - Final examination results - Assessment results - Report cards - Student and parent questionnaire data and/or focus group results - Student demographic data - Attendance data - Staff data (e.g. sick leave, age, degrees) - Results from primary schools - Results in higher education - School plan - School prospectus

An *external locus of control* present in two of the schools may have hindered data use as these teachers stated that "assessment results are different each year, depending on whether you have good or not so good students". Finally, *information overload* may prevent effective data use, as was found in two schools. In these two schools respondents complained that there was too much data out there and that "data are not always accessible, partly because there are too much data available".

3.6   Results: comparison of the influencing factors across countries

In Table 6, the different purposes for data use per country are summarized. Table 7 compares the results per country for the different influencing factors (e.g. data and data system characteristics, school organizational characteristics, and user characteristics).

Table 6   *Data use purposes per country*

Germany	Netherlands	Lithuania	Poland	England
▪ Data are used for school improvement planning (1) ▪ Assessment data are used to track teacher development (1) ▪ Public relations: administrative data and statistics (2) ▪ Assessment results and self-evaluations are used for instructional changes (2) ▪ Data, such as assessment results are used to form learning groups (1) ▪ Student data are used to monitor progress (2) ▪ Data are used for parent feedback (1)	▪ Data, such as achievement and survey data are used to monitor progress and identifying areas of need (6) ▪ Data, such as inspection and self-evaluation results, are used for policy development and planning (6) ▪ Assessment, final examination results, and data on intake, transfer and school leavers, are used to evaluate teacher performance and to discuss with teachers (6) ▪ Inspection results, if satisfactory, are used for PR (3) ▪ Self-evaluation results are used to meet accountability demands (3) ▪ Data, such as assessment results, are used to make instructional changes (5)	▪ Data are used for planning and assessing change (2) ▪ Data are used for monitoring the implementation of the school's mission, vision and goals (2) ▪ Data are used to monitor achievement (1) ▪ Data are used to identify strong and weak aspects (1) ▪ Data are used for defining new/strategic aims and objectives (2) ▪ Data are used for cooperation with parents (1) ▪ Data are used for improvement of educational purposes (2) ▪ Data are used for communication and cooperation with other schools (1) ▪ Data are used for planning school activities (1) ▪ Data are used to improve the quality of education (1) ▪ Data are used to improve the quality of teaching	▪ Plan grouping of students based on intake data (1) ▪ Monitor progress of individual students and groups of students based on assessment data (2) ▪ Monitor the performance of teachers based on assessment data (1) ▪ Identify weak and strong aspects of schools, teachers, and programs based on assessment data (1) ▪ Develop interventions as needed based on assessment data (1) ▪ Choose an appropriate program of teaching based on intake data (1) ▪ Plan on modifications in the program of teaching to adjust to the needs of the class based on intake data (1) ▪ Adjust lesson plans and goals according to needs of students based on assessment data (1) ▪ Change the topics of lessons based on assessment results (1) ▪ Present student achievement results to parents (2) ▪ Monitor student progress based on assessment data (1) ▪ Proof that the school improves based on assessment results (1) ▪ Teachers use survey results to understand student needs and expectations, habits, preferences, interests and incorporates some of these elements in their courses (1)	▪ Using assessment data for curriculum development (2) ▪ Using attainment and performance data for placing students (1) ▪ Using performance data and lesson observations for motivating staff (2) ▪ Monitor and track student achievement based on performance, attainment and attendance data (2) ▪ Evaluate and improve teacher performance based on lesson observations, performance data and internal inspections (3) ▪ Based on Ofsted reports and achievement scores set new targets for departments (1) ▪ Reward and motivate children based on data (1) ▪ Policy development based on self-evaluation results, performance data, staff survey and Ofsted (3) ▪ Improve lessons based on student voice data, observations (1) ▪ Improve the school environment based on student voice data and parent surveys (1) ▪ Targeted instruction for weak and strong students based on performance data (1) ▪ Improve communication with parents on stakeholders based on statistics of the website (1) ▪ Improve student behavior based on behavior, attainment and attendance data (1)

Note: Between brackets the number of schools in which this aspect was mentioned can be found.

Table 7   *Data and data system characteristics, organziation characterestics and user characteretics per country*

Country	Data	Orgqanization	User
Germany	• No pressure or sanctions to use inspection report (2) • (National) assessment data not always timely and accurate • Final examination results not timely, accurate and valid (and not public) • Teachers often have no direct access to student data (1) • Administrative data are timely and of good quality, but no access for teachers (1) • Collects a lot of data, but no systematic use (1) • Data not relevant for instruction (1)	• Challenge to find time/lack of time (2) • No data expert (2) • Evaluation tools available (1) • No encouragement for teachers to use data (1) • Lack of support in data entry (1) • Lack of support in data analyses (2) • Cooperation only around student performance report cards (1) • Cooperation around data use depending on interest or data management (1) • Clear vision and goals (1) • No pressure to use data (1)	• Belief in the use of data (2) • Lack of statistical skills (1) • Extra workload due to double data collection (1) • Interest in use of valuable (centralized test) data (1) • Experiences with qualitative data, but not with self-evaluation (1)
Netherlands	• Lack of access to reliable, valid, accurate and timely data (6) • Lack of alignment of different types of data (1) • Information overload (2)	• Lack of time (5) • (Lack of) school leader support (3) • (Too little) teacher collaboration (6) • Data expert available (3) • Need for training (5) • Vision, norms and goals for data use (2)	• Belief in the use of data (6) • Lack of knowledge and skills (2) • External locus of control (2)
Lithuania	• Data not always timely (2) • Relevant and accurate data (2)	• Support of colleagues in the use of data (1) • No data expert available (2) • Lack of time (1) • Clear vision and goals (2) • Teacher collaboration around data (2) • Need for professional support and training (2)	• Belief in the use of data (2) • Lack of knowledge and skills (2)
Poland	• Reliable, valid, accurate data (2) • Proactive in collecting different types of data (2)	• Subject specific team meetings, focusing on analyzing student data (2) • School leader request analyses of student outcome data and improvement plans (1) • The school leader coordinates the work of the teams, provides structures, puts processes in place, participates in meetings, supports the development of an improvement plan, and monitors the implementation (1) • School leader supports working with data on an every day basis (1) • No structured process for data use and monitoring (1)	• Belief in the use of data (2) • Data use as an integral part of everyday work (1) • Teachers are certified examiners who are able to assess and understand student assessment data (1) • Lack of skills to use value added data (1)

Table 7   *Data and data system characteristics, organziation characterestics and user characeretics per country (Continued)*

England			
	▪ Some assessment data not timely (4) ▪ Some data not available or accurate (2) ▪ Some data not reliable (4) ▪ Benchmarks sometimes change (1) ▪ Software difficult to understand (1) ▪ Each department can use their own data system targeted to their needs, besides the school wide system (1) ▪ Different tools available to analyze and use data (4)	▪ Lack of money (2) ▪ Lack of time (2) ▪ Training available on data use and data systems (2) ▪ Data expert and/or manager is available for support (2) ▪ Collaboration around data use: discussion of performance data (2) ▪ Clear goals and vision (1) ▪ Support from the local authority in the use of data (1)	▪ Belief in the use of data (4) ▪ Lack of motivation (2) ▪ Some staff lack of knowledge and skills, not all have the same level of competence (2) ▪ School staff have the knowledge and skills needed (2)

Note: Between brackets the number of schools in which this aspect was mentioned can be found.

4. Conclusion and discussion

Based on the results described above, we developed the data use framework displayed in Figure 2. Before discussing this framework, we have to discuss the limitations of this report. First of all, the schools that participated by no means represent a representative sample. We want to emphasize here that the goal of this part of the project was not to make firm generalizations, but to gain more insights into the use of data in different schools. The data were collected by interviewing teachers and school leaders in only a few schools per country. Teachers' and school leaders self-perception is used to study their use of data. We checked the comments made by the respondents by asking for more details and by asking for examples. Still, de data may produce a slightly colored or biased picture of the actual use of data within schools. However, as the results are in line with the results of several other data use studies, we feel confident to base our data use framework on the results of this study in combination with literature in the field.

In this framework, policy influences the enablers and barriers to data use, data-driven decision making, and stakeholder and student learning. Different aspects of a country's policy may be of influence. Firstly, characteristics of the *accountability system* may play an important role. For example, the presence of an inspectorate (such as in England and in the Netherlands) and other forms of *external evaluation* (such as in Poland, Lithuania) may influence data use. Schools may perceive these evaluations as a form of *pressure.* Another form of pressure that is put on school is the *public presentation of a school performance*, such as in England (in League tables), in the Netherlands (online and rankings that appear in newspapers and journals) and Lithuania (online). Moreover, schools in some countries, such as Lithuania, the Netherlands and England, are expected to engage in *school self-evaluations*, leading to additional data schools can use. Also, the amount of *autonomy* schools have in decision making can affect data use. In England and the Netherlands, schools have a lot of *autonomy*, and they can make almost all decisions (with regard to the curriculum, instruction, personnel and resources) themselves. In Germany, schools have a lot less autonomy. Furthermore, a policy context influences *the types of data* that are available. Some countries work with national standardized assessments (Germany and Poland) and/or national standardized examinations (Germany, Poland and the Netherlands). Other countries have no national standardized assessments or examinations (England). Finally, if a country offers training (and sometimes a reduction in teaching hours as a consequence of taking the training) influence the extent to which school staff are able to engage in effective data use.

As displayed in Figure 2, different enablers and barriers influence data-driven decision making. Firstly, characteristics of the organization influence data-driven decision making. The following organization variables were found to influence data-driven decision making in the different countries (e.g. in some countries the lack of these variables hindered effective data-driven decision making, the presence of these variables promotes effective data-driven decision making):

- Structured time is set aside to use data and structured processes for data use exist within the school (G, N, L, E, P) (Note: G, N, L, E, P refer respectively to the fact that this variable influenced data use in German, Netherlands, Lithuanian, English and Polish schools).
- The availability of an data expert who can provide the needed data in a timely matter, as well as assist in analyzing, interpreting, and using data (G, N, L, E)
- the availability of training: professional development in accessing, analyzing, interpreting and using data (G, N, L, E)
- Teacher collaboration: teachers collaborate around the analysis, interpretation and use of data, in for example subject matter teams, grade level teams of data teams (G, N, L, P, E)
- Vision, norms and goals for data use: the school has clear goals and visions, and data can be used to monitor the extent to which the school is reaching these as well as to come up with measures to improve, if necessary.

Moreover, the school also expects school staff to use data on a regular basis and specific norms and goals with regard to data use exists (G, N, L, E)

▪ The school leader actively supports, encourages and facilitates (for example, by structuring time) data use (N, P)

Secondly, characteristics of the <u>data</u> influence. Specifically, the following variables were found to play a role:

▪ Accessibility and availability of data and information logistics, for example through information management and other data systems. School staff should be able to find the data they need easily and timely. Data should be aligned, and school staff should not have to look into three different systems to obtain the types of data they need (G, N, L, P, E)

▪ The quality of data: schools need timely, accurate, valid, relevant, reliable data, which coincides with their needs (G, N, L, P, E)

▪ Tools, which support data analyses, interpretation and use (e.g. which can aggregate data, can calculate attainment and progress, adjusted to socio economic status etc.) (G, N, E)

Thirdly, <u>user</u> characteristics influence data use. The following variables were found to play a role in the different countries:

▪ Attitude toward data: It is important that school staff believe in the use of data, that they think it is necessary to use data to improve their practice, and that they are motivated to use data (G, N, L, P, E)

▪ School staff need knowledge and skills to collect, analyze, interpret and use data (G, N, L, P, E)

The different enablers (if these variables are present) and barriers (absence of these variables) influence the extent to which data are used to base decisions on. We distinguish between three different types of data-driven decision making (although these sometimes overlap). Firstly, the use of data can be used for <u>school development</u> purposes. In the case studies described above the following school development purposes were mentioned:

▪ Policy development and school improvement planning , based on areas of need and strong aspects (N, E, G, L, P)

▪ Teacher development (G, N, L, P, E)

▪ Grouping of students and placing students at school level (G, P, E)

▪ Monitor the implementation of the school's goals and, if necessary, (re)define aims and objectives/set new targets (L, E)

▪ Motivating staff (E)

Data can also be used for <u>accountability</u> purposes. The following accountability purposes were identified in the case studies:

▪ Public relations, to show the outside world how good the school is doing (G, N)

▪ Communication with parents (e.g. schools are accountable to parents) (G, L, P, E)

▪ Communication with other schools (L)

▪ To meet accountability demands (for example, self evaluation results are used as a basis in external evaluations) (N, E, P)

Thirdly, data can be used for <u>instructional development</u>, such as:

▪ Monitoring progress of students (G, N, L, P, E)

- Adjust instruction (e.g. adapt instruction towards the needs of students, group students differently, determine the content of instruction, give students feedback, provide students with additional time etc.) (G, N, P, E)
- Curriculum development (P, E)
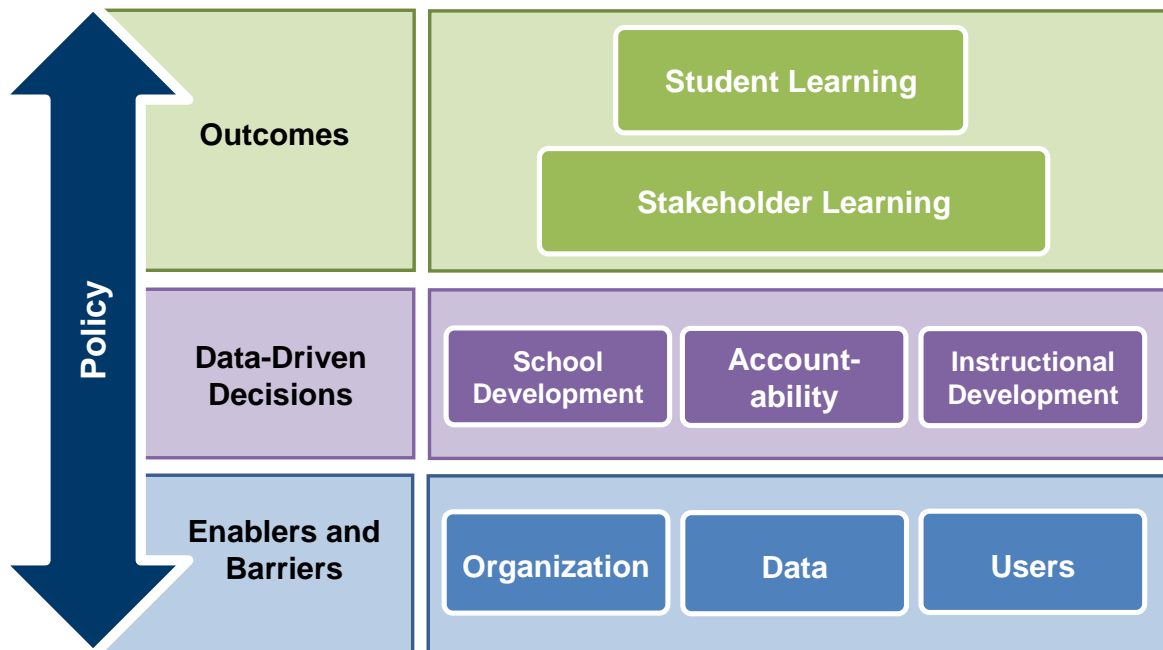- Motivating and rewarding students (E)

Figure 2   A data use framework

If data are used for these different purposes, this may lead to stakeholder (e.g. teachers, school leaders, parents) learning. For example, a teacher might decide to make instructional changes based on data (data-driven decision). This leads to improved instruction by the teacher (outcome: teacher stakeholder learning). Stakeholder learning in turn may lead to student learning (e.g. inquiry of students into their own learning and improved student achievement).

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