Data-Based Decision Making in the School Environment: A Study on Data Use in Indonesian Primary Schools

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SUMMARY

Many studies underline the use of data for school improvement. However, studies on data use are predominantly based on developed countries, with very few from developing countries. A literature survey revealed that there had been no scientific studies concerning data use in Indonesia. Therefore, this study aimed to investigate data use in Indonesian schools. This study was based on a conceptual framework focusing on kinds of data, purposes of data use and factors promoting or hindering data use in schools. The research questions were answered with a sequential explanatory mixed methods research design. In the first phase, the study used a descriptive research leading to a survey of teachers and heads of schools. A total of 60 schools consisting of 194 teachers and 28 heads of schools participated in the survey. Based on the analysis of the survey, six schools were purposively sampled as critical cases which are three high users and three low users in each of the purposes of data use (for accountabillity, school improvement and instruction). The purpose of categorizing the schools was because the high data user schools were expected to provide an understanding of suitable situation to promote data use, while the low data user schools were supposed to provide the understanding of factors hindering data use. In the second phase, the study used a multiple-case study approach using document analysis and semi-structured interviews of (2) teachers and (1) heads of school in each of those six schools. Data from the multiple-case study refined the descriptive statistical results of the survey by discovering respondents' perspectives in more depth. The results from this study were generalized to the conceptual framework and provide in-depth evidence of phenomenon of data use in Indonesia.

Regarding the kinds of data available, the study determined that Indonesian primary schools had similar and a lot of kinds of input, process, outcome, and context data available. With regard to the purposes of data use, the study set out to determine that most data was used for accountability purposes. These findings might be accounted for by the government trying to counter-balance the schools' autonomy, demanding the schools to fulfill the required types of data, so that the focus of data use seems to be more on accountability than on school development and instructional purposes. Furthermore, findings of the study proposed that the four factor characteristics influenced differently between the high data use and low data use schools. The differences were mainly in terms of school leadership, collaboration, accessibility and quality of data. However, the study results revealed that teachers and heads of schools lack data literacy skills and they never received any professional development training on data use, so that they might practice unintended use of data or do not use data at all. With regard to the extent of which factors did influence data use, the study concluded as follows. First, data use for accountability was mainly influenced by external policy characteristics. Next, data use for school development was influenced by school organizational characteristics and external policy characteristics. Finally, data use for instruction was mainly influenced by data characteristics.

The study of data-based decision-making in schools was a complex process. Future studies should take into consideration other possible factors such as the role of government, supervisors, parents and students, as well as an extended conceptual framework and methodology in order to anticipate unexplained context and to get the actual rationalization of how teachers and heads of schools exercised the data for decision-making. Finally, the study recommends that Indonesian government invests more in a reliable information system and professional development training on data use as a method to enhance the use of data for school development and instructional purposes. In addition, the supervisors need to give more feedback about the data regarding the school functioning and teaching practices rather than only ensuring the accountability demand. The main idea of these recommendations suggest that schools need to use data in the combination of all purposes of data use. Then, the fundamental goal of data use, school improvement in terms of student learning could be achieved.

Key words: Kinds of school data, data-based decision making, school development purpose, instructional purpose, school accountability purpose, promoting and hindering factors.

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CHAPTER ONE

1. INTRODUCTION

This chapter introduces data-based decision making in the school environment. Next, it presents the statement of the problem and the rationale of the study in Indonesian context. Towards the end of the chapter, the formulation of the aim, the research questions and the relevance of the study are described.

1.1. Data-based decision making in the school environment

There are a number of decisions made by heads of schools and teachers about school practices that will affect student learning. It is even very important for them to make a proper decision so that schools are capable to identify the areas of need, address their resources and also improve students' performances. However, decision making without using data may not lead to positive or intended results. Therefore, heads of schools and teachers should use data in making these decisions, because data are vital especially in giving proper information to support school development and to adapt instruction in addressing student learning needs (Schildkamp & Ehren, 2013). Data in the school environment can be defined as all information that is collected to show some characteristics of schools. These data can include information such as students' performances, teachers' lesson plans, or the school self-evaluation report (Schildkamp, Ehren, & Lai, 2013). Finally, this leads to the term data-based decision making or data use, which according to Schildkamp & Kuiper (2010), is a system that consists of analyzing schools data; and then implementing the results of analyses to innovate insruction and school development; and then evaluating these implementations.

For years, schools have been collecting data for planning and evaluating their education practices. There are many studies that have underlined the impact of data use in the development of educational practice. First, data has a great potential to support the teacher. For instance, accurate use of data can assist the improvement of instruction (Young, 2006) and can help the teacher to reflect their teaching practice (Breiter & Light, 2006). In terms of school development, data can be used to make decisions about school policy and professional development planning (Brunner, Fasca, Heinze, Honey, Light, and Mandinatch, 2006; Coburn & Talbert, 2006), and assisting individual related decisions (Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006). Moreover, data may be used to encounter accountability (Coburn & Talbert, 2006) and to authorize staff's decisions (Coburn & Talbert, 2006; Diamond & Spillane, 2004) because schools are required to be more accountable to the public about the education they provide (Ingram et al., 2004).

Despite the benefits associated with data, studies also report that many teachers do not use data correctly or do not use data at all (Schildkamp & Kuiper, 2010). Instead, a majority of their decisions is taken based only on intuition (Ingram et al., 2004). In addition, According to Schildkamp & Kuiper (2010), misuse of data happens when schools misapprehend data and end up focusing on improvement in the wrong aspects of their education practice. There are various studies on data use (Wohlstetter, Datnow, & Park, 2008; Schildkamp, et al., 2012) which have highlighted several factors that may either promote or hinder the proper use of data in schools. For example, teachers and heads of schools are often encountered to make decisions on limited time (Schildkamp & Ehren, 2013). As a result, not all school staff use data for decision-making. The studies also indicate that a number of teachers have a lack of data literacy skills (Ingram et al., 2004; Schildkamp & Kuiper, 2010). Moreover Schildkamp & Kuiper (2010), also discovered teachers to comprehend data as a thing for heads of schools. In other studies, teachers even disagreed to collect and use data as part of their work (Ingram et al., 2004; Schildkamp & Kuiper, 2010; Schildkamp & Ehren, 2013). Another factor hindering data use within institutions is unreliable information systems (Wohlstetter et al., 2008) that make it hard to collect and analyze the required data. As a result, teachers are not able to access relevant, timely and accurate data that corresponded to their needs (Schildkamp & Kuiper, 2010). In conclusion, most studies on data use in schools showed that many heads of schools and teachers use data appropriately or do not use data at all due to varied factors.

1.2. Background and statement of the problem

According to Honig & Coburn, (2007), there are clear differences in the way schools use (or do not use) data between schools within countries, even regions. Contextual differences profoundly influence data-based decision making in the schools. Previous studies from different countries and contexts, for example, New Zealand (Lai, McNaughton, Timperley, & Hsiao, 2009), USA (Wohlstetter, Datnow, & Park, 2008), The Netherlands (Schildkamp, & Kuiper, 2010; Schildkamp et al., 2012) persist to give strong evidence that results of data-based decision making in the school environment are profoundly influenced by difference of contexts in schools or countries. Therefore, the need to study how heads of schools and teachers use data within different contexts is critical (Schildkamp & Kuiper, 2010). Furthermore, Spillane, (2012) also claimed that studying data within the school should be about understanding what data is used by school staff and for what purposes it is used. In addition, other researchers (Goren, 2012; Honig & Coburn, 2007) state that besides understanding what data is used and how teachers and heads of schools use them, it is also crucial to discover what factors promote or hinder data use in schools.

However, a majority of those studies on data use in schools have predominantly taken place in western countries such as the USA (Ingram, et al.,2004; Schildkamp & Teddlie, 2008; Wohlstetter, et al., 2008; Diamond & Spillane, 2004), The Netherlands (Schildkamp & Kuiper, 2010; Schildkamp, et al., 2012; Ehren & Swanborn, 2012), and New Zealand (Lai, et al., 2009). Meanwhile, data use studies in developing countries have rarely been conducted. There is a need to study data use in developing countries because of elementary problems such as: lack of good infrastructure and qualified teachers (UNESCO, 2013) could have a direct or indirect connection to improper use of data available in the developing countries' schools. Furthermore, a literature survey in Indonesia reveals that there have been no scientific studies concerning data use in Indonesian schools (ACDP, 2013). This suggests that there is a scarcity of knowledge about data use in Indonesia and it is not clear how schools use data for their education practice, or if they use data at all. As such, the available data, the purpose of data use and the promoting and hindering factors within the Indonesian school context remain unclear. Hence, this study aimed to investigate kinds of data available. The study also focused on the purpose of data use. At last, the study identified different factors that may hinder or promote data use in Indonesian schools.

1.3. Context and rationale of the study

After decades of centralization of government system, in the late 1990s Indonesia embarked a fundamental change to become decentralized in most state functions including education. The regulations point out that decentralized education system requires a different set of tasks to be place in both local government and school levels. So that decentralized education system changes particular roles of heads of schools and teachers as well as the local government in order to be more effective in realizing the education services for citizen. (MoEC, 2012).

Under decentralized system, education is coped by the District Education Office (DEO) in the local government level. DEO has an important responsibilities in delivering education services. The responsibilities of DEO are planning, implementing, monitoring and evaluating education programs and activities in their districts. Primary school inspectorates are placed in the DEO which have a particular responsibilities for supporting and monitoring schools primary within the districts. The school inspectorates are obliged to do an inspection and evaluation of the schools once a year in order to ensure quality assurance based on national education standard. The national education standard are established by the central government as a minimum service standard for basic education across all schools. The standards demand schools to provide specific number of teachers, curriculum, facilities, assessments, and textbooks for students. Schools are also required to make a report of school management and activities in regular basis. (MoEC, 2012).

In the school level, the decentralized system influences schools to become more autonomy. Therefore, schools become more responsible for planning, implementation, monitoring and evaluating their own programs and activities such as: preparing curriculum, vision and mission, managing own finances, and developing syllabus. The implementation of autonomy has also impacted a change in head of schools' and teachers' roles. This was particularly challenging for teachers because teachers now are expected to prepare the lesson plans for each study subject by themselves. (MoEC, 2012).

With regards to the assessment system, there is no major change since Indonesian education system has traditionally underline school examination and national examination to assess student learning and academic achievement. The results of school examination have been used to ensure that students are able to pursue the next grade once a year. Moreover, national examinations are assigned at the end of grade 6 (primary school or SD), at the end of grade 6 (grade 3 of junior secondary school or SMP), and at the end of grade 12 (grade 3 of senior secondary school or SMA). According to regulation, students passing grade are determined bye the performance of three levels of assessments. First, the assessment by teachers which is the average grades on report cards for the last three semesters. Second, the assessment by schools which is the school exams. Lastly, the assessment by the central government which is the results of the National Examinations (MoEC, 2012

Overall, the process of decentralized education system has made significant progress over the past ten years. However, more efforts is needed in building up school-level capacity to manage better education services and in ensuring government level sufficient support and pressure to supervise the schools. A further key challenge is also the need to develop an appropriate use of the assessments of student learning in achieving better student performances in the future (MoEC, 2012).

From the discussion of the Indonesian context, it is clear that for the reforms of decentralization education system to succeed: there is a need for Indonesian schools to use data. First, this is because schools are required to be accountable to the government in fulfilling service standards. Second, the decentralization education system program requires schools to be responsible for their decision related to school development and teachers also require creating their instruction in their teaching practice to promote student-centered learning. Finally, there are also various student assessments data available that can be used to increase student performance.

However, Indonesian schools are faced with challenges that may need improvement strategies such as the proper use of data. Unfortunately, the possible contribution of data use has not been explored in Indonesia. Therefore, there is a need for study as an attempt to enhance understanding of data use in schools in an Indonesian context. The objective of this study is to investigate the current situation concerning data use in Indonesian primary schools. Hence, this study aimed to investigate data available, its use, and factors promoting and hindering data use in Indonesian schools.

1.4. Aim and relevance of the study

The aim of this study is to investigate the current situation concerning data use in Indonesian primary schools. To achieve this, the study seeks answers to the following specific research questions:

1. What kinds of data are used by primary heads of schools and teachers in Indonesia?
2. For what purposes are the data used by primary heads of schools and teachers in Indonesia?
3. What are the factors promoting or hindering data use by primary heads of schools and teachers in Indonesia?

By answering these research questions, this study aims at making a scientific contribution, by offering understanding on data use in a different context. This way, the study could help in deepening the existing theory about data based decision making in the school environment. Next, the results of the study aim to help education stakeholders in Indonesia to understand the kinds of data, promoting or hindering factors and purpose of data use in Indonesian primary schools. In addition, the study can also be used as a guideline for future studies of data use in other developing countries and as a reference point for data-based decision making implementation for supporting decentralization of the education system in Indonesia.

CHAPTER TWO

2. CONCEPTUAL FRAMEWORK

This chapter introduces the conceptual framework to guide the study. The framework presents the kinds of data, the purposes of data use, and factors promoting or hindering data use in schools. The remaining parts of the chapter describe the sub-components of the framework.

In order to conduct the study, there is a need for a conceptual framework about the use of data in the school environment. For this study, the conceptual framework developed by Schildkamp & Kuiper (2010) was used to study data use by teachers and heads of schools in Indonesia. Several modifications were added with regards to the data resources that could be available in the school and external policy characteristics that could be another factor promoting or hindering data use. The conceptual framework was used by Schildkamp and Kuiper (2010) to study the use of data in Dutch schools and discovered as a fundamental guide for such studies. Meanwhile, it should also be considered that some significant data use aspects in Indonesian primary schools are not covered by the present framework. The framework of the study is given in Figure 1 below, and the discussions that based on it are followed.

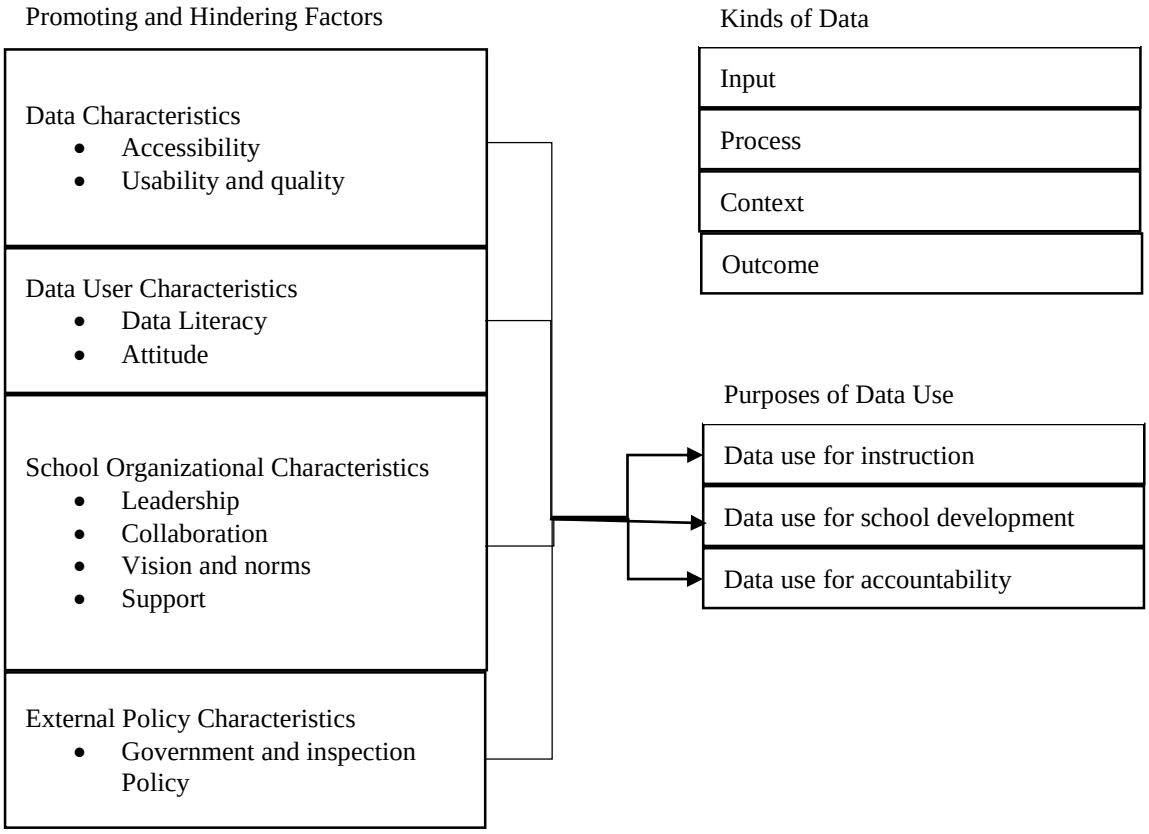

Figure 1. Framework of the study

There are three parts in the framework of the study in order to answer the three research questions. Part one describes the kinds of data available in schools, part two describes the purpose for which the data are used, and part three describes the factors promoting or hindering data use.

2.1. Kinds of data in schools

In part one of the study framework, data in the school environment can be identified from four sources: input, process, outcome and context (Ikemoto & Marsh, 2007). Below are further descriptions of different data sources in schools.

Input data consist of finances and student and teacher characteristics. For example: teacher qualification and experience data, fee payment, school transfers and student demographic data (home, ethnicity and social, economic status).

Process data consist of data relating to school management and teacher instruction. For example: school policies, missions, targets, timetables, lesson plans, teaching time, classroom management, and assessments.

Output data consist of performance indicators, measured grades and test results before and at the end of the semester period. For example data on student achievement results and student well-being.

Context data are the data within the school context stimulating school performances. For example data on parents, student, and teacher involvement, school culture, building, and materials.

2.2. Purposes of data use in schools

In part two of the study framework, the purposes of data use are for accountability, instruction and school development. Below are further descriptions of these three different purposes of data use in schools (Schildkamp & Kuiper, 2010).

2.2.1. Accountability purpose

Schools are required to comply with the standards or requirements given by the government in several countries. The government are also required to ensure that all schools are organized according to the country's policies (Hargreaves, Braun, Welner, Mathis, & Gunn, 2013). In these systems, the use of data has an important role to certify that the schools have fulfilled the requirements. Data may be used to authorize school improvement actions taken by heads of schools and teachers (Coburn & Talbert, 2006; Diamond & Spillane, 2004). Schools can also use data for accountability towards different stakeholders such as parents, school inspectors and government. Heads of schools and teachers can use data in the school environment as evidence of their education practices (Schildkamp & Kuiper, 2010; Schildkamp, Lai & Earl, 2013; Wohlstetter, Datnow & Park, 2008).

2.2.2. Instruction purpose

Studies showed that teachers have been using data for instruction purposes because it has a positive influence on students learning (Carlson, Borman, & Robinson, 2011; McNaughton, Lai, & Hsiao, 2012). According to Schildkamp et al., (2013), the analysis of various student assessment, classroom observations, and self-evaluation results data may provide teachers with different kinds of information. This may enable teachers to better understand student learning and also differences between student groups. Therefore, they will be choosing teaching instruction, changing teaching techniques, and determining the speed of their teaching in classrooms (Young, 2006; Honig & Coburn, 2008). Furthermore, teachers could use data in several ways to improve their teaching instructions, for example: to set learning goals, to determine students' knowledge, to tailor teaching instruction to individual needs, and to evaluate students' progress (Schildkamp, Poortman, Ebbeler, & Luyten, 2014).

2.2.3. School development purpose

Data can be used for school development. For example, heads of schools can use performance data, lesson observation data and internal evaluation data to adjust school policies related to the priorities and goals (Breiter & Light, 2006; Coburn & Talbert, 2006). In addition, data use may also help teacher professional development. Lesson observation, performance, and evaluation data may be used to decide which kind of professional development is needed in those schools (Schildkamp, Karbautzki, & Vanhoof, 2014). This indicates the way data use can have an impact on the teachers' professional development and hence help the school development, in general. Generally, previous studies state that the use of data is essential and proved to support in making decision for school development (Schildkamp, Karbautzki & Vanhoof, 2014, Schildkamp & Kuiper, 2010; Schildkamp, Lai & Earl, 2012; Wayman & Stringfield, 2006; Young, 2006; Wohlstetter, Datnow, & Park, 2008)

2.3. Promoting or hindering factors of data use in schools

The third part of the framework suggests four variables of characteristics that may promote or hinder data use in schools. These are data characteristics, school organizational characteristics, user characteristics, and external policy characteristics. Below are brief descriptions of the variables.

2.3.1. The data characteristics

Data characteristics consist of accessibility and the quality of data (Schildkamp &Kuiper, 2010).

Accessibility to data in schools may hinder or promote its use in schools (Kerr et al., 2006). In some schools, data may be completely inaccessible to teachers. For example, the absence of a sound information management system will make it difficult for teachers to collect and analyze the required data (Breiter and Light, 2006; Wayman and Stringfield, 2006).

Data quality involves accuracy and timely data (Kerr et al., 2006), reliable and valid data, (Kerr, et al., 2006), relevant data (Schildkamp et al., 2014; Schildkamp & Kuiper, 2010), and data that are usable (Schildkamp et al., 2014; Schildkamp & Kuiper, 2010). A combination of the above-mentioned have an important role in the quality of data that may promote or hinder data use in schools.

2.3.2. The data user characteristics

Data user characteristics consist of data literacy and attitude of the user towards data.

Data Literacy

Data literacy skills possessed by the teacher in using data is an important variable that can promote or hinder data use (Kerr, et al., 2006; Wohlstetter, et al., 2008; Young, 2006). It is crucial for the teacher to have the ability to analyze and to interpret data so that they can use data appropriately (Goren, 2012). The study claimed that teachers making use of data, especially for instructional change, are influenced by their ability to collect, analyze and interpret data.

Attitude of the user

Attitude of the user means buy-in/belief in data. This concerns the extent to which teachers believe in the use of data. Teachers will promote the use of data when they believe that data is necessary to guide their teaching practice and to determine student needs (Mingchu, 2008).

2.3.3. The school organizational characteristics

School organizational characteristics involves school leadership, collaboration of teachers towards data use, vision, norms, and the support teachers receive in using the data (Schildkamp &Kuiper, 2010).

School leadership

Studies indicate that a good leadership can eliminate barriers to the use of data in schools. It means that heads of schools should model data use, demonstrate effective use of data, and facillitate teachers in using and learning how to use data (Kerr, et al., 2006; Wohlstetter, et al., 2008; Young, 2006).

Teacher collaboration

Collaboration among teachers is a way to support data use. According to Wohlstetter et al. (2008), schools should provide opportunities to review data frequently and plan accordingly as a team. Furthermore, teachers should be able to share the learning of their students with students, parents, and other teachers (Spillane, 2012).

School's vision, norms and goals for data use

School's clear vision and norms for data use may promote data use in schools. Therefore, heads of schools need to create shared vision environment which is a common understanding between teachers about good schooling, and norms for data use meaning that schools should be prioritizing data to make decisions (Kerr et al., 2006; Wohlstetter et al., 2008; Young, 2006).

Support for data use

This are another factors that influence data use in schools. They are time for data use, training for data management, and data experts in schools. Studies show that arranging time to use data promotes data use in schools (Wohlstetter, Datnow & Park, 2008; Young, 2006). Another form of support is training teachers on the use of data. Studies on the impact of teacher training on data use showed that teachers were able to formulate teaching instructions based on data after the training (Breiter & Light, 2006; Kerr et al., 2006; Wohlstetter, Datnow & Park, 2008). Finally, teachers should have support in data collection, analysis and interpretation of data use from a designated data expert in their schools (Kerr et al., Young, 2006).

2.3.4. The external policy characteristics

Working with data in schools is an integral part of the process of decision-making that happens because of policies within the countries (Earl, & Louis, 2013).Therefore, external policy such as supervisors and government regulations also influences the use of data. First, this policy can affect the accessibility and availability of data for schools. For example, The Ontario Ministry of Education ascertained that there is a set up in their system in a way that enables schools to access data without difficulty (Dunn et al. 2012). Second, the policy can also give pressure to schools in regard the use of data (Schildkamp et al., 2012). For example, teachers may ignore the data which they consider as poor, but they may use the same data when they are subjected to the pressure (Ingram et al., 2004) For example, study conducted by Diamond and Spillane (2004) showed that combination between too much pressure and too little support can lead to a narrow focus of schools in complying accountability demands alone and neglecting the school improvement. Therefore, there is a need to give schools both the support they require as well as pressure as such the characteristics of the government policies in Canada, to make sure that data are used appropriately (Dunn et al. 2012).

CHAPTER THREE

3. METHODOLOGY

This chapter provides s a description of the research design, study site, target respondents sampling, instruments, procedures, data analysis, reliability, and validity as well as ethical considerations of the study.

3.1. Research Description

This study was an exploratory research. Therefore, the research questions in this study which aim to investigate kinds of data, the purposes of data use and factors promoting or hindering data use were answered with two phases of explanatory research design. In the first phase, there was a quantitative phase leading to the selection of cross-sectional survey research design. Cross-sectional survey simply explorative in nature that sought to quantify responses on the items or the variables from the conceptual framework at one time (Onwuegbuzie & Leech, 2006).

In the second phase, there was a qualitative phase leading to the selection of multiple-case study research design. According to Yin (2013), case study is a study that explores a current phenomenon within the real-life context, especially when the borders between phenomenon and context are not obvious. Data from the case study design does not generalize to the population, but it can be generalized to the conceptual framework and provide in-depth evidence of the phenomena of data use (Yin, 2013).

Finally, the rationale for this approach was that the quantitative phase provided a general understanding of the kinds of data available, the purposes of data use and factors promoting or hindering data use. Subsequently, the qualitative phase refined those statistical results by exploring participants' perspectives in more depth (Creswell, 2012).The study was also a mixed method of sequential explanatory design because the quantitative phase of the study informed the development of sampling for the qualitative phase.

3.2. Study location and site

Indonesia is spread across a string of 17,508 islands with a population of more than 240 million in 34 provinces. Indonesia has 144,567 registered primary schools, among which 132,513 are government-owned, and 12,594 are privately owned schools (MOEC, 2012). The study was conducted in fifteen provinces of Indonesia in order to get a sample from different corners of Indonesia which spread across many islands such as Sumatra, Java, Kalimantan, Sulawesi, Maluku, and Nusa Tenggara. The selection of these regions was because the researcher had a network and was able to access the District Education Office (DEO) within the regions that were willing to help the administration of the surveys. Table 1 below shows the study locations within the provinces of Indonesia.

Table 1. The study site location

No	Name of the location	Province – Island
1	North Aceh	Aceh – Sumatra
2	Bengkalis	Riau – Sumatra
3	Muara Enim	South Sumatra
4	West Tulang Bawang	Lampung – Sumatra
5	Jakarta	DKI Jakarta
6	Tanggerang	West Java
7	Temanggung	Central Java
8	Malang	East Java
9	Kapuas Hulu	West Kalimantan
10	Paser	East Kalimantan
11	Majene	West Sulawesi
12	Toli - Toli	South Sulawesi
13	Bima	West Nusa Tenggara
14	South Halmahera	North Maluku
15	Fakfak	West Papua

3.3. Respondents

In the first or quantitative phase, because of the early stage of data use in Indonesia, the researcher used convenience sampling and administered the survey at the schools that were willing to participate via the networks in District Education Office. The number of targets was at least 50 schools from 100 schools that have been approached. The school staffs that were included in the research were heads of schools and teachers. The respondents in the study were heads of schools and teachers that were available at the time to participate in the survey. The number of targets is three to five respondents per school or 150 – 300 respondents in total. Finally, a total of 60 schools (60% responses rate) within 12 study locations participated in the survey. There were 222 (74% response rate) respondents who filled out the survey, consisting of 28 heads of schools and 194 teachers.

In the second or qualitative phase, this study used purposively critical case sampling to identify six schools for the case studies. Those six schools were three schools with a quite high score on each of the purposes of data use and the three with a quite low score on each of the purposes of data use. The purpose of categorizing the schools was because the high data user schools were supposed to provide an understanding of suitable environment to promote data use, while the low data user schools were expected to enhance the understanding of factors hindering data use. Furthermore, the purpose of categorizing the schools into three purposes of user which are data use for instruction, school development and accountability was to enhance the understanding of which factors did influence data use in each of the purposes. Therefore, this sampling was appropriated to the study objectives and also to enhance interpretation of data from quantitative phase so that the researcher can learn more about the understanding of data use while including these critical cases (Onwuegbuzie & Leech, 2007). Finally, the purpose of qualitative research was to gather more in-depth insight from a smaller number of respondents. Therefore, interviews were conducted with (2) teachers and (1) heads of schools in each of six schools. In total, there were eighteen respondents that were involved in the interviews. Table 2 below summarizes the category of sampling in the qualitative phase.

Table 2. Sampling of respondents on case studies

Categorization		Regions	Number of schools	Respondents
High data user	For instruction	Central Jakarta	1	3
	For school development	East Jakarta	1	3
	For accountability	South Jakarta	1	3
Low data user	For instruction	Muara Enim	1	3
	For school development	North Jakarta	1	3
	For accountability	Bengkalis	1	3
Total			6	18

3.4. Instrumentation

3.4.1. Survey

In the first or quantitative phase, the researcher used a cross-sectional survey of descriptive research. The researcher modified the existing survey previously used in the Tanzanian context (Hawa, 2014) to use in Indonesia. The modified survey as well as the existing survey was developed on the ground of the conceptual framework from Schildkamp and Kuiper (2010) which investigate kinds of data available, purposes of data use, and factors promoting or hindering data use. Moreover, specifically the items under "external policy characteristics" were developed from the instrument of Michael (2012) that uncovered the supervisors and government policies related to data use.

In total, the survey consists of 71 items to collect information of data use (Appendix A) from heads of schools and teachers. Table 3 below summarizes the survey items per research themes and sub-themes.

Table 3. The survey items per research themes and sub-themes

Research themes and sub-themes		Number of items	Scale	Example question
Kinds of data		1	Multiple checklist	What kinds of data are available in your schools
Purposes of data use	Data use for accountability	3	4-point Likert-scale	We provide data for our school improvement to our Inspectors
	Data use for school development	9	4-point Likert-scale	Results of students are used to evaluate teacher's performance
	Data use for instruction	9	6-point Likert-scale	I use data to determine progress of students
Factors promoting and hindering data use	Data characteristics	11	4-point Likert-scale	The data I have on our students are up-to-date
	Data user characteristics	8	4-point Likert-scale	I can adjust our teaching based on data
	School characteristics	18	4-point Likert-scale	Data use is a priority in our school
	External policy characteristics	12	4-point Likert-scale	There is a government policy for the school to use the data in making decisions

3.4.2. Interview and document analysis

In the second or qualitative phase, the researcher used interview questions and document analysis for multiple-case study. The instrument for the interview built upon the instrument previously used by Hawa (2014) in Tanzania. It was also based on the conceptual framework from Schildkamp & Kuiper (2010) The interview was semi-structured to collect information from heads of schools and teachers. The interview guidelines contained items covering all research themes. The selection of semi-structured interview allowed follow-up questions to gain deeper understanding of the interviewee's perspective about the phenomenon of data use in Indonesian primary schools. Furthermore, samples of documents representing the use and the availability of data in schools were collected as a parallel process developed from the interviews. These documents provided corroborate information which was used for more clarification of statements during the interviews with heads of schools and teachers. The example for the document analysis is shown in Appendix C. Table 4 below shows the examples of interview questions per research theme.

Table 4. The example question per research theme.

Research themes	Example question
Kinds of data	Which data do you use in your job?
Purposes of data use	For what purpose do you use the data? For what purpose do other teachers use data?
Factors promoting and hindering data use	Do you receive any support in the collection, analysis, interpretation and/or use of data? Are there any barriers in the school that prevent the use of data?

3.5. Procedures

In the first or quantitative phase, the surveys were distributed to 100 schools through fifteen networks of the researcher in the District Education Office in each region. The surveys were administered for at least one head of schools and two teachers in each school. The estimated time to fill in the survey was twenty minutes. The network of the researcher collected the surveys in a certain period and then sent back to the researcher for analysis.

In the second or qualitative phase, the researcher directly visited six schools that were identified based on the analysis of the data from the survey. The researcher interviewed the head of schools and two

teachers in each school participating in the previous survey. The average time to interview each person was one hour. Table 5 below summarizes the data collection per research theme.

Table 5. Data collection per research theme.

Research Themes	Survey		Interview		Document Analyses
	Head of School	Teacher	Head of School	Teacher	School
Kinds of data	ν	ν	ν	ν	ν
Purposes of data use	ν	ν	ν	ν	ν
Factors promoting or hindering data use	ν	ν	ν	ν	-

3.6. Data analysis

3.6.1. Quantitative data

First, the descriptive statistics of survey items for all heads of schools and teachers in each school were analyzed to quantify and describe the kinds of data available and purposes for which the data was used within schools. In addition, the researcher conducted multiple regression analyses to determine to which extent factors promoting or hindering data use influenced the purposes of data use. The researcher calculated for each model with data use for accountability, school development, and instruction as dependent variables and data, the data user, school organizational and external policy characteristics as independent variables. Finally, the effects of the predictor variables were interpreted with regression coefficients in the regression model (Field, 2009). Furthermore for the sampling purpose, the researcher used descriptive statistics of survey items that led to the selection the six schools, three with the quite high mean score and three with quite low mean score for each of the purposes of data use. These six schools participated in the case study for the qualitative phase.

3.6.2. Qualitative data

First, all interviews were audiotaped and transcribed. Key themes based on the conceptual framework were coded in the interview transcripts. The Atlas.ti software aided the analysis of transcribed interviews into related codes. For example, the available data in the school were coded under either sub-themes: input, process, outcome or context data, themes relating to purposes of data use were coded under sub-themes such as data use for instruction, accountability, and school development. Finally, themes on promoting and hindering factors were coded under sub-themes of data characteristics, school organization characteristics, user characteristics and external policy characteristics. Summarized tables on key findings (see Appendix F) and a composite description that presents the "essence" of the phenomenon from the heads of schools and the teachers were prepared for each school. In addition, in each school, samples of documents kept by respondents were examined before continuing to the analysis. A within case analysis for each school was conducted, followed by cross-case analysis to elaborate the study results across the three schools with high data user and three schools with low data user in each purpose of data use. This case-oriented approach was used to find the differences and similarities of the primary schools that generalize the results to the conceptual framework and to provide in-depth proof of the phenomenon of data use within the schools in Indonesia (Yin, 2013).

3.7. Reliability and validity

3.7.1. Quantitative data

The researcher had two Indonesian teachers to suggest in the language and clarity of the items to check the face validity of this survey. The process refined the items by omitting or replacing some of the items for better respondents' understanding. Furthermore, factor analysis was performed to determine the construct validity and to confirm the basic structure among variables. Reliability analysis of the survey delivered the Cronbach's alpha coefficient. This statistic indicated the average correlation among all items that construct the survey (Field, 2009).

Factor and reliability analyses. The factor and reliability analyses have been performed with the dataset of 105 respondents. The factor analysis was done for 70 items based on the modified model of data use conducted by Hawa (2014). The factor analyses revealed seven variables consistent with the

conceptual framework (see Table 7). The factor loadings after rotation for each variable are shown in Appendix D. Furthermore, the removal criteria on which items with factor loadings less than .51 (Field, 2009) was used to select which items fitted the best within the found variables model. Based on those removal criteria, one item was removed from the data characteristics and three items were removed on the school organizational characteristics. In addition, all seven variables show a good reliability of scales. Table 7 below summarizes the result of factor analysis based on principle component analysis and reliability analysis for each variable.

Table 6. The result of factor analyses.

Variables	Variance*	Items**	Cronbach alpha
Data use for accountability	81.54 %	3	.88
Data use for school development	52.94 %	9	.88
Data use for instruction	49.34 %	9	.86
Data characteristics	44.98 %	10	.87
Data user characteristics	47.79 %	8	.83
School organizational characteristics	38.83 %	15	.90
External policy characteristics	47.26 %	12	.89

*Explained with eigenvalues > 1.00
**Resulted from oblimin rotation using the criteria for factor loading greater than .51

3.7.2. Qualitative data

The researcher conducted a pilot study in one school in Indonesia before the actual interviews of selected schools. The pilot study confirmed content validity of the instruments and helped the researcher to adjust the interview questions in term of languages or concepts. First, internal validity was promoted by triangulating major differences and similarities between respondent's opinions and experiences for each case. Furthermore, the researcher conducted a triangulation between the interview data and the documents to decide the accuracy and the construct validity of the collected information. Finally, all interviews were audio taped and transcribed to permit analyses of the within and across cases. Hence, a specific case and cross-case thick descriptions including quotation from respondents were provided to confirm the external validity (Yin, 2013).

In addition to the above, a group of two researchers conducted an inter-rater reliability check of the interviews data. The researcher arranged a shared coding rubric which was agreed upon to avoid differences causing from researchers' inconsistency (Creswell, 2012). The rates were calculated from 2 of 18 transcribed interviews (11.11%) with 30 codes and 208 responses which gave an agreement of 79% or Cohen's kappa of .79.

3.8. Ethical considerations

The researcher submitted a request for approval from the University of Twente Research Ethical Committee before collecting data from survey and interview to the home country. The researcher also got an authorization from District Education Office in Indonesia for conducting the research at the schools. Finally, the researcher has sent an introduction letter to all of the target schools. Attached to the introduction letter, there was information for the respondents. They got a clear explanation of the study, the right to remain anonymous and their consent requested before survey and using audiotapes for interview.

CHAPTER FOUR

4. RESULTS

This chapter presents the findings of survey and interviews. The results on all three research questions are presented: kinds of data available, the purposes of data use, and factors promoting and hindering data use in the schools.

4.1. Survey analyses

A total of 222 respondents participated in the survey. Respondents consist of 28 (12.61%) heads of schools and 194 (87%) teachers in 60 Indonesian schools. Table 6 below shows the distribution of the survey data collection within Indonesian provinces.

Table 7. The distribution of survey results.

Province	Region	Total schools	Total heads of schools	Total teachers
Riau	Bengkalis	1	1	2
South Sumatera	Muara Enim	1	1	3
Lampung	West Tulang Bawang	7	5	21
DKI Jakarta	North Jakarta	6	3	29
	South Jakarta	12	4	36
	Central Jakarta	6	1	26
	West Jakarta	1	0	1
	East Jakarta	10	2	36
West Java	Tangerang	1	1	0
Central Java	Temanggung	1	0	1
East Java	Cilacap	1	1	3
	Malang	3	2	7
Yogyakarta	Yogyakarta	1	0	4
East Kalimantan	Paser	1	0	3
Nusa Tenggara	Bima	2	2	6
South Sulawesi	Toli - Toli	2	1	4
North Moluccas	South Halmahera	4	4	12
	Total	**60**	**28**	**194**

4.1.1. Kinds of data available

The analysis of survey regarding kinds of data available in schools was grouped into input, process, context, and output data. Table 8 below summarizes the frequencies and percentages of the availability of data to Indonesian primary heads of schools and teachers within those groups.

Table 8. The summary of results for kinds of data available in schools.

Kinds of data	The frequency and percentages of the availability of data		
	Head of school	Teachers	Total
Input data			
Student demographic data	23 (92.00 %)	70 (87.50 %)	93 (88.60 %)
Student SES data	16 (64.00 %)	53 (66.30 %)	69 (65.70 %)
Parent demographic data	22 (88.00 %)	65 (81.30 %)	87 (82.90 %)
Teacher data	23 (92.00 %)	72 (90.00 %)	95 (90.50 %)
Student transfer	23 (92.00 %)	66 (82.50 %)	89 (84.80 %)
Process data			
Student log book	20 (80.00 %)	60 (75.00 %)	80 (76.20 %)
School curriculum	23 (92.00 %)	71 (88.80 %)	94 (89.50 %)
Pass mark	21 (84.00 %)	63 (78.80 %)	84 (80.00 %)
Lesson plan	22 (88.00 %)	67 (83.80 %)	89 (84.80 %)
School annual policy	22 (88.00 %)	56 (70.00 %)	78 (74.30 %)
Student attendant	20 (80.00 %)	61 (76.30 %)	81 (77.10 %)
Teacher attendant	21 (84.00 %)	58 (72.50 %)	79 (75.20 %)
Outcome data			

Student final report	23 (92.00 %)	70 (87.50 %)	93 (88.60 %)
Final examination	23 (92.00 %)	70 (87.50 %)	93 (88.60 %)
Student daily report	21 (84.00 %)	69 (86.30 %)	90 (85.70 %)
School evaluation	22 (88.00 %)	62 (77.50 %)	84 (80.00 %)
Teacher evaluation	19 (76.00 %)	51 (63.80 %)	70 (66.70 %)
Context data			
School profile	21 (84.00 %)	68 (85.00 %)	89 (84.80 %)
School facilities	20 (80.00 %)	50 (62.50 %)	70 (66.70 %)
School financial report	22 (88.00 %)	60 (75.00 %)	82 (78.10 %)

Input data. The kinds of input data available in Indonesian primary schools were student socio-economic status, students, parents demographic student transfer and teacher qualification data. In general, more than 65% of heads of schools and teachers reported that those data were available in schools. In comparison with other kinds of data, student socio-economic status data was the least available in Indonesia with only 65.70% stated. Regarding the differences between heads of schools and teachers, teachers only had reported slightly more data available on student socio-economic status data. This means several teachers might have initiated to collect this data for their own purposes.

Process data. The kinds of data available in schools under this category were student log book, school curriculum, the passing mark, lesson plan, school annual policy, student and teacher attendances data. Overall, more than 74% of heads of schools and teachers pointed that those data were available in schools. In comparison with other kinds of data, school annual policy data was the least available with only 74.30% stated. Furthermore, heads of schools pointed slightly more all kinds of process data available than teachers. This might indicate that some process data were only available for heads of schools but not for teachers.

Outcome data. The kinds of output data available in schools were student daily report, final report, final examination, school and teacher evaluation data. Generally, more than 65% of heads of schools and teachers claimed that those data were available in schools. In comparison with other kinds of data, teacher evaluation data was the least available with only 66.70% stated. Regarding the differences between heads of schools and teachers, teachers only pointed slightly more data available on student daily report. This might be assumed that several teachers might kept the student daily report only for their own purposes but not for schools.

Context data. The kinds of data available in schools under this category were school profile, facilities, and the financial report. In general, more than 66% heads of schools and teachers pointed that those data were available in schools. In comparison with other kinds of data, school facilities data was the least available with only 66.70% stated. Furthermore, heads of schools pointed slightly more that all kinds of process data are available than teachers. This might indicate that several context data were only available for heads of schools but not for teachers.

4.1.2. Purposes of data use

Based on the conceptual framework and confirmed by factor analyses, the purpose of data use was divided into three variables: (1) accountability, (2) school development and (3) instructional purposes. All answers to the individual questions for the purposes of data use are shown in Appendix E. Before elaborating on these topics, the mean and standard deviation of the purposes for heads of schools and teachers are presented in Table 9.

Table 9. Mean and standard deviation of the questionnaire on data use purpose.

	Heads of schools Mean (SD)	**Teachers Mean (SD)**	**Total Mean (SD)**
Data use for accountability*	3.44 (.54)	3.38 (.46)	3.39 (.48)
Data use for school development*	3.30 (.41)	3.20 (.40)	3.22 (.40)
Data use for instruction**	4.40 (.76)	4.52 (.81)	4.49 (.79)

* four-point scale, rating from 1= 'totally disagree' to 4= 'totally agree.'
** six-point scale, rating from 1 = 'barley/never' to 6 = 'two times a week'

Data use for accountability in total of Indonesian primary heads of schools and teachers received a mean score of 3.39. This is a relatively high score which means they generally agreed to the use of data for accountability. For examples, more than 90% (strongly) agreed with statements such as: "*The data we use for accountability purposes (e.g. to give reports to parents and school inspectors) represents the reality at school*" and "*We provide data for our school improvement to our inspectors*" (see Appendix E). Regarding the differences between heads of schools and teachers, t-test analysis revealed that heads of schools' mean score was not significantly higher than teachers on data use for accountability ($t = .77$, $p = .44$).

Concerning the use of data for school development, 95.2% of the respondents (strongly) agreed to use external evaluations (e.g. from the school inspection) for school development. Moreover, more than 90% also (strongly) agreed with statements such as: "*We use detailed data analyses as an essential part of improvement processes in my school*" and "*Heads of school use data to show teachers the extent to which the school is achieving its goals*" (see Appendix E). It is noteworthy that data use for school development also received a relatively high mean score of 3.22. Also for accountability, t-test analysis revealed that heads of schools did not score significantly higher than teachers on data use for school development ($t = 1.14$, $p = .25$).

Finally, regarding the use of data for instruction, although there were around 30% of the respondents that used data to set learning goals and to determine the progress of students not more than twice a year (see Appendix E), data use for instruction still received a relatively high mean score of 4.49. This was because around 50% of the respondents pointed out that data were used for adapting teaching, setting the speed of the lessons and giving feedback to students more than once a week (see Appendix E). Furthermore, t-test analysis revealed that teachers' mean score did not significantly higher than heads of schools on data use for instruction ($t = .61$, $p = .53$).

4.1.3. Factors promoting or hindering data use

Based on the conceptual framework and confirmed by factor analyses, the factors promoting or hindering data use were divided into four variables: (1) data characteristics, (2) data user characteristics, (3) school organizational characteristics and (4) external policy characteristics. First, descriptive results of the survey items were presented, followed by regression analyses which used to determine to what extent data use for accountability, school development, and instruction were influenced by data, data user, school organizational, and external policy characteristics.

Data characteristics. The data characteristics variables consist of three components: (1) accessibility of data, (2) usability of data and (3) data quality. All answers to the individual questions for the data characteristics use are shown in Appendix E. Before elaborating on these topics, the mean and standard deviation of the data characteristics for heads of schools and teachers are presented in Table 10.

Table 10. Mean and standard deviation of the questionnaire on data characteristics.

	Head of school Mean (SD)	**Teachers Mean (SD)**	**Total Mean (SD)**
Data characteristics	3.28 (.40)	3.23 (.40)	**3.24 (.40)**
Data accessibility	3.19 (.47)	3.15 (.45)	3.16 (.45)
Data usability	3.29 (.41)	3.32 (.43)	3.31 (.42)
Data quality	3.40 (.54)	3.31 (.51)	3.33 (.52)

four-point scale, rating from 1= 'totally disagree' to 4= 'totally agree.'

The data characteristics were given a mean score of 3.24. This was a relatively high score which means heads of schools and teacher generally agreed with all of the three components of data characteristics. First, most of the respondents (strongly) agreed that they had a data information system at their school and had access to the relevant data. Second, most of them (strongly) agreed that data was useful to show the learning progress of the students. Finally, most of them also (strongly) agreed that data were perceived as update and accurate. This was also presented in Table 10 that these three components received a mean score more than 3.00. Regarding the differences between heads of schools and teachers, t-test analysis revealed that heads of schools did not score significantly higher than teachers on data characteristics ($t = .44$, $p = .66$).

Data user characteristics. The data user characteristics variables consist of two components: (1) attitude and (2) data literacy. All answers to the individual questions for the data user characteristics are shown in Appendix E. Before elaborating on these topics, the mean and standard deviation of the data user characteristics for heads of schools and teachers are presented in Table 11.

Table 11. Mean and standard deviation of the questionnaire on the data user characteristics.

	Head of school Mean (SD)	Teachers Mean (SD)	Total Mean (SD)
Data user characteristics	3.27 (.36)	3.18 (.39)	**3.20 (.38)**
Data literacy	3.20 (.40)	3.12 (.47)	3.14 (.45)
Attitude	3.40 (.41)	3.29 (.39)	3.31 (.40)

four-point scale, rating from 1= 'totally disagree' to 4= 'totally agree.'

Most of the respondents (strongly) agreed that they were able to diagnose student learning needs and to interpret data. Moreover, they also (strongly) agreed that data were important to determine student learning needs and to adjust their teaching. This was showed in Table 11 that data user characteristics received a reasonably high mean score of 3.20 with the highest mean score was the attitude towards data of 3.31. Furthermore, t-test analysis revealed that heads of schools did not score significantly higher than teachers on both data user characteristics ($t = .99$, $p = .32$).

School organizational characteristics. The school organizational characteristics were divided into five components: (1) school leadership, (2) collaboration, (3) vision, (4) norms and (5) training and support. All answers to the individual questions for the school organizational characteristics are shown in Appendix E. Before elaborating on these topics, the mean and standard deviation of the data characteristics for heads of schools and teachers are presented in Table 12.

Table 12. Mean and standard deviation of the questionnaire on school organizational characteristics.

	Heads of schools Mean (SD)	Teachers Mean (SD)	Total Mean (SD)
School characteristics	3.34 (.35)	3.24 (.37)	**3.27 (.37)**
Leadership	3.46 (.37)	3.31 (.44)	3.35 (.49)
Collaboration	3.28 (.38)	3.25 (.43)	3.26 (.42)
Shared vision	3.28 (.59)	3.21 (.49)	3.23 (.51)
Norm	3.18 (.49)	3.06 (.54)	3.09 (.53)
Support	3.14 (.38)	3.09 (.41)	3.10 (.40)

four-point scale, rating from 1= 'totally disagree' to 4= 'totally agree.'

The school organizational characteristics were given a mean score of 3.27. This was a relatively high score which means heads of schools and teacher generally agreed with all of the components of school organizational characteristics. First, most of the respondents stated in all of Indonesian's schools that their heads of schools encourage data use to support education and knows the importance of developing data use skills in their teachers. Regarding the collaboration, almost all respondents (totally) agreed to share data with their students and their colleague. In all of Indonesian schools, most of the respondents believed that their colleagues have the same vision of teaching and learning as they did. Regarding the concept norms, most of them believed data use is a priority at their school. Finally, concerning the support, respondents are sufficiently supported in data use and have someone in their school to reach out to for data question. This was also presented in Table 12 that these three components received a mean score more than 3.00. Furthermore, t-test analysis revealed that heads of schools did not score significantly higher than teachers on school organizational characteristics ($t = 1.12$, $p = .26$).

External policy characteristics. The external policy characteristics variables consist of two components: (1) supervisor policy and (2) government policy. All answers to the individual questions for the external policy characteristics are shown in Appendix D. Before elaborating on these topics, the mean and standard deviation of the data characteristics for heads of school and teachers are presented in Table 13.

Table 13. Mean and standard deviation of the questionnaire on external policy characteristics.

	Heads of school Mean (SD)	Teachers Mean (SD)	Total Mean (SD)
Policy characteristics	3.28 (.35)	3.21 (.39)	**3.22 (.38)**
Supervisor policy	3.21 (.47)	3.19 (.45)	3.19 (.45)
Government policy	3.33 (.36)	3.22 (.41)	3.25 (.40)

four-point scale, rating from 1= 'totally disagree' to 4= 'totally agree.'

Most of the respondents (strongly) agreed that supervisors were very much concerned with the data, and their recommendation were prompted to focus on data. Moreover, they also (strongly) agreed that there was a government policy for the school to use the data in making decisions. This was presented in Table 13 that external policy characteristics received a quite high mean score of 3.22 with the highest mean score was the government policy of 3.25. Furthermore, t-test analysis revealed that heads of schools did not score significantly higher than teachers on external policy characteristics ($t = .80$, $p = .42$).

The extent of which factors did influence data use. Prior to the regression analysis, the variables were checked on multi-collinearity. This applies in particular to regression analysis with multiple predictors. When there is a high level multi-collinearity between predictors, this can lead to difficulties in determining the unique contribution of the predictors that are highly correlated (Field, 2009). Therefore, correlation analysis was performed to ascertain the level moderation between the predictors and also to determine the degree of relationship between the predictors and the dependent variables which are the purposes of data use. Correlation analysis was done by using Spearman's Rho (ρ) since it was more resistant to input errors, and the questionnaire had a Likert scale which indicates that measurements were taken from ordinal scales. Table 14 below shows the output of the Spearman's Rho analyzes.

Table 14. The results of correlation analyzes.

Variable	1	2	3	4	I	II	III
1.Data characteristics	1.00						
2.User characteristics	.73**	1.00					
3.School characteristics	.58**	.67**	1.00				
4.Policy characteristics	.37**	.51**	.68**	1.00			
I. Accountability	**.31****	**.40****	**.50****	**.49****	1.00		
II. Development	**.32****	**.41****	**.58****	**.58****	.62**	1.00	
III.Instruction	**.42****	**.41****	**.31****	**.14**	.34**	.24*	1.00

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

Based on Table 14, it was very clear that there were a lot of significant correlations ($p < .01$ and $p < .05$). However, there were no correlations above .80. This indicates that there was probably no multi-collinearity. Furthermore, looking at the correlations between the predictors and the dependent variables which are represented in bold, it can be noted that most of the expected relationships derived from the conceptual framework can be significantly confirmed. Only for the correlations between external policy characteristics and data use for instruction ($r = .14$) the output showed a not significant low correlation. Nevertheless, still most of the expected predictors had at least a significant correlation with the purposes of data use.

Finally, a multiple regression analysis was conducted to examine to what extent there is a correlation between the factor variables (data, data user, school organizational, external policy characteristics) and the dependent variables (data use for accountability, school development, instruction). To draw a conclusion based on multiple regression analysis, several assumptions such as the residuals are normally distributed and that mutual independence were checked and met. Table 15 below shows the regression coefficient and standard error of the variables influencing data use for accountability, school development and instruction.

Table 15. Regression coefficients and standard error of the regression analyzes.

Variables	Accountability B(SE)	Development B(SE)	Instruction B(SE)
Data characteristics	.04(.14)	.05(.11)	.78(.24)*
Data user characteristics	.15(.18)	.00(.13)	.40(.30)
School organizational characteristics	.25(.20)	.42(.15)*	.11(.33)
External policy characteristics	.33(.15)**	.36(.11)*	-.20(.25)

*. Regression is significant at the 0.01 level (2-tailed)
**. Regression is significant at the 0.05 level (2-tailed)

For the analysis with data use for accountability as a dependent variable, results of multiple regression analysis revealed that the overall model was significant (R^2 = .29, F = 10,621, p <.001). The variables together explained 29% of the variance in data use for accountability. An investigation of the parameters showed that all factors positively impacted on data use for accountability. However, the results showed that only external policy characteristics significantly influenced data use for accountability (b = .33, SE = .14, p< .005). This means that a score of one unit higher on external policy characteristics relates to an increase of the score on data use for accountability with .33.

For the analysis with data use for school development as a dependent variable, results of multiple regression analysis revealed that the model was significant (R^2 = .43, F = 19,591, p <.001). The variables together explained 43% of the variance in data use for school development. An investigation of the parameters showed that all the factors positively impacted on data use for school development. The results showed that school organizational characteristics significantly influenced on data use for school development (b = .42, SE = .15, p< .001), as well as external policy characteristics (b = .36, SE = .11, p < .001). In other words, a score of one unit higher on school organizational characteristics increases a score on data use for school development with .42 and a score of one unit higher on external policy characteristics relates to an increase of the score on data use for school development with .36.

Finally, the results of multiple regression analysis revealed that the instruction model was significant (R^2 = .30, F = 10,926, p <.001). The variables together explained 30% of the variance in data use for instruction. An investigation of the parameters showed that data user characteristics and school organizational characteristics positively impacted data use for instruction and only data characteristics that had a significant influence (b = .78, SE = .24, p< .001) that increase of the score on data use for instruction with .78 for one unit higher.

4.2. Interview and document analyses

A total of six schools participated in the case study, the researcher used descriptive statistics of survey items that led to the selection of these six schools, three with a reasonably high mean score and three with reasonably low mean score for each purpose of data use. Table 16 below summarizes the mean score of three purposes of data use for each school.

Table 16. Mean score on data use purpose of the case study schools

Categorization of school		Accountability (μ = 3.39)	Development (μ = 3.22)	Instruction (μ = 4.49)
High data user	For instruction			**5.06**
	For school development		**3.53**	
	For accountability	**3.80**		
Low data user	For instruction			**2.58**
	For school development		**2.75**	
	For accountability	**2.44**		

μ = Mean of all schools

A total of 18 respondents from six schools participated in the interviews. Table 17 below summarizes the label used for the entire presentation of results based on the categorization sampling in the case study.

Table 17. The label used for the entire presentation of results.

Categorization of school		Label			
		School	**Head of school**	**Teacher 1**	**Teacher 2**
High data user	For instruction	HI	HI-H	HI-T1	HI-T2
	For school development	HD	HD-H	HD-T1	HD-T2
	For accountability	HA	HA-H	HA-T1	HA-T2
Low data user	For instruction	LI	LI-H	LI-T1	LI-T2
	For school development	LD	LD-H	LD-T1	LD-T2
	For accountability	LA	LA-H	LA-T1	LA-T2

4.2.1. Kinds of data available

The analysis of interview data regarding kinds of data in schools involved within-case analysis for each school (see appendix C for example of document analysis), followed by cross-case analysis for low data use and high data use schools. The descriptions related to kinds of data available and used, grouped into input, process, context, and output data in high data and low data use schools are summarized in Table 18 below.

A. **Case analyses of kind of data available in high data use schools**

Input data. All kinds of input data were available in these three high data use schools. Students and parents data were available both on the hardcopy and softcopy files because they used online system to verify all background data of the incoming students. Next, the student socio-economic status was integrated with data from the District Education Office (DEO) in order to identify unfortunate students which need financial support from the government. Likewise, teacher data was also originated from the DEO, so that they did not have to make a new records for incoming teachers. Finally, the document analysis also confirmed the availability of all input data in all schools.

Process data. Basically, all kinds of process data were formulated based on the guidance from the government. For example, in all of three high data use school, school curriculum, passing mark and school annual policy were had similarities in terms of the format but the content was filled according to their own situation and goals. Conversely, lesson plan, student log book and student attendances data differ based on each teacher's desire. For example, a teacher in the HI school had created a student attendance data which not only checking the time of presence but also the time of leaving. Moreover, teacher attendance was checked with the finger scan system that integrated with the DEO. Overall, all kinds of process data were available based on document analyses in all the schools.

Outcome data. The student assessment data such as: student daily progress, examination results and student final report were not only on the hand of the head of schools but also on the hand of all the teachers. Thus all of them were able to present all the documents at once. Furthermore, school evaluation and teacher evaluation were carried out twice a year at the end of school semester. The researcher could analyze the school evaluation from all the head schools and access the teacher evaluation from all the teachers in high data use schools.

Context data. All of the high data use schools were holding the principle of transparent accountability. The researcher was able to access and analyze the context data such as school profile, school facilities and school financial report since they also already displayed the data on the board in front of the school. As one of the head of school said: *"We want to inform the parents about what we have done and provided in the school"*. Lastly, student and teacher transfer data were also available given that these data were integrated in the online system.

Table 18. The summary of interview results for kinds of data available in schools.

Kinds of data	LI				LD				LA				HI				HD				HA			
	H	T1	T2	Doc	H	T1	T2	Doc	H	T1	T2	Doc	H	T1	T2	Doc	H	T1	T2	Doc	H	T1	T2	Doc
Input data																								
Student demographic data	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Student SES data	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Parent demographic data	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Teacher qualification data	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Student transfer	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Process data																								
Student log book	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
School curriculum	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pass mark	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lesson plan	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
School annual policy	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Student attendant	+	+	+	+	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Teacher attendant	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Outcome data																								
Student final report	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Final examination	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Student daily report	+	-	-	-	+	-	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
School evaluation	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Teacher evaluation	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Context data																								
School profile	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
School facilities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
School financial report	+	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+

Doc = Document analyses
+ = mentioned/available

B. **Case analyses of kind of data available in low data use schools**

Input data. The availability of input data in the low data use school were similar. There were students and parents data which were simply recorded when the student began the school at grade one or transferred from the other school. Next, there were teacher qualification data which were recorded when the teacher joined in the school. The most interesting finding was when the respondents were asked about student socio-economic status data, the majority of teachers argued that the data was recorded based on the head of school's estimation only, not real facts. These statements were also proved by the document analysis because the researcher could not find the SES data in the documents provided by the heads of schools. Furthermore, the researcher could not conduct document analysis in the LD school because the Head of school should leave earlier before we finished all the interviews. So the researcher could not triangulate the information gathered from the interviews with the documents.

Process data. The three low data use schools showed another similarity in the availability of the process data. First, school curriculum, passing mark, the lesson plans were available in these schools. Interestingly, based on the document analysis, those data seemed not originated from the school environment. As also a teacher in the LD school argued that those data were a copied version from other school. A second similarity was that all the Heads of school argued that the student log book was available. However, none of the teachers reported that they have recorded the student's activities in some kind of student log book. As a teacher in LI school claimed that he only used his intuition to assess the student attitudes from their daily activities. Furthermore, there were also some differences between these schools in terms of the process data availability. For example, In the LD school, school annual policy was not accessible for researcher even the teachers. Another example, the student attendances were not given in the LA school, but the teachers simply made in the note book for their own purposes.

Outcome data. The common types of data available in the three low data use school were student reports and examination results. The student report was delivered twice a year and examination result was provided once a year. However, as has been informed before, the researcher could not verify and analyze those data in the LD school. Another similarity, all heads of school argued that they had conducted school and teacher evaluation once a year at the end of school year. Nonetheless, the researcher could not find this data from the documents and the teachers also confirmed that they never had received the result of the evaluation.

Context data. School profile and school facilities were the only types of data were available in all the three low data use school, since they had already displayed the data on the board in front of the school. On the other hand, what was interesting, all teachers argued that the school financial report was not accessible for teachers. Notwithstanding with the statements from the head of schools that the school financial report was available, the researcher also was not able to access it. Furthermore, student transfer data was also not available in the LA and LD school.

C. **Cross-case analyses of kind of data available**

Input data. From the analysis, the results showed that the socio economic status data was the only data not available in low data schools. The other input data such as students data, parent data, and teacher data were available in both high and low data use schools. However, the high data use schools showed more sophisticated input data than the low data use schools. For example, with the use of online system to verify the data of the incoming students obviously demonstrated a better input data rather than recorded the data by hand.

Process data. Talking about simply the availability of the process data, both types of schools showed most of the data were available. The student log book was only the unavailable data in all the low data use schools since all the teachers mostly used intuition to determine student attitudes in the class. However, the high data use schools clearly showed more concern regarding the quality and the usability of data. For example, lesson plans and school curriculum were formulated based on the evaluation of the real situation of school itself. Moreover, it seemed that data was useful for them so that they did not use a copied version from the other school.

Outcome data. From the analysis, the results showed that the high data use schools provided more outcome data than low data use schools. One of the essential differences was the evaluation data. The school and the teacher evaluation data were not found in the low data use schools. Furthermore, the examination result and student report were available in both of schools. Then again it seemed that the data quality in the high data use schools was better than the low data use schools, for instance, the student report in the high data use schools consisted a more comprehensive explanation about the student achievement.

Context data. The kinds of data in this category were similar in both of schools. There were school facilities, school profiles, and student transfer data available in both schools. One of the interesting findings was the school financial report, the researcher could easily access this data in the high data use school whereas the data was claimed to be confidential in the low data use schools.

4.2.2. Purposes of data use

The interview data were analyzed in individual case of schools (see appendix F for example of coding analysis of interview data), followed by cross-case analysis between schools. The description related to the purpose of data use by the schools were grouped into data use for accountability, instruction, and school development. Results of these school aspects are summarized in Table 19.

A. Case analyses of purposes of data use in high data use schools

Data use for accountability. All data available in the schools were used for accountability purposes. All kinds of data such as input, process, outcome and context data should be delivered to the government for different purposes. For example, financial purpose as one teacher in the HA school said: "*We submit the lesson plans and teacher attendance to be considered for our monthly allowances*", or accreditation purpose as one of the head of school reported: "*We delivered the examination result at the end of the school year so that they (the government) can decide the classification of the schools within the area based on the score*", or simply monthly reporting purpose of school facilities and the financial report. Furthermore, there were also the supervisor who conducting the inspection at least once a month or maybe occasionally. One of the teacher in the HA school reported: "*all kinds of preparation data for lesson activities should always be ready in case there will be an occasional inspection*". Last but not least, the high data use schools especially the HA school also appeared to be responsible about the education they provide for the parents. Besides the student report usually delivered to the parents once a semester, there was also the school committee that consisted of the representatives of the parents in order to oversee the school education practices. The school always held a meeting at least once a year with the committee to report all kinds of information regarding the student performance and financial report. In addition, some teachers might also invite certain parents whose children were facing some troubles in the school in order to discuss possible solutions for both of them. For example, one teacher at HA school informed: *"Both teacher and parents are responsible for the student learning; when a student makes troubles at least three times, we will invite his/her parents to the school"*.

Table 19. The summary of interview results for purposes of data use in schools

Purposes of data use	LI			LD			LA			HI			HD			HA		
	LI-H	LIT1	LIT2	LDH	LDT1	LDT2	LAH	LAT1	LAT2	HIH	HIT1	HIT2	HDH	HDT1	HDT2	HAH	HAT1	HAT2
Accountability																		
Government report	+	+	-	+	-	+	+	-	-	+	+	+	+	+	+	+	+	+
Parents report	+	+	-	+	-	+	-	-	-	+	+	+	+	+	+	+	+	+
Inspection	+	+	-	+	-	+	+	-	-	+	+	+	+	+	+	+	+	+
Development																		
Evaluation	+	-	-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
School Planning	+	-	-	+	-	-	+	-	+	+	+	+	+	+	+	+	+	+
Curriculum development	+	+	-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
Teacher Professional Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Instruction																		
Set learning goals	-	-	-	-	-	+	-	+	-	+	+	+	+	+	+	+	+	+
Assess student progress	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Adapt teaching	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	+	+
Give student feedback	-	-	-	-	-	-	-	-	-	+	+	+	-	-	+	+	-	-
Determine student abilities and attitudes	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	+	+
Unintended																		
Abuse of data use	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Misuse of data	-	-	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
Useless	-	-	+	-	-	+	-	+	+	-	-	-	-	-	-	-	-	-

+ = mentioned

Data use for development. Data in the three high data schools were usually used for curriculum development and school planning. With regard to curriculum development, the curriculum in one school would be revised once a year. The curriculum consisted of several components, such as: vision and mission, passing mark, lesson subject and also lessons schedule for one year. Then each of the components would consider particular data for the improvement. For example, passing mark considered the examination result and student grades, as one of the HD school teacher said: "*The higher the student grades and the previous examination results are, the higher the passing mark of the certain subject*". Another example, lessons subject and schedule considered the teacher qualification data, as one of the heads of schools reported: "*The placement of teachers in the class will be based on the teacher qualification data"*. Regarding the school program, the planning of the school program for one year ahead was based on the previous school evaluation and current school condition. Talking about this issue, the head of school in the HD school stated: "*School program meeting begins with school self-evaluation; we will consider the program which succeeded or should be added based on the national indicators provided from the government. We will also analyze current school condition based on suggestions from the school committee, teachers and students*". This means the school evaluation was also formulated based on evidences guided by the national indicator. Lastly, even though all the high data use schools conducted teacher evaluation once a year, it was not clear whether these data were considered for the teacher professional development. It is because the teacher professional development was held by the government, not by the school itself.

Data use for instruction. Data use for instruction was usually exercised in three high data user schools. Firstly, data was used for setting the learning goals; for example in the making of lesson plan, learning goal was decided on the basis of the student assessment result. One teacher in HI school said: "*if there is a student that still has not fulfilled the goal of today's lesson, such a student will have a remedial to fulfill the goal in the next class."* Secondly, data was used for adapting teaching method; for example teachers in HI schools changed their teaching method based on the previous student performance. One teacher said that: "*Sometimes in the class, students could not understand the concept of a particular subject, so in the next meeting I will change the way I present the lesson*". Next, several outcome data, such as: student daily progress and student examination result were used to assess student achievement. Accordingly, the teachers would give feedback and sometimes differentiate the student abilities based on those data. Besides that, teachers especially in the HI school also used data to determine student attitudes. One of the teacher created student log book namely "*buku kejadian*" that recorded students' activities especially student disobedience. Once such a student caused a lot of troubles, the teacher would use personal approach to overcome the problem. Moreover, some teachers also considered student socio-economic status data to uncover the setback of a particular student.

B. Case analyses of purposes of data use in low data use schools

Data use for accountability. Data in the low data use schools were used for accountability mainly in the view of the heads of schools. One of the teachers in the LA school claimed: "*I don't know anything about all kinds of reports that the school has delivered to the government, those are head of school's responsibilities*". Furthermore, the results obtained from interviews with the head of school showed that data were commonly used for reporting education practices to the government. One of the heads of schools reported: "*We delivered monthly report to the government about all kinds of aspects regarding education practice, such as: teacher and student attendances, school facilities and financial report*". In addition, data were also arranged to meet a particular demand given by the supervisor in case of inspection. For example, one of the heads of schools said: *All kinds of process data in school such as student reports and lesson plans were prepared when there will be an inspection"*. Lastly, in the LI and LD schools, data were also provided for informing student progress to the parents. For example, student reports were delivered to parents once a year. However, in the LA school, this school's responsibility sometimes was not fulfilled. One of the LA school teachers informed*: "Sometimes, the student progress report to the parents is not continuously delivered, we just simply give it only to the students*".

Data use for development. The majority of teachers in the low data use school argued that they were not involved in planning school program and curriculum. One of teachers in the LD school said: "*The curriculum and lesson plans were given ready from the head of school; I was not involved in the design*". Moreover, some of the teachers informed that there was a meeting in every beginning of school year but their role was only to hear what the head of school had already planned. One time, they might have opportunities to express their needs but only regarding the facilities support. Even worse when the other LD school teacher was asked about his role in the meeting of school development, he said: *"I don't know anything about the school planning meeting, it is her (head of school) responsibilities"*. On the other hand, talking about school development issues with the three heads of schools indicated that data were used for school evaluation, curriculum development and school planning program. One of the heads of schools claimed: *"First, we evaluate the student progress and teaching practices, based on this evaluation, we develop the curriculum and plan the school program for one year ahead".* Still, none of the teachers reported that they ever had seen the result of teacher or school evaluation. Lastly, regarding the use of data for teacher professional development, the results suggested that this issue had never been a concern by the schools.

Data use for instruction. In all cases, data were commonly used for assessing student achievement. They informed some data, such as student attendances, student daily progress and examination result in student final report. Even, some of the teachers had used only examination result to assess the student achievement. One of the teachers in the LI school said: *"We used the examination result to see student progress."* Besides assessing student achievement, data were used also to set learning goals in the lesson plans. However, not all teachers were used to this purpose. For example, a teacher in the LI school said: *"The goals were set based on the books"*. Overall, the results obtained from the interviews showed that data were still not completely used for instruction, because none of them mentioned the use of data as to adapt the teaching method, to give student feedbacks or to determine students' abilities and attitudes.

Unintended use of data. Based on the interviews with several teachers, the researcher discovered findings with regards to the unintended use of data. One of the interesting findings was some of the teachers revealed that there was an abuse of data use. For example, a teacher in the LI school reported: "*Head of school makes a copy of curriculum and lesson plan from another school in order to fulfill school accountability to the supervisor and government*". Another finding was misuse of data, for example: teaching to the test happened in the LI schools. It means teachers narrowed the student achievement to only what it was assessed in the examination results. Consequently, teachers taught the test items so that student can achieve higher based on these items. Final finding was that the data was useless. All heads of schools demanded teachers just to collect data without using it. A teacher in LA school said: "*The head of school demands teachers only to collect student progress data without discussing it*".

C. Cross-case analysis of purposes of data use

Data use for accountability. From the above analyses, results showed several similarities regarding the use of data for accountability in both groups of schools. First, the most mentioned purpose by both respondents was reporting the education practices to the government. For example, all heads of schools had to deliver the report monthly and all teachers had to submit several data as a requirement for monthly allowances. Second, both groups of schools also had to prepare several data for inspection purpose. Noticeably, there was a difference between them regarding the intensity. For example, the teachers in HA school had to be ready for inspection anytime, while this was not the case in the LA school. Finally, the results also showed the difference between both groups of schools because the use of data for reporting the education practices to the parents was not the most important purpose in low data use school cases.

Data use for school development. The similarities of the use of data for school development in both groups of school were for curriculum development and school program planning. Still, it was noted that most of the teachers especially in the LD schools claimed that they were not involved in those activities. Hence, there were not a lot of evidences to confirm that data was really used for curriculum development and school planning in low data use schools. One of significant differences was that data was used for school evaluation in HA school while this case was not mentioned in the LA school. Finally, none of

both groups of schools mentioned the use of data for teacher professional development, as explained before it might be because the government was the one that had the responsibility in teacher professional development program, not the schools.

Data use for instruction. Firstly, in both groups of schools data was mostly used for assessing student achievement. However, there was a gap in the quality of the student report because the student report in HI school was more comprehensive in describing students' achievements. The next most mentioned purpose was setting learning goals. Whereas in the LI school for example, the learning goals was taken from the material book. Furthermore, the use of data to adapt teaching, to give student feedback, and to determine student abilities or attitudes were only mentioned by teachers in high data use schools.

Unintended use of data. As described in previous section, the unintended use of data happened only in low data use schools. There were three kinds of unintended use mentioned: first, the abuse of data where the head of school made a copy of curriculum and lesson plan from other school in order to meet accountability demand from the government; second, the misuse of data in terms of teaching to the test; and third, data was not used in the LA school because it was only collected by the head of school yet not clear what is the purpose of the data.

4.2.3. Factors promoting or hindering data use

The analysis of interview data from all schools was analyzed in terms of factors promoting or hindering data use presented in the conceptual framework. These are grouped into data characteristics, school organizational characteristics, user characteristics and external policy characteristics. The interview data were analyzed in individual case of schools (see appendix F for example of coding analysis of interview data), followed by cross-case analysis between schools. Table 20 below presents the results for each school. In the table, it is indicated whether a factor promoted (+) or hindered (-) the use of data according to the respondents.

A. Case analyses of factors promoting or hindering data use in high data use schools

Data characteristics. With regards to the accessibility, all of the respondents argued that data was easy to access. The possible explanation for this was that all high data use schools have an administration staff to help them accessing any kinds of desired data at once. In addition, with the help of online system for student and school data, it made accessing data easier since they could access it wherever they want. One of the LI teacher said: *"It helps us to find particular information about students, moreover if I lose the hardcopy file, I can recover it"*. In terms of usability, the benefit of data was different between teachers. A teacher in the HI school argued that data helped them to assess the student progress, while a teacher in the HD school informed that data was useful to see the school development, on the other hand a teacher in the HA school claimed that data were important as evidences of the education they provided. Lastly, with regard to the quality of data, all of the respondents claimed that data was update and accurate. For example, a teacher in the HI school said: *"Data was accurate because we have the document evidences, for example, we have a copy of birth certificate to verify the student data"*. As also explained before, they also used the online system and had the administration staff to update the data. It can be assumed that data was updated and accurate. Taken together, the data characteristics in high data use schools especially in the HI school seemed to promote the data use for instruction.

Table 20. The summary of interview results for factors promoting or hindering data use in schools

Factor promoting or hindering data use	**LI**			**LD**			**LA**			**HI**			**HD**			**HA**		
	LI-H	LIT1	LIT2	LDH	LDT1	LDT2	LAH	LAT1	LAT2	HIH	HIT1	HIT2	HDH	HDT1	HDT2	HAH	HAT1	HAT2
Data characteristics																		
Accessibility	+/-	-	-	+/-	-	-	+/-	-	-	+	+	+	+	+	+	+	+	+
Usability	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Accurate	+	-	-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
Update	+	+/-	-	+	-	+/-	+	-	-	+	+	+	+	+	+	+	+	+
User characteristics																		
Believe in data	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Data literacy	-	-	-	+/-	-	+/-	-	-	-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	-	-
School characteristics																		
Leadership	+	-	-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
Collaboration	+	-	+/-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
Norm	+	-	-	+	-	-	+	-	-	+/-	+	+/-	+	+/-	+/-	+/-	+/-	-
Shared vision	-	-	-	-	-	-	-	-	-	+/-	+/-	-	+	+/-	+/-	+/-	+/-	-
Expert support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Time available	+	-	-	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+
Training	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Policy characteristics																		
Inspection of data	+	+	+	+/-	+/-	+	+/-	+/-	+/-	+	+	+	+	+	+	+	+	+
Recommendation of data	+	+	+/-	-	-	-	-	-	-	+/-	+/-	+/-	+	+	+	+	+/-	+
Salary and certification	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Financial support	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

+ = Mentioned promoting factor
- = Mentioned hindering factor
+/- = Mentioned both promoting and hindering factor

Data user characteristics. As discussed in the usability of data above, all of the respondents appeared to buy-in/believe in data for different purposes. For example, the teachers in the HI school believed that the use of data would give them correct assessment of student learning, while the teachers in the HD school believed that data was important as a guidance to prevent the school developing in the wrong way. On the other hand, teachers in the HA school claimed that data was important as evidences of the education they provided. Besides the positive attitudes, most of the respondents also argued that they knew how to interpret and use the data, especially teachers in HI school which also informed that interpreting the data was part of their job. For example, when the teacher was asked how he interpreted the data, he answered: "*I have two documents, first is examination analyses, the second is follow-up actions. After the examination, we analyze each of the question items especially the one that have more difficulties since only few of the students can solve it; then we will conduct remedial lesson as a follow-up to that difficult content of the lesson*". Even though the researcher could not observe the actual implementation of the analyses in that limited time of the interview, the results on data user characteristics in high data use schools especially in the HI school gave the impression to promote the actual data use.

School organizational characteristics. With respect to school leadership, all teachers agreed that their heads of schools encouraged the use of data and became a role model for them. One teacher in the HD school admitted: **"***Without the head of school, we are not eager to use the data, since he was the one who initiated and supervised the use of data***".** Likewise, the head of school also added: "*I have to check and give the signature into the lessons plan before the class activities*". In terms of collaboration, there were several meetings with regards to data use in school, for example assessment data in schools were discussed by all teachers in collaborative manner; as one teacher in HD school said: "*In every decision making, we plan our curriculum and program as a team*"; even they also discussed the data among break times, as one teacher said: "*we share a lot of activities involving data in our school, even in a break time*". Further analyses from the teachers suggested that the high collaboration within the school was a result of decent leadership which allowed a high interaction between teachers. Regarding the shared vision and norm, the interview results showed not all vision and goals were about data use. For example, the vision shared by one of the heads of schools was related to the improvement of student learning but it was not clear whether the use of data was part of the goals. However, the norms for data use were integrated in the teachers' guidelines. One of the teachers stated: *"Analyzing data was part of my job"*. Finally with regard to the support, there was a dedicated time for teachers to analyze the data, as one teacher said: *"We have a time after schooling for two hours before leaving that we use it to analyze the data"*. Furthermore, results showed that all respondents in this group of schools never received any training on data use, consequently, all schools were lack of expert in data use. However, they claimed that data expert was not needed in the school since they could manage to analyze the data together.

External policy characteristics. The interview results showed that all kinds of data available in the schools were related to the policies given by the government. For example, student data, socio-economic status data, financial report and school profile were prepared for financial grant policy. Next, teacher qualification data, teacher attendances and lesson plan were formulated for salary and promotion policy. Finally, examination result, student report, and school evaluation were delivered for accreditation policy. In addition to that, the education district office also assigned one supervisor for each of school in order to investigate the data in schools. One teacher said: "*Supervisor come to check the data, such as: the attendances, the examination result and the daily progress*" and also to give recommendation related to the data use as a head of school added: "*after the class, they gathered the teachers to give a recommendation regarding the school improvement*". The results on external policy characteristics in high data use schools especially in the HI school also gave the impression to promote the actual data use.

B. Case analyses of factors promoting or hindering data use in low data use school

Data characteristics. Regarding the accessibility, most of the teachers informed that data were hard to access. One teacher in the LI school said: "*Examination results data are hard to access because the head of school keeps it by himself*". The other teacher in the LA school also added: "*Generally, data are hard to access for teachers; for example, financial report is confidential*". On the other hand, one

of the heads of schools claimed: "*Data are easy to access, there are both softcopy and hardcopy files available*". However, it seemed that the information management system was not reliable; for example, when the researcher asked a particular data in the LI school, it was hard for the head of school to find it. Another drawback was that there was no administration staff in all of the three schools, so data was not always provided at once. In terms of the usability, most of them assumed that data were useful. Well, the results suggested data were mostly used for accountability purposes. One of the heads of schools said: "*Data is very useful, when school is requested for reporting education practice, we deliver the data".* There were few of them informed that data was useful to see student progress. Yet also, the quality of data was low; the student report in the LI school only indicated the last examination result, not as whole student progress in a year. Furthermore, all of the heads of schools claimed that data were accurate and updated since they had to submit monthly report to the government. Meanwhile, as described in the unintended use of data section, the teacher in the LI school said: "*Lesson plans were the copied version from the other school*". It means that some of the data, such as: school curriculum and lesson plans were not the accurate or updated data concerning the real school situation. Taken together, the data characteristics in the low data use schools especially in the LI school seemed to hinder actual data use.

Data user characteristics. With respect to the attitude of the users**,** most of the respondents appeared to buy-in/believe in data. They argued that data were important in education practice. Still as discussed above, the importance of data was mostly for accountability purpose. One teacher said: "*I believe data is needed for school administration*". There were only some of them informing that data was important to see the student progress. Then again, none of the teachers argued that data was important, for instance, to improve student performances, to adapt teaching or to develop teaching skills. The user's setback was also occurred in terms of data literacy. There are some of the teachers reported that they are lack of knowledge in analyzing data. For example, a teacher in the LI school said: "*I am a new teacher, I don't know how to analyze data".* On the other hand, there were few teachers argued that they knew how to analyze data, for example a teacher said: *I know how to analyze data, for example if the average score of math exam was 80, it means I have done the lesson successfully".* However, the overall interviews revealed that these few teachers knew how to analyze data yet only in a simple and straightforward way.

School organizational characteristics. It seemed that school leadership was a problematic for all low data use schools. What is interesting is that even all the heads of schools claimed that they supported teachers in using data, initiating the school meeting to discuss data, promoting a shared vision and a norm in using data, and providing time for teachers in using data. None of the teachers confirmed that those statements were true. For example, a teacher in the LI school argued about lacked of leadership which he stated: "*Head of school is not close to us, he likes to demand teachers only to collect data*"; another teacher in the LD school confirmed about no collaboration at all which he said: "*There was no meeting or discussion in planning school program*" and also confirmed about the lacking of support which he said: "*There is no dedicated time for teachers to analyze the data*". The overall response to the school organizational characteristics especially in the LD school seemed to hinder effective data use. In addition, all respondents agreed that they had no experts at school in using data and never had training and support to learn how to analyze and use data at all.

External policy characteristics. In terms of the inspection characteristics, all of the respondents informed that the supervisors checked the availability of several process data. For example, one of the heads of schools said: "*When the supervisor came to do the inspection, he was checking the curriculum, the lesson plans, and the attendances*". Moreover, in some schools the supervisor also gave evaluation to the teachers. The other head of school reported: "*After observing the class, the supervisor gathered the teachers to give an evaluation and solutions regarding their teaching practice"*. However, the findings which were obtained especially in the LA school revealed that there were no recommendation with regard to the use of data. Regarding the government policies, there were several policies that required all heads of schools and teachers to use data. For example, for incentives and certification purposes, a teacher reported: "*We have to submit data such as teacher attendances and lesson plans in order to fulfill salary and certification requirements*". Another example, for financial grant, one of the heads of schools also confirmed: "*There are some data such as financial report and student data to be*

submitted in order to get financial support from the government." Overall, the results indicated that the external policy characteristics in low data use schools seemed to promote the use of data only for accountability purpose.

C. Cross-case analysis of factors promoting or hindering data use

Data characteristics. From the above analyses, it clearly showed that there was a major gap between high data use and low data use schools regarding the accessibility and the quality of data. So in general it could be assumed that data characteristics might promote or hinder the use of data. Further analysis taken from the HI and LI school suggested that data characteristics had a major influence to data use especially for instruction purpose. The reason was related to the better access and advanced data quality; the HI school teachers tend to reason the usability of data as for adapting teaching method or assessing student. On the other hand, the LI school teachers which lacked accessibility and quality of data somehow had not seen the advantages of data for instruction purpose.

Data user characteristics. Regarding the attitudes of the user, there were some teachers in HA and HI school that argued data was important for school development and instruction purposes. However, the most mentioned reason of what they believed was that data was important for accountability purpose. In terms of the data literacy, the results somehow gave the same suggestion with data characteristics that the user's knowledge had also an influence to data use for instruction. The reason was for example both of the teachers in the HI school knew how to interpret data so that they could use the student daily progress to set the learning goals, whereas this case did not happen in the LI school.

School organizational characteristics. From the above analyses, it also obviously showed that there was a major gap between high data use and low data use schools regarding school leadership, collaboration, shared vision, norms and support. So generally it could be assumed that school organizational characteristics might promote or hinder data use. Furthermore, a deeper analyses taken form the HD and LD school suggested that school organizational characteristics had a great influence to the use of data for school development. One of the reasons is that for example relating to school leadership and collaboration, both teachers in the LD school argued that they were not involved in school development; it means that the lacking of collaboration and good leadership had hindered the use of data for development purpose. On the other hand, the HD school showed a good leadership and positive collaboration culture which also appeared to promote the use of data for development. With regards to the school's vision, norm and support, the major gap between both of groups were the availability of the sufficient time and the proper guidelines for teachers in using data which were happened in the high data use schools. Finally, one of the similarities in the school organizational characteristics were no support in terms of trainings about the use of data and no data expert in both high data use and low data use schools.

External policy characteristics. The results from all of the schools clearly showed that external policy characteristics had a great influence specifically to the use of data for accountability purpose. All of the policy examples mentioned by the respondents such as accreditation policy, financial policy and inspection policy had driven the schools to prepare the required data in order to give evidences about the education they provided. Furthermore, there were some cases suggested that external policy might promote the use of data for school development. For example, in the HD schools mentioned that supervisor came to the school in order to give recommendation for school improvement.

CHAPTER FIVE

5. DISCUSSION AND CONCLUSION

This study focused on exploring kinds of data, purposes of data and the promoting and hindering factors in Indonesian primary schools. Therefore, the goal of this study was to gain an understanding into the use of data within schools based on the analysis of a survey and case study presented in the previous chapter. The section below presents the discussion of findings and the relation with the literature. Conclusion of the study are made with regard to the research questions (i.e. data available, use and, the promoting and hindering factors). Finally, implications for further research and recommendations for practice and policy will be described.

5.1. Kinds of data available in Indonesian primary schools

The discussion of kinds of data available in Indonesian schools will be based on suggestion from Ikemoto & Marsh (2007) that categorized kinds of data available into input data, process data, outcome data, and context data. Regarding the input data, the survey results showed that student demographic data, parent data, teacher data and student socio-economic (SES) data were kinds of data available in schools; while SES data was the least available. Furthermore, the case study also showed that all the mentioned data above were available and the SES data was the only data hardly available in low data use schools. The only explanation was the SES data was taken based on the head of schools intuition alone so that the researcher could not analyze this document.

In terms of process data, student log books, school curriculum, passing mark, lesson plan, school annual policy, student and teacher attendances data were kinds of data available in Indonesian schools based on the survey result. The least available were student log book and school annual policy. Moreover, the case study showed similarities with the survey results. All mentioned data were available, whereas student log book was not available in the low data use schools, because teachers claimed to rely on intuition to determine student attitudes in daily activities. Meanwhile, school annual policy was claimed by teachers only to be available for head of schools. Overall, the kinds of process data available in Indonesia were in line with the examples given by Ikemoto & Marsh (2007).

In terms of outcome data, types of data available based on survey results were student daily report, final report, examination result, school evaluation and teacher evaluation. The least available were school and teacher evaluation which also confirmed with case study analyses in low data use schools, because once again evaluation seemed to be accessible only to the head of school. Moreover, since the document was not accessible, it was not clear whether the school evaluation was data driven. In addition to others kinds of outcome data available, in contrast with Schildkamp et al., (2012) data use study in Dutch context, there were no inspection results in Indonesian school. The inspection result was found to be integrated in school self-evaluation result which was held annually.

Finally with regard to the context data, the survey results showed that school profile, school facilities, and school financial report were kinds of available data in Indonesian schools with the least available was school facilities. However the case study results showed a difference. Even though all mentioned data above were available, the school financial report was the one that the researcher found to be confidential in the low data use schools. It was argued by several teachers that school financial report was not reporting real school expenses but somehow taken based on head of school's estimation alone. Overall, the kinds of context data available in Indonesia agreed with the examples given by Ikemoto & Marsh (2007).

Taken together, the discussion of survey and case study results above suggested several key findings. Firstly, there were quite a lot of types of data found and most of them were available in Indonesian schools. A possible explanation was the accountability demand to obey with regulations (Coburn & Talbert, 2006) that may have increased the availability of the input, process and outcome data sources. This finding was similar with the situation of data use in Tanzanian context (Hawa, 2014). In addition, the kinds of data were similar in most of the schools. It might be accounted to the method of counter-balancing the school autonomy by the government which required the same types of data that should be met by all Indonesian schools. Secondly, findings showed that process data were the most type of

data found and input data were the most data available. This is not in line to Bernhardt (2009) study that outcome data were the most type of data available in schools. This can be accounted to the different policies between the countries regarding the kinds of data required to comply. Third, despite the available data in schools, some teachers reported that most data are only available for the heads of schools. Further analysis revealed that the kinds of data available were mostly school level data. A study conducted in the Dutch context (Schildkamp & Kuiper, 2010) also reported that heads of schools were the ones who mostly used school level data and teachers mostly used the classroom level data. Finally, the findings revealed that some respondents relied on intuition in several decisions and data making. This finding agreed with Ingram et al., (2004) who also found that not all decisions made by schools are data driven and that decisions mainly were based on intuition alone

Returning to the first research question stated: "*What kinds of data are available in Indonesian primary schools?*" Table 21 below presents the conclusion of kinds of data found with the content description and show the availability rank order from the most available until the least available in each category which concluded from Table 8. *The summary of results for kinds of data available in schools*.

Table 21. The summary of kinds of data available in Indonesian primary schools

Availability Rank	Kinds of data available	Content description
	Input data	
1st	Student demographic data	Date of birth, gender, address
2nd	Parent demographic data	Date of birth, address
3rd	Student transfer	Number of intake and student leavers
4th	Teacher data	Qualification, Experience, Salary, Age
5th	Socio economic data	Parents income, social status
	Process data	
1st	School curriculum	Subject matter, indicators, lesson schedule, pass mark
2nd	Lesson plan	Goal of the lesson, content, assessment method
3rd	Pass mark	Standard minimum score, Student intake score
4th	Student attendances	Student daily attendances
5th	Teacher attendances	Teacher daily attendances
6th	Student logbook	Student daily activities, student attitudes
7th	School annual policy	Vision and mission, school program
	Outcome data	
1st	Student final report	Final grade for each subject
2nd	Examination result	Examination score
3rd	Student daily progress	Daily assessment, homework score
4th	School evaluation report	Managerial, process, assessment, staff evaluation based on national indicator
5th	Teacher evaluation report	Teaching practices, attitudes, knowledge and skills based on national indicator
	Context data	
1st	School profile	Address, contact, accreditation, achievement
2nd / 3rd	School financial report	Income and expenses
2nd / 3rd	School facilities	Number of room, books, other facilities

5.2. Purposes of data use in Indonesian primary school

The findings showed that the schools used data for accountability, instruction, and school development. Moreover, the survey results generally showed that most data were used for accountability purposes, followed by data use for school development purposes, and data use for instruction. Likewise, the case study results also reported that both high and low data use schools mostly used data for accountability. Then, there were some schools which also comprehended the value of data for instruction and school development. However, it was noted that there were differences between schools regarding the amount and the features of data use for each purpose.

Regarding the use of data for accountability, the findings agreed with several previous studies (e.g. Ehren & Swanborn, 2012; Schildkamp et al, 2014) that argued the focus of data use seemed to be more on accountability than on school development and instructional purposes. One of the main reason appeared to be the same as in the Dutch context, the decentralization system of education in Indonesia increased the autonomy of schools in decision making. To counter-balance this autonomy system, schools are required to report the quality of their education to relevant stakeholders, such as government, supervisors and parents (Schildkamp & Ehren, 2013). For example based on case study results, all schools were obliged to deliver several kinds of data such as: attendances, examination results and financial reports to district office of education once a month. Furthermore, all schools also required to provide several data like lesson plans during the inspection from the supervisors. This was also in line with the role of inspectorate division to investigate the evidences of school education practices (MoEC, 2012). However, the frequencies of the inspection differ between schools. This means the use of data for inspection purpose were higher only in some schools whose supervisors performed their role as it should be. Finally regarding data use for accountability to the parents, one of the interesting findings was the establishment of school committee which consisted of parent representatives in the high data use for accountability school. In this case, the school committee had a privilege to monitor the school practices as carried out by supervisor. This finding was supported by Earl & Louis (2013) that valued the contribution of parents in the views of accountability. However, most of the schools were still lack of parents' role in their system of accountability.

With regard to the data use for school development, case study findings revealed that low data use schools used data improperly or did not use data at all (Schildkamp & Kuiper, 2010), meanwhile high data use schools appeared to use data for school evaluation, school planning, and curriculum development which matched those observed in earlier studies (Breiter & Light, 2006; Coburn & Talbert, 2006). For example, the head of school used instrument given from the supervisor to evaluate several key points such as teaching practices and school management based on the national indicator of education standard (MoEC, 2012). Then, the evaluation result would be used for planning school program or priorities in the next year. However, none of schools mentioned the use of data for teacher professional development, it might be attributed to the role of District Education Office which was the one that had the responsibility in teacher professional development program (MoEC, 2012). So that was not clear whether these evaluation data were considered by DEO for the teacher professional development. Another example of the use of data for curriculum development, some teachers considered the previous examination results to determine the passing mark of certain subjects in the next curriculum. However, in-depth analyses revealed that all the process of data use for school development was indicated to be not systematic. Comparing with the cyclic and iterative procedure of data use developed by Schildkamp & Handelzalts (2011), the process of data use in Indonesian schools missed several steps. For example, it was not clear whether they had formulated hypothesis or analyzed the quality of data before the implemented solution. It seemed the process only consisted of problem definition and data collection then immediately jumped to interpretation and action. Another missed step was the evaluation of the action which was taken only once a year, not deliberately taken after the implemented action.

Regarding the use of data for instruction, case study findings revealed that low data use schools used data for instruction for assessing student achievement by concentrating only on one kind of data such as examination result. This finding was corroborated with Schildkamp et al, (2014) that stated teachers were not capable to use another types of data available which suggested a narrow focus of data in the schools. This finding could be accounted to the lack of data literacy or the lack of appropriate data that will be explained further in the next section. On the other hand, high data use schools appeared to use data to set learning goals, to determine student abilities and attitudes, to adapt teaching and to evaluate student progress which was supported by Young (2006). Yet this was also noted as discussed earlier in school level that the process of data use assumed to be not methodical as the iterative procedure developed by Schildkamp and Handezalts (2011). For example, teachers set the learning goals for the student with simply categorizing them into below passing mark or above passing mark. This finding could also be attributed to simpler intended data use: conceptual use of data (Weiss, 1998). Conceptual use of data refers to an indirect type of data use. For example, while teachers had yet to take any action

to address the difference abilities between students, they started simply by setting different learning goals. Afterwards, it would lead them to take actions in terms of instrumental use. As instrumental use of the data means to involve analyzing as well as making decisions based on data (Weiss, 1998).

Furthermore, the finding revealed several unintended uses of data. First was misuse of data, this occurs when teachers use data improperly and as a result focus on improving the wrong things (Ehren & Swanborn 2012). For example, "teaching to the test" phenomenon happened in the low data use schools. It means teachers narrowed student achievement to only what it was assessed in the examination results. Consequently, teachers taught the test items so that students were able to pass the test. The next one is the abuse of data that had been demonstrated by previous research (Booher-Jennings, 2005). In this study, the abuse of data was attributed to high-stake accountability system caused by the government. For example, a teacher in the low data use school reported that the head of school made a copy of curriculum and lesson plan from other school in order to meet accountability demand from the government.

One additional finding is that the head of school and teachers used data differently. The survey results revealed that head of school scored higher in using data for accountability and school development whereas teachers scored higher in using data for instruction. Although the t-test analysis revealed that the difference was not significant, this finding also in line with the case study result that most of head of schools mostly used school level data to confirm that the education practices followed the government regulations and most teachers are more concerned in classroom level data. These findings are agreed with what Schildkamp & Kuiper (2010) found: that heads of schools mostly used school level data for policy and planning at school level while teachers were more concerned in student progress at classroom level.

Returning to the second research question stated: "*What are the purposes of data use in Indonesian primary schools?*" This study set out to determine the most data was used for accountability purposes, followed by data use for school development purposes, and data use for instruction. Moreover, Table 22 below presents the conclusion of the finding of purposes of data use with the examples of activities.

Table 22. The summary of purposes of data use in Indonesian primary schools

Purposes of data use	**Examples of activities**
For accountability	
Government report	Schools deliver the evidence of education practices once a month Teachers submit the required data for promotion application
School inspection	Schools prepare the evidence of education practices during the inspection
Parent report	Schools deliver the student report to the parent once a semester
For school development	
Curriculum development	Teachers consider the examination result and student grades to set the passing mark in the next curriculum
School planning	Schools use the evaluation result for planning school program or priorities in the next year
School evaluation	Head of schools use instrument given from the government to evaluate several key points such as teaching practices and school management based on the evidences
For instruction	
Assessing student achievement	Teachers use examination result to assess student achievement or student report
Setting learning goals	Teachers use student examination result to set learning goal to whom below passing mark of above passing mark
Adapting teaching method	Teachers use student daily progress to adapt the teaching method in the next lesson
Determining student attitudes	Teachers use student log book to record student daily activities and finally to determine student attitudes
Unintended use	
Useless	Head of school demands teachers to collect data without discussing it

Misuse	Teaching to test, teachers narrow the student achievement to only what it assessed in the examination results
Abuse	Head of school makes a copy of curriculum and lesson plan from other school in order to meet accountability demand from the government.

5.3. Factors promoting or hindering data use in Indonesian primary schools

The main findings of the study proposed that the four factors influenced differently between the high data use and low data use schools for each purpose. The differences were showed as expected where high data use schools provided an insight of factors to promote data use, while the low data user schools provided the understanding of challenges to data use. In addition, the findings also proposed the extent to which factors significantly influenced data use of each purpose.

Regarding the data characteristics, the survey results revealed that the mean score of data characteristics was high. Indeed this phenomenon was demonstrated in the high data use schools, not in low data use schools. For example, data was easy to access in the high data use schools, the possible reasons were the help of the administration staff and the good information system, also advocated by several studies (e.g. Breiter & Light, 2006; Wohlestetter, et al 2008). On the other hand, there was no reliable information system or even an administration staff in low data use schools, so data was not always provided at once. Another example, high data use schools had ensured better quality data which involved accurate and updated data; this was also a result of good information system in the schools. Also, all teachers in high data use schools remarked data was useful for their needs. Overall, the findings demonstrated in high data use schools were in line with previous studies which proposed that the easy access to accurate and updated data (Kerr, et al., 2006), reliable, valid and relevant data, (Kerr, et al., 2006; Mingchu, 2008), and data that correspondents with their needs (Schildkamp, 2007) might improve data use.

With regard to the extent of which factors influence data use, the survey results revealed that data characteristics significantly influenced data use for instruction. Similarly, the case study also had a related suggestion. The reason was related to the better access and more accurate data; the high data use for instruction school teachers inclined to reason the use of data as for adapting teaching method or determining student progress. On the other hand, the low data use for instruction school teachers did not practice the use of data for instruction purpose because of having a lack of accessibility and quality of data. However, the finding of the current study are not in line with the previous study in Dutch context (Schildkamp et al., 2014) that reported data characteristics was an important enabler of data use for accountability and school development, but not for data use for instruction. This difference might be expected due to different contexts of the studies.

Regarding the data user characteristics, the survey results revealed that the mean score of data user characteristics was high. This phenomenon agreed with the case study result with regard to the user attitudes, most of the respondents bought-in and believed in data. Although they mentioned several reasons, they mainly believed data was important as evidences for education practices. This finding was also supported before with several previous studies (Ehren & Swanborn, 2012; Schildkamp et al., 2014) that argued the focus of data use seemed to be more on accountability. Furthermore, the survey results were not in line with the cases study with regard to the data literacy. Even though the teachers in the high data use informed that using the data was part of their job, they are still lack of skills to analyze data in methodical approach as revealed in the previous studies which encouraged the significance for the user to possess the required skills for data use (e.g. Goren, 2012; Kerr, et al., 2006; Mingchu, 2008; Wohlstetter, Datnow & Park, 2008).

With regard to the extent of which factors influence data use, the survey results revealed that user characteristics had no significant influence to any of purposes of data use. In a bit of a contrast, the case study showed a minor influence to data use for instruction. The reason was for example, both of teachers in the high data use for instruction school knew how to interpret data so that they could use the student daily progress to set the next learning goals. This did not happen in the low data use for instruction school. This finding was partly consistent with previous study by Schildkamp et al. (2014) that reported the data user characteristics were an important enabler for data use for development and instruction.

One of possible explanation was still most teachers were lack of data literacy that might hinder the proper data use in Indonesian schools. Taken all findings together, buying-in and believing on data alone would not help to improve data use in school. Therefore, there is a need of training for heads of schools and teachers with skill and knowledge for data use. Many studies had a similar suggestion (Datnow, Park, & Kennedy-Lewis 2012; Schildkamp, Earl, & Lai, 2013), because it is the significant method for teachers and head of schools to improve the understanding about the actual use of data.

Regarding the school organizational characteristics, the survey results revealed that the mean score of school organizational characteristics was high. This phenomenon indeed was demonstrated in the high data use schools. For example, the heads of schools from the high data use schools had more encouraging and better role model for data use rather than what were modelled by heads of schools in low data use schools. Another example, teachers in high data use schools appeared to be more collaborative than those in low data use schools. This might be related to the adequate time for teacher in working together to analyze and discuss data in high data use schools. These findings are confirmed by previous studies which suggested the significance of decent leadership in schools, hence the good leader might enhance the practices of data use in schools (Kerr, et al., 2006; Wohlstetter, Datnow & Park, 2008) In addition, collaboration among teachers was the best way to increase teacher motivation to use data, because teachers could work together in analyzing and interpreting the data (Wohlstetter, Datnow & Park, 2008; Young, 2006). Also, studies show that planning time to use data also enhanced data use in schools (Wohlstetter, Datnow & Park, 2008; Young, 2006). Unfortunately, another case study finding were not in line with what had been revealed in the survey results. For example, teachers never had trainings about the use of data in both high data use and low data use schools. Another findings revealed that schools had no expert in data use. This was a hindering factor because as Schaffer, Stringfield, & Reynolds, (2001) stated, data analyzing could sometimes be too complicated for all teachers to manage. Hence an expert might be needed where teachers were lack of skill and knowledge to analyze the data.

With regard to the extent of which factors influence data use, the survey results revealed that school organizational characteristics significantly influenced data use for school development. Likewise, the case study also had a related suggestion. One of the reasons was for example related to school leadership and collaboration, both teachers in low data use for development school argued that they were not involved by the head of school in school planning and curriculum development, which means that the lacking of collaboration and good leadership had hindered the use of data for development purpose. On the other hand, the high data use for development school showed a good leadership and positive collaboration culture which also promoted the use of data for development. This finding was partly consistent with Schildkamp et al. (2014) that reported the school organizational characteristics were an important enabler for all three types of data use. This difference might be expected due to different contexts of the studies.

Regarding the external policy characteristics, the survey results revealed that the mean score of external policy characteristic was high and also signifantly influenced data use for accountability. Similarly, the case study results revealed that the external policies indeed occurred in both high data use and low data use schools. This was probably a result of the decentralization regulations that involved in all Indonesian primary schools. All of the policy examples mentioned by the respondents such as accreditation policy, financial policy and inspection policy had driven the schools to prepare the required data in order to give evidences about the education they provided. Moreover, there was also regular inspection from the supervisor in order to investigate the data which exercised the implemented regulation.

Another survey result also revealed that external policy characteristics significantly influenced data use for school development. This phenomenon might be accounted to types of inspections discovered in the case study which not only investigated the lessons activities and the documents, but also provided feedback and recommendations to the school on the functioning for school improvement. Overall, these findings corroborated with the Dutch context in a previous study (Schildkamp & Ehren, 2013) suggested that schools required to account for the quality of the school to relevant stakeholders and a regular monitoring by the inspectorate were also needed to counter-balance the high level of school autonomy.

Another interesting finding was regarding the differences between heads of schools and teachers in all of the four factor charasteristics. Although the differences were not significant according to the survey, the case study showed a lot of different opinions between head of school and teachers which were confronting each other. For example, some heads of schools argued that data was easy to access, collaboration was demonstrated, adequate time for using data was provided. On the other hand, teachers argued that all of those statements were not true. That was the reason why heads of schools might have a tendency to answer the survey a little higher than teachers.

Returning to the third research question stated: "*What are the factors promoting or hindering data use in Indonesian primary schools?"* This study was concluded as follow. First, data use for accountability was influenced by external policy characteristics. Next, data use for school development was influenced by school organizational characteristics and external policy characteristics. Finally, data use for instruction was influenced by data characteristics. Moreover, Table 23 below presents the conclusion of the finding of each factors with the examples of promoting or hindering characteristics.

Table 23. The summary of factors promoting or hindering data use in Indonesian primary schools

Factors influencing data use	Enabler example	Hinder example
Data characteristics		
Accessibility	Information management system Administration staff	The data is kept by head of school himself
Usability	Data as evidences	Data is only collected
Quality	Data are accurate and timely	Data manipulation
User Characteristics		
Attitude of user	Buy-in/belief in data	Teachers see data as a thing for head of school
Data literacy	Teachers know how to interpret student examination result	Teachers rely on intuition
School organizational characteristics		
Leadership	Role model and encouraging	Demanding and unsupportive
Collaboration	Involvement of teachers and regular meeting	Head of school work by himself and lack of meeting
Norm and vision	Teacher guidelines in data use	Lack of goals in data use
Support	Sufficient time to analyze data	No expert and no training
External policy characteristics		
Government policies	Accreditation policy and financial policy	High-stake demand
Inspection policy	Investigating the data use Recommendation of school functioning	Not regular and not giving any feedback to schools

5.4. Recommendation of the study

Implication for further research. This study aims at making a scientific contribution, by offering understanding on data use in a different context especially in developing countries. One of the reflection from the study was related to the common problems in developing countries as well as Indonesia. Lack of good infrastructure and qualified teachers (UNESCO, 2013) did have an influence to the use of data in schools. For example, difficult access to data caused by unreliable information system and lack of data literacy caused by the insufficiency trainings have triggered the improper use of data or the absence use of data. Therefore, the study suggests more studies of data use in other developing countries which could help in deepening the existing theory about the data-based decision-making in different contexts.

From the study findings, there are several limitations that might give implications for future research. First of all, this study revealed that data-based decision making studies in the school environment was a complex process. For example, based on the survey results, there were parts of the variance in the purposes of data use that remained unexplained. Moreover, the differences of data use practices found in the case study between two groups of schools were possibly not directly related to the factors in the framework study, but might be some other schools context which caused different practices of data use.

One of possible explanations was that the conceptual framework might not include all relevant variables to study the data use in this context. Therefore, further conceptual framework should take a consideration about the actual and rich factors which enabled the use of data in different context. Another explanation might be due to the the use of self-reported data and the limited time of the study. Self-report instruments such as questionnaires and interviews might give the respondents a tendency to alter the answer in a superficial way or promote the tendency to answer in a socially desired way. In addition, the researcher did not observe the real teacher activities related to data use. Therefore the further studies should use more time and practical method such as direct observation methods to get the real situation of how teachers exercised the data. Another drawback of the study was that relevant stakeholders, such as supervisor, government, parents and students yet did not form sample of the respondent. Therefore, further studies should also include them to anticipate unexplained school context which caused different practices of data use. Finally, the current study did not make a firm generalizations. Therefore, further studies should also use large scale quantitative research in order to obtain more generalizable results regarding the studies of data use in other contexts.

Implication for policy and practice. This study aimed to improve understanding of the use of data in the Indonesian context. Deliberately, it aimed to help education stakeholders to understand the kinds of data, purpose of data use and promoting or hindering factors in the Indonesian primary schools. In addition, this study can also be used as a reference point for developing data-based decision making practices in Indonesian schools in the future.

From the study findings, there are three main recommendations that might have an impact, for improving data use in Indonesian primary schools. First, findings from the study indicated that not all schools had a reliable information system. Therefore, the Indonesian government needed to invest in an advanced information system in order to increase the accessibility and the quality of data in schools. This recommendation might be an advantage for both government and schools. In the government side, this system would help the government to monitor the functioning of the school in more efficient and transparent way. While in the other side, the easier access and better quality of data might influence more practices of using data for instruction in the schools. Second, findings from this study revealed that most heads of schools and teachers lacked data literacy skills and had never received any training on data use. As results suggested, teachers might use data in a simple way or committing unintended data use in the schools. Therefore, the Indonesian government needs to invest in teacher professional development program in the use of data. An adaptation of the Dutch data team procedure (Schildkamp & Handelzalts, 2011) is proposed to be implemented in Indonesian schools. Data teams were teams of teachers and heads of schools working together using data to solve certain problems within the school using a methodical approach. So that school staffs would learn how to systematically use data in order to enhance the functioning of the school. Also, head of school and teaches would be more collaborative in their daily activities. This might also lead to more practices of using data for school development and instruction. Third, findings from this study indicate that most of the schools only exercised data for accountability purpose. Therefore the Indonesian government should encourage its school accountability system through more constructive inspection behaviors. It means that supervisors not only ensure the schools complying regulations set by the government but also give feedback and recommendations about the school functioning and teaching performances that lead to more practices in using data for school development and instruction. Finally, the main idea of the above-mentioned recommendations suggested that schools need to use data in the combination of all purposes of data use. This was also suggested by previous research (Schildkamp et al, 2014) that all purposes of data are equally important: then the fundamental goal of data use, school improvement in terms of student learning, could be achieved.

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APPENDICES

Appendix A: Survey

Angket penelitian ini terdiri dari 4 halaman dan terbagi menjadi 2 bagian:
A. **Bagian pertama** adalah daftar pilihan data yang tersedia di sekolah;
B. **Bagian kedua** adalah pengisian skala terhadap beberapa faktor dan tujuan dalam menggunakan data.
Estimasi penyelesaian angket adalah 5 – 10 menit. Oleh karena itu, pergunakan waktu sebaik-baiknya dan berikan jawaban dengan sebenar-benarnya karena hasil dari angket ini tidak akan berpengaruh terhadap penilaian Bapak/Ibu Guru.

Nama Sekolah :	☐ Kepala Sekolah ☐ Guru

A. **Daftar pilihan data yang tersedia di Sekolah**
Berikan tanda centang (✔) pada kotak yang sesuai dengan jawaban Anda

Apa saja jenis data yang tersedia di sekolah Anda? (jawaban bisa lebih dari satu)

Pilihan **data mengenai siswa**:
- ☐ Hasil belajar siswa (rapor siswa)
- ☐ Hasil ujian akhir siswa
- ☐ Data diri siswa
- ☐ Data keluarga siswa
- ☐ Data status ekonomi siswa
- ☐ Data presensi siswa
- ☐ Data perpindahan siswa masuk dan keluar
- ☐ Data proses belajar siswa (tugas, ulangan harian)
- ☐ Data perilaku siswa
- ☐ Lainnya :
- ☐ Lainnya :
- ☐ Lainnya :

Pilihan **data mengenai sekolah**
- ☐ Data guru
- ☐ Data surat tugas & SK guru / kepala sekolah
- ☐ Presensi guru
- ☐ Rencana Pelaksanaan Pembelajaran
- ☐ Kurikulum Sekolah
- ☐ Profil Sekolah
- ☐ Rencana kelulusan minimal
- ☐ Data evaluasi diri sekolah
- ☐ Data standar pelayanan minimal sekolah
- ☐ Rencana Kegiatan dan Anggaran Sekolah
- ☐ Data laporan biaya operasional sekolah
- ☐ Lainnya :
- ☐ Lainnya :
- ☐ Lainnya :

B. **Pengisian skala terhadap faktor dan tujuan penggunaan data**
Berikan tanda silang (✕) pada kotak yang sesuai dengan jawaban Anda

	Akses Data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
1	Saya memiliki akses ke data mengenai siswa saya baik dalam salinan *hard copy* maupun *soft copy* (*computer file*)	☐	☐	☐	☐
2	Saya dapat menemukan seluruh data mengenai siswa saya dalam satu *file* (satu kumpulan berkas)	☐	☐	☐	☐
3	Saya memiliki akses ke data yang relevan mengenai siswa saya (sesuai kehendak saya)	☐	☐	☐	☐
4	Data mengenai siswa saya tersedia di setiap awal tahun ajaran (dalam 3 minggu pertama)	☐	☐	☐	☐
5	Ketika siswa baru masuk sekolah pada pertengahan tahun ajaran, data mengenai mereka akan segera tersedia	☐	☐	☐	☐
	Fungsi Data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
6	Data mengenai siswa yang saya miliki membantu saya dalam merencanakan pelaksanaan pembelajaran.	☐	☐	☐	☐
7	Data mengenai siswa yang saya miliki membantu saya dalam menentukan hasil belajar siswa	☐	☐	☐	☐
8	Saya memiliki data mengenai perkembangan siswa saya	☐	☐	☐	☐
9	Data mengenai siswa yang saya miliki membantu saya dalam menyesuaikan metode mengajar	☐	☐	☐	☐
	Kualitas data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
10	Data mengenai siswa yang saya miliki aktual (terkini)	☐	☐	☐	☐
11	Data mengenai siswa yang saya miliki akurat (tepat)	☐	☐	☐	☐
	Keahlian menafsirkan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
12	Saya mampu menganalisis dan menafsirkan data mengenai siswa saya untuk menyesuaikan metode saya mengajar	☐	☐	☐	☐
13	Saya mampu menganalisis dan menafsirkan data mengenai siswa saya untuk mendiagnosis kebutuhan belajar siswa tersebut	☐	☐	☐	☐
14	Saya paham tentang kualitas yang dimiliki sebuah data (keakuratan dan keabsahan data)	☐	☐	☐	☐
15	Saya mampu menganalisis dan menafsirkan data mengenai siswa saya berdasarkan pada kualitas yang dimiliki sebuah data (keakuratan dan keabsahan data)	☐	☐	☐	☐
16	Saya mampu menafsirkan data yang disajikan dalam bentuk grafik	☐	☐	☐	☐
	Sikap dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
17	Data merupakan hal yang penting dalam mendiagnosis kebutuhan belajar siswa	☐	☐	☐	☐
18	Data merupakan hal yang penting dalam menyesuaikan metode saya mengajar	☐	☐	☐	☐

19	Siswa akan mendapatkan manfaat ketika rencana pelaksanaan pembelajaran berdasarkan pada data.	☐	☐	☐	☐
	Kepemimpinan dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
20	Kepala sekolah mendorong penggunaan data sebagai pendukung pelaksanaan pembelajaran	☐	☐	☐	☐
21	Kepala sekolah adalah contoh yang baik sebagai pengguna data di sekolah	☐	☐	☐	☐
22	Kepala sekolah menyediakan waktu untuk para guru untuk menganalisis dan menggunakan data (analisa data sebelum merencanakan pelaksanaan pembelajaran) di awal tahun sekolah (dalam waktu 3 minggu pertama)	☐	☐	☐	☐
23	Kepala sekolah bersama wakil kepala sekolah menganalisis dan menggunakan data (analisis data sebelum mengeluarkan kebijakan sekolah)	☐	☐	☐	☐
24	Kepala sekolah atau wakil kepala sekolah membahas data mengenai siswa dengan saya	☐	☐	☐	☐
25	Sekolah menyadari bahwa kita perlu untuk terus mengembangkan keahlian para guru dalam menganalisis dan menggunakan data	☐	☐	☐	☐
	Kolaborasi dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
26	Saya berbagi dan berdiskusi tentang hasil belajar siswa kepada siswa	☐	☐	☐	☐
27	Saya berbagi dan berdiskusi tentang hasil belajar siswa kepada dengan orang tua siswa	☐	☐	☐	☐
28	Saya berbagi dan berdiskusi tentang hasil belajar siswa saya kepada guru-guru lain	☐	☐	☐	☐
	Visi dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
29	Guru - guru di sekolah memiliki pemahaman yang sama tentang metode mengajar yang baik	☐	☐	☐	☐
30	Guru - guru di sekolah memiliki pemahaman yang sama tentang kebutuhan belajar setiap siswa	☐	☐	☐	☐
31	Guru - guru di sekolah memiliki pemahaman yang sama tentang cara menentukan hasil belajar siswa yang efektif	☐	☐	☐	☐
	Norma dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
32	Penggunaan data adalah hal yang prioritas di sekolah saya (yaitu hampir setiap keputusan berdasarkan pada data)	☐	☐	☐	☐
33	Di sekolah, kami menggunakan metode yang terstruktur untuk menganalisa data sebelum mengambil keputusan atau tindakan	☐	☐	☐	☐
	Dukungan dalam penggunaan data	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
34	Saya didukung oleh sekolah dalam menganalisa dan menggunakan data secara efektif	☐	☐	☐	☐
35	Ada seseorang di sekolah yang dapat membantu saya menganalisa dan menafsirkan data mengenai kebutuhan belajar siswa	☐	☐	☐	☐

36	Ada seseorang di sekolah yang dapat membantu saya menggunakan data (menyesuaikan metode mengajar berdasarkan data)	☐	☐	☐	☐
37	Ada waktu yang disediakan oleh sekolah untuk saya menganalisa dan menggunakan data	☐	☐	☐	☐
	Kebijakan pengawas sekolah	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
38	Pengawas sangat banyak memperhatikan data di sekolah	☐	☐	☐	☐
39	Standar dan indikator yang digunakan dalam pengawasan sekolah berkaitan dengan data	☐	☐	☐	☐
40	Pengawas memeriksa ketersediaan data di sekolah	☐	☐	☐	☐
41	Pengawas mendorong sekolah untuk mengumpulkan data	☐	☐	☐	☐
42	Rekomendasi pengawas mengarahkan sekolah untuk fokus pada data	☐	☐	☐	☐
	Kebijakan pemerintah	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
43	Ada kebijakan Dinas Pendidikan agar sekolah menggunakan data dalam mengambil keputusan atau tindakan	☐	☐	☐	☐
44	Kebijakan pemberian bantuan fasilitas sekolah berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
45	Kebijakan kenaikan pangkat guru berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
46	Kebijakan pemberian bantuan operasional sekolah berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
47	Kebijakan perpindahan guru dan kepala sekolah berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
48	Kebijakan pemberian tunjangan dan gaji guru berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
49	Kebijakan penentuan peringkat sekolah di wilayah kami berdasarkan pada data yang dikirimkan oleh sekolah	☐	☐	☐	☐
	Penggunaan data untuk akuntabilitas	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
50	Penggunaan data bertujuan sebagai wujud akuntabilitas (laporan pertanggungjawaban kepada pengawas sekolah atau Dinas Pendidikan)	☐	☐	☐	☐
51	Kami mengirimkan data tentang perkembangan sekolah kepada pengawas sekolah atau dinas pendidikan	☐	☐	☐	☐
52	Data yang kami kumpulkan di sekolah terdokumentasikan.	☐	☐	☐	☐
	Penggunaan data untuk pengembangan sekolah	Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
53	Kami menggunakan evaluasi eksternal (evaluasi pengawas sekolah) untuk pengembangan sekolah	☐	☐	☐	☐
54	Kami menggunakan hasil belajar siswa untuk mengevaluasi kinerja guru	☐	☐	☐	☐
55	Kepala sekolah menggunakan data untuk memperlihatkan proses pengembangan sekolah	☐	☐	☐	☐

56	Data merupakan hal yang penting dalam proses pengembangan sekolah	☐	☐	☐	☐
57	Pembuatan kurikulum sekolah berdasarkan pada analisis kebutuhan siswa	☐	☐	☐	☐
58	Kami menggunakan data untuk merancang rencana kegiatan dan anggaran tahunan	☐	☐	☐	☐
59	Kami menggunakan data sebagai bahan pertimbangan pelatihan guru	☐	☐	☐	☐
60	Kami menggunakan hasil belajar siswa untuk mengevaluasi kurikulum sekolah	☐	☐	☐	☐
61	Kami menggunakan hasil belajar siswa sebagai bahan untuk merencanakan pelaksanaan pembelajaran	☐	☐	☐	☐

	Penggunaan data untuk instruksi	Hampir tidak pernah	Setahun sekali	Setahun dua kali	Sebulan sekali	Seminggu sekali	Seminggu dua kali
	Seberapa sering Anda **menggunakan data** untuk aktivitas berikut :						
62	Menetapkan tujuan pembelajaran	☐	☐	☐	☐	☐	☐
63	Menentukan hasil belajar siswa	☐	☐	☐	☐	☐	☐
64	Melihat perkembangan siswa	☐	☐	☐	☐	☐	☐
65	Menyesuaikan metode mengajar	☐	☐	☐	☐	☐	☐
66	Mengatur kecepatan pelajaran	☐	☐	☐	☐	☐	☐
67	Mengevaluasi proses belajar siswa	☐	☐	☐	☐	☐	☐
68	Membentuk kelompok belajar	☐	☐	☐	☐	☐	☐
69	Menentukan isi pembelajaran	☐	☐	☐	☐	☐	☐
70	Mempelajari mengapa siswa membuat kesalahan tertentu	☐	☐	☐	☐	☐	☐

Appendix B: Interview

Interview guideline for School Leader (SL)

I am working on a master thesis concerning the use of data, such as assessment results and self-evaluation results, for school improvement. I would like to ask you several questions concerning school improvement initiatives in your school and the use of data. When I talk about data, I mean all the information that is available on the functioning of the school, including assessment data, self-evaluation results and inspection report. The goal of my study is to find out various ways in which the school uses data. This interview will take approximately one hour. Before we start this interview, do you have any questions? Do you mind if I audiotape this interview? The results will be treated anonymously.

1. A) Could you tell me something about recent curriculum or school improvement initiatives in your school?

   Let the respondent speak freely, but probe if the questions below are not addressed, and ask for examples and illustrations. Also, ask about the use of data to improve student outcomes.

   B) What is your role in these initiatives?
   C) Does the school use data in these initiatives? If yes, which data?
   D) By whom are these data being used?
   E) How are these data being used?
   F) For which purposes are these data being used?

2. A) Which data do you use in your job?

   Let the respondent speak freely, but probe if the questions below are not addressed for each data source mentioned by the respondents. Ask for examples and illustrations.

   B) How are these data being used?
   C) How often do you use this type of data?
   D) For which purposes are these data being used?

3. A) I brought a list of different types of data (note: this list will be different for each of the countries), which might be available in your school. Can you tell me if these data are indeed available, if you have access, and if you use these data sources? Some of the data sources may have already been addressed in question .

   You can skip these data sources. For the other data sources, ask if the respondents uses these. If the respondent uses the data, ask how, how often and for which purposes, if the respondent does not use the data, ask why not. Also, ask for examples and illustrations of use.

   - ☐ School Inspection reports
   - ☐ Student progress reports
   - ☐ Information in the annual school programme of events
   - ☐ Information on the annual policy plan of the school
   - ☐ School self-evaluation result, including teacher and school leader questionnaires
   - ☐ Data on intake, student transfer / turn over / school leavers
   - ☐ Final examination results
   - ☐ Assessment result
   - ☐ Student demographic data
   - ☐ Student questionnaires data
   - ☐ Fee payment data
   - ☐ Lesson plans
   - ☐ Student and teacher daily attendance data

B) Did I miss certain data sources either you or your colleagues use? If yes, which ones? How do you use these data, how often, and for what purposes?

4. A) For what purpose do you use the data?
   Let the respondent speak freely. If the respondent is not able to answer this question, you can give some hints by asking if he or she uses data for improving his teachings, group students, evaluate efforts, etc
   B) For what purpose do other teachers use data?

5. A) Do you receive any support in the collection, analysis, interpretation and/or use of data? *If the respondent is not able to answer this question, you can give some hints by asking if the school board encourages the use of data, if data is discussed collectively in team meetings, if the respondent received any professional development in the use of data etc.*
   B) If yes, how and is this sufficient?
   C) If no, do you want support? If yes, what type of support?

6. A) Are there any barriers in the school that prevent the use of data?
   If the respondent is not able to answer this question, you can give some hints by asking if the respondent thinks he or she has the knowledge and skills needed to analyze data, of he or she has enough time to use data, and if the respondent has sufficient access to data.
   B) If yes, what barriers and how do these barriers prevent data use?
   C) Can you indicate whether or not you agree with the following statement and why:
   - We have little money to use data effectively.
   - I have little time to use data effectively.
   - I don't have access to the all data I would like to use.
   - We receive a lot of our data too late.
   - A lot of data are not accurate.
   - A lot of data are not relevant to my job.
   - I don't think it is important to use data in my job.
   - I need training in the use of data.
   - We are capable of improving our school without the use of data.
   - I encourage data use in my school.
   - We collectively use data in this school.
   - Our school has a clear vision and clear goals.
   - We use data to check if we are reaching our goals.
   - Our school has a data expert, which helps me in the use of data.
   - have the skills and knowledge needed to use data.

This was my last question. Thank you very much for your time. I am going to write a short report based on this interview. I will send this report to you for confirmation. Again, I want to stress that these results will be treated anonymously.

Interview guideline for Class Teachers (CT)

I am working on a master thesis concerning the use of data, such as assessment results and self-evaluation results, for school improvement. I would like to ask you several questions concerning school improvement initiatives in your school and the use of data. When I talk about data, I mean all the information that is available on the functioning of the school, including assessment data, self-evaluation results and inspection report. The goal of my study is to find out various ways in which the school uses data. This interview will take approximately one hour. Before we start this interview, do you have any questions? Do you mind if I audiotape this interview? The results will be treated anonymously.

1. A) Could you tell me something about recent curriculum or school improvement initiatives in your school?

   Let the respondent speak freely, but probe if the questions below are not addressed, and ask for examples and illustrations. Also, ask about the use of data to improve student outcomes.

   B) What is your role in these initiatives?
   C) Does the school use data in these initiatives? If yes, which data?
   D) By whom are these data being used?
   E) How are these data being used?
   F) For which purposes are these data being used?

2. A) Which data do you use in your job?

   Let the respondent speak freely, but probe if the questions below are not addressed for each data source mentioned by the respondents. Ask for examples and illustrations.

   B) How are these data being used?
   C) How often do you use this type of data?
   D) For which purposes are these data being used?

3. A) I brought a list of different types of data (note: this list will be different for each of the countries), which might be available in your school. Can you tell me if these data are indeed available, if you have access, and if you use these data sources? Some of the data sources may have already been addressed in question .

   You can skip these data sources. For the other data sources, ask if the respondents uses these. If the respondent uses the data, ask how, how often and for which purposes, if the respondent does not use the data, ask why not. Also, ask for examples and illustrations of use.

   - ☐ School Inspection reports
   - ☐ Student progress reports
   - ☐ Information in the annual school programme of events
   - ☐ Information on the annual policy plan of the school
   - ☐ School self-evaluation result, including teacher and school leader questionnaires
   - ☐ Data on intake, student transfer / turn over / school leavers
   - ☐ Final examination results
   - ☐ Assessment result
   - ☐ Student demographic data
   - ☐ Student questionnaires data
   - ☐ Fee payment data
   - ☐ Lesson plans
   - ☐ Student and teacher daily attendance data

   B) Did I miss certain data sources either you or your colleagues use? If yes, which ones? How do you use these data, how often, and for what purposes?

4. A) For what purpose do you use the data?
   Let the respondent speak freely. If the respondent is not able to answer this question, you can give some hints by asking if he or she uses data for improving his teachings, group students, evaluate efforts, etc
   B) For what purpose do other teachers use data?

5. A) Do you receive any support in the collection, analysis, interpretation and/or use of data? *If the respondent is not able to answer this question, you can give some hints by asking if the school board encourages the use of data, if data is discussed collectively in team meetings, if the respondent received any professional development in the use of data etc.*
   B) If yes, how and is this sufficient?
   C) If no, do you want support? If yes, what type of support?

6. A) Are there any barriers in the school that prevent the use of data?
   If the respondent is not able to answer this question, you can give some hints by asking if the respondent thinks he/she has the knowledge and skills needed to analyze data, of he/she has enough time to use data, and if the respondent has sufficient access to data.
   B) If yes, what barriers and how do these barriers prevent data use?
   C) Can you indicate whether or not you agree with the following statement and why:
   - We have little money to use data effectively.
   - I have little time to use data effectively.
   - I don't have access to the all data I would like to use.
   - We receive a lot of our data too late.
   - A lot of data are not accurate.
   - A lot of data are not relevant to my job.
   - I don't think it is important to use data in my job.
   - I need training in the use of data.
   - We are capable of improving our school without the use of data.
   - I encourage data use in my school.
   - We collectively use data in this school.
   - Our school has a clear vision and clear goals.
   - We use data to check if we are reaching our goals.
   - Our school has a data expert, which helps me in the use of data.
   - have the skills and knowledge needed to use data.

This was my last question. Thank you very much for your time. I am going to write a short report based on this interview. I will send this report to you for confirmation. Again, I want to stress that these results will be treated anonymously.

Appendix C: Example of Document Analysis

Name of School: High data use for instruction school

No	Name of Data	Kinds of data	Contents
1	Student demographic data	Input data	Date of birth, gender, address
2	Parent demographic data	Input data	Date of birth, address
3	Teacher data	Input data	Qualification, Experience, Salary, Age
4	Socio economic data	Input data	Parents income, social status
5	Student transfer	Input data	Number of intake and student leavers
6	School curriculum	Process data	Subject matter, indicators, lesson schedule, pass mark
7	Lesson plan	Process data	Goal of the lesson, content, assessment method
8	Pass mark	Process data	Standard minimum score, Student intake score
9	Student attendances	Process data	Student daily attendances
10	Teacher attendances	Process data	Teacher daily attendances
11	Student logbook	Process data	Student daily activities, student attitudes
12	School annual policy	Process data	Vision and mission, school program
13	Student final report	Outcome data	Final grade for each subject
14	Examination result	Outcome data	Examination score
15	Student daily progress	Outcome data	Daily assessment, homework score
16	School evaluation report	Outcome data	Managerial, process, assessment, staff evaluation based on national indicator
17	Teacher evaluation report	Outcome data	Teaching practices, attitudes, knowledge and skills based on national indicator
18	School profile	Context data	Address, contact, accreditation, achievement
19	School financial report	Context data	Income and expenses
20	School facilities	Context data	Number of room, books, other facilities

Appendix D: Results factor analyses

Pattern Matrix of data use for accountability [a]

Items	Component 1
We provide data for our school improvement to our inspectors	.905
Data that we collect in our school are documented (can be easily found/retrieved if needs arise)	.903
The data we use for accountability purposes (e.g. to give reports to parents and school inspectors) represents the reality at school	.901

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern matrix of data use for school development[a]

	Component 1
School leaders use data to show teachers the extent to which the school is achieving its goals	.812
The division of teaching time in my school is based on identified learning needs of students	.757
We use detailed data analyses as an essential part of improvement processes in my school	.753
In my school, we use student examination results to plan yearly goals and targets for school improvement	.752
In our school, we use external evaluations (e.g. from the school inspection) for our own improvement	.728
In my school student examination results lead to decisions with regard to professional development of teachers	.721
In my school we use data as a tool to determine effective teaching methods	.687
Results of students are used to evaluate teacher's performance	.669
Student examination results are used to identified gaps in our curriculum in my school.	.656

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern Matrix of data use for instruction[a]

	Component 1
Identify teaching and learning content to use in class	.791
Give student feedback on their learning process	.774
Determine progress of students	.734
Set learning goals for individual students	.713
Set the speed of my lessons	.701
Determine which topics and	.696
skills students do and do not possess	.683
Study why students make certain mistakes	.613
Form small groups of students for targeted teaching and learning	.594

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern Matrix of data characteristics[a]

	Component 1
The data I have on my students are up-to-date	.837
I can find all the data on my students in one file	.766
I have access to student data in either hard copy files or information system	.725
The student data I have are accurate because they are similar despite the different sources school	.698
I have too little data on my students	.696
I have data on the progress of my students	.690
The student data I have access to helps me plan my lessons	.678
Data on my current students are available from various offices in my school at the beginning of each school year (within three weeks)	.652
When students start in the middle of the school year, their data becomes quickly available from various offices in my school	.603
I have access to relevant data on my students from various offices in my school	.563
With the data I have on my students, I can determine the academic growth of my students from year to year	

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern Matrix of data user charcateristics[a]

	Component 1
I am able to use data to diagnose student learning needs	.849
I know how to interpret data and reports I receive (exam results, student achievement results of previous years) according to the quality criteria (correlation, validity, reliability, etc)	.755
I understand the quality criteria and concepts for data use (for example: correlation, validity, reliability)	.704
I am able to adjust my teaching based on data	.676
I can comfortably interpret data that are presented in graphs	.673
Students benefit when teaching is based on data, e.g. teaching techniques, contents, etc	.627
Data is important in changing my teaching	.624
It is important to use data in determining individual student needs	.587

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern Matrix of school organizational characteristics[a]

	Component

	1
Teachers in my school share a common understanding about effective ways to evaluate student learning	.793
Our school leader is a good example of an effective data user	.728
Teachers in my school share a common understanding of what student learning is	.711
Data use is a priority in my school (i.e. almost every decision depends on data)	.683
Teachers in my school share a common understanding about what good teaching is	.673
Our head of department discusses data with me	.673
I share and discuss the results of my students with other teachers	.666
I share and discuss the results of my students with students	.657
In my school we use a structured method to analyze and to interpret data before any action	.645
Our school leader and head of departments discuss the results of their data analyses in the school	.636
I share and discuss my students' results with parents	.635
Our school leader encourages data use as a tool to support effective teaching	.633
Our school leader creates many opportunities (e.g. time) for the teachers and other staffs to use data (eg. analyzing data for planning improvement actions)	.584
I am adequately supported by school in the effective use of data	.563
Our school is aware that we need to keep developing the skills of teachers to analyze data	.512
There is someone within the school who helps me change my practice (e.g. teaching) based on data	
There is specific time set aside by the school for me to use data	
There is someone within the school whom I can contact for help about using data	

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Pattern Matrix of external policy characteristics[a]

	Component
	1
Inspections lead to changes school in collecting the data	.802
School inspection inspects the availability of the data	.761
There is a Government policy for the school to use the data in making decisions	.752
School inspection recommendation is prompted to focus on data	.746
Standard and indicator used in school inspection are concerning the data	.730
Inspectors are very much concern with the data	.719
Grant of school facillities are based on data provided by schools to Government	.670
The promotion of teachers are based on data provided by schools to Government	.663
Establishment of school ranking within the region are based on data provided by schools to Government	.621
Displacement of teachers and principals based on data provided by schools to Government	.615
The salaries for teachers given based on data provided by schools to Government	.567
Grant of school funding are based on data provided by schools to Government	.551

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix E: Survey results

	Accessibility of data	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I have access to student data in either hard copy files or information system	0 %	4.8%	61.0%	34.3%
2	I can find all the data on my students in one file	0 %	4.8%	59.0%	36.2%
3	I have access to relevant data on my students from various offices in my school	0 %	25.7%	55.2%	19.0%
4	Data on my current students are available from various offices in my school at the beginning of each school year (within three weeks)	2.9%	5.7%	61.0%	30.5%
5	When students start in the middle of the school year, their data becomes quickly available from various offices in my school	1.0%	10.5%	66.7%	21.9%
	Usability of Data	Strongly Disagree	Disagree	Agree	Strongly Agree
6	The student data I have access to, helps me plan my lessons	0 %	5.7%	54.3%	40.0%
7	With the data I have on my students, I can determine the academic growth of my students from year to year	2.9%	3.8%	57.1%	36.2%
8	I have data on the progress of my students	0 %	1.0%	61.9%	37.1%
9	The student data I have access to. helps me adjust my teaching	0 %	5.7%	60.0%	34.3%
	Quality of data	Strongly Disagree	Disagree	Agree	Strongly Agree
10	The data I have on my students are up-to-date	0 %	6.7%	52.4%	41.0%
11	The student data I have are accurate because they are similar despite the different sources school	0 %	4.8%	58.1%	37.1%
	Data literacy	Strongly Disagree	Disagree	Agree	Strongly Agree
12	I am able to adjust my teaching based on data	1.0%	12.4%	62.9%	23.8%
13	I am able to use data to diagnose student learning needs	1.0%	3.8%	71.4%	23.8%
14	I understand the quality criteria and concepts for data use (for example: correlation, validity, reliability)	1.0%	8.6%	70.5%	20.0%
15	I know how to interpret data and reports I receive (exam results, student achievement results of previous years) according to the quality criteria (correlation, validity, reliability, etc)	1.0%	7.6%	68.6%	22.9%
16	I can comfortably interpret data that are presented in graphs	1.9%	7.6%	58.1%	32.4%
	Attitude	Strongly Disagree	Disagree	Agree	Strongly Agree
17	It is important to use data in determining individual student needs	0 %	1.0%	54.3%	44.8%
18	Data is important in changing my teaching	0 %	1.9%	69.5%	28.6%

19	Students benefit when teaching is based on data, e.g. teaching techniques, contents, etc	0 %	3.8%	67.6%	28.6%
	Leadership	Strongly Disagree	Disagree	Agree	Strongly Agree
20	Our school leader encourages data use as a tool to support effective teaching	0 %	3.8%	46.7%	49.5%
21	Our school leader is a good example of an effective data user	0 %	5.7%	47.6%	46.7%
22	Our school leader creates many opportunities (e.g. time) for the teachers and other staffs to use data (eg. analyzing data for planning improvement actions) beginning of each school year (within three weeks)	0 %	7.6%	57.1%	35.2%
23	Our school leader and head of departments discuss the results of their data analyses in the school	0 %	9.5%	59.0%	31.4%
24	Our head of department discusses data with me	0 %	7.6%	62.9%	29.5%
25	Our school is aware that we need to keep developing the skills of teachers to analyze data	0 %	0 %	47.6%	52.4%
	Collaboration	Strongly Disagree	Disagree	Agree	Strongly Agree
26	I share and discuss the results of my students with students	0 %	9.5%	65.7%	24.8%
27	I share and discuss my students' results with parents	0 %	1.9%	66.7%	31.4%
28	I share and discuss the results of my students with other teachers	0 %	1.0%	63.8%	35.2%
	Shared vision	Strongly Disagree	Disagree	Agree	Strongly Agree
29	Teachers in my school share a common understanding about what good teaching is	0 %	8.6%	54.3%	37.1%
30	Teachers in my school share a common understanding of what student learning is	0 %	6.7%	64.8%	28.6%
31	Teachers in my school share a common understanding about effective ways to evaluate student learning	0 %	8.6%	63.8%	27.6%
	Norms	Strongly Disagree	Disagree	Agree	Strongly Agree
32	Data use is a priority in my school (i.e. almost every decision depends on data)	0 %	17.1%	62.9%	20.0%
33	In my school we use a structured method to analyze and to interpret data before any action		8.6%	67.6%	23.8%
	Support	Strongly Disagree	Disagree	Agree	Strongly Agree
34	I am adequately supported by school in the effective use of data	0 %	1.9%	66.7%	31.4%
35	There is someone within the school whom I can contact for help about using data	0 %	20.0%	66.7%	13.3%
36	There is someone within the school who helps me change my practice (e.g. teaching) based on data	0 %	13.3%	70.5%	16.2%
37	There is specific time set aside by the school for me to use data	0 %	7.6%	67.6%	24.8%

	Supervisor policy	Strongly Disagree	Disagree	Agree	Strongly Agree
38	Inspectors are very much concern with the data	1.9%	10.5%	61.0%	26.7%
39	Standard and indicator used in school inspection are concerning the data	0 %	3.8%	73.3%	22.9%
40	School inspection inspects the availability of the data	0 %	4.8%	62.9%	32.4%
41	Inspections lead to changes school in collecting the data	0 %	3.8%	63.8%	32.4%
42	School inspection recommendation is prompted to focus on data	1.9%	10.5%	61.0%	26.7%
	Government policy	Strongly Disagree	Disagree	Agree	Strongly Agree
43	Grant of school facillities are based on data provided by schools to Government	1.0%	6.7%	70.5%	21.9%
44	There is a Government policy for the school to use the data in making decisions	0 %	1.9%	64.8%	33.3%
45	The promotion of teachers are based on data provided by schools to Government	0 %	6.7%	53.3%	40.0%
46	Grant of school funding are based on data provided by schools to Government	0 %	2.9%	54.3%	42.9%
47	Displacement of teachers and principals based on data provided by schools to Government	1.0%	13.3%	60.0%	25.7%
48	The salaries for teachers given based on data provided by schools to Government	0 %	5.7%	62.9%	31.4%
49	Establishment of school ranking within the region are based on data provided by schools to Government	0 %	9.5%	58.1%	32.4%
	Data use for accountabillity	Strongly Disagree	Disagree	Agree	Strongly Agree
50	We provide data for our school improvement to our inspectors	0 %	1.0%	56.2%	42.9%
51	The data we use for accountability purposes (e.g. to give reports to parents and school inspectors) represents the reality at school	0 %	3.8%	55.2%	41.0%
52	We provide data for our school improvement to our inspectors	0 %	1.9%	56.2%	41.9%
	Data use for school development	Strongly Disagree	Disagree	Agree	Strongly Agree
53	In our school, we use external evaluations (e.g. from the school inspection) for our own improvement	0 %	4.8%	72.4%	22.9%
54	Results of students are used to evaluate teacher's performance	0 %	10.5%	67.6%	21.9%
55	School leaders use data to show teachers the extent to which the school is achieving its goals	0 %	3.8%	68.6%	27.6%
56	We use detailed data analyses as an essential part of improvement processes in my school	0 %	2.9%	51.4%	45.7%
57	The division of teaching time in my school is based on identified learning needs of students	1.0%	9.5%	57.1%	32.4%
58	In my school, we use student examination results to plan yearly goals and targets for school improvement	0 %	1.9%	61.9%	36.2%

59	In my school student examination results lead to decisions with regard to professional development of teachers	0 %	9.5%	64.8%	25.7%
60	Student examination results are used to identified gaps in our curriculum in my school.	1.0%	13.3%	57.1%	28.6%
61	In my school we use data as a tool to determine effective teaching methods	0 %	4.8%	68.6%	26.7%

	Data use for instruction	**Almost never**	**Once a year**	**Twice a year**	**Once a month**	**Once a week**	**Twice a week**
	To what extent do you use data to:						
62	Set learning goals for individual students	0 %	6.7%	24.8%	20.0%	28.6%	20.0%
63	Determine which topics and skills students do and do not possess	0 %	1.9%	28.6%	26.7%	22.9%	20.0%
64	Determine progress of students	0 %	1.9%	17.1%	28.6%	35.2%	17.1%
65	Make or adapt my teaching to individual students' needs	0 %	5.7%	14.3%	31.4%	27.6%	21.0%
66	Set the speed of my lessons	1.0%	1.0%	14.3%	33.3%	22.9%	27.6%
67	Give student feedback on their learning process	0 %	0 %	10.5%	27.6%	30.5%	31.4%
68	Form small groups of students for targeted teaching and learning	2.9%	7.6%	12.4%	29.5%	29.5%	18.1%
69	Identify teaching and learning content to use in class	0 %	5.7%	9.5%	28.6%	32.4%	23.8%
70	Study why students make certain mistakes	2.9%	5.7%	3.8%	28.6%	32.4%	26.7%

Appendix F: Example of coding analysis for interview

Coding themes	Data use for accountability	Data use for school development	Data use for instruction	Unintended data use
School HI	• Usually, the examination results are reported to the government and the supervisors • The final examination result are reported for accreditation of the school. At the end of the school year there will be accreditation of school rank from the government within the region • We report student results to the parents so they know about the progress of their students • We make a report of student attendances to their parents • We report the students log book to their parents • We make lesson plans ready before the supervisors inspect us • We put school profile in front of the school board so parents can see what is inside the school • We put financial report in front of school board as a school accountability for parents	• We analyze the data and the guidance from the government suitable for our school development • we use data such as guidance from government, assessment data, and students data for curriculum development • We evaluate what we have done before, and analyze it for future planning at the beginning of the school year • Before the end of school year, head of school gather the teachers to evaluate student report. We can use the student report to decide the passing mark of the next school year • The purpose of reporting the analyze result is for knowing how the school develops • We use teachers data and qualification to assign them into proper grade • Head of school uses school evaluation for planning next year school program	• We start the lesson with reassessment of the previous lesson by using student daily progress report • Overall at the lesson we use student attendances, daily assessment, student attitudes data, homework, student progress. All of them will be accounted for final student report at the end of school year • For example, after examination we analyze the student results, Students who get above the passing mark will receive extra lesson, on the other hand will receive remedial lesson • In everyday lesson, We use students data to know their background • We use student attendances to know their determination in studying • In lessons, we use student log book to make a note about student attitudes • In making lesson plan, we consider the school environment • in deciding passing mark, we see students capabilities, school supporting system, and also the difficulties of the lesson	

			• We use student progress data to know which students are outstanding and less outstanding	
School LI	• Examination results are used only for inspection • Teachers data are used for inspection • Head of school provide and report a comprehensive data of school to parents and government or supervisor • Teachers attendances are used for monthly report to government or supervisor		• I teach based on the lesson plan which I got from Head of school	Head of school makes a copy of curriculum and lesson plan from the other school in order to fulfill accountability to government

Coding themes	**Data characteristics**	**Data user characteristics**	**School organizational characteristics**	**External policy characteristics**
School HI	• Form the student report, we can analyze which student have an increasing or a decreasing progress • We can use the student report to decide the passing mark of the next school year • Student examination results are useful to see which student are needed for remedial or extra lessons. • Data with a good quality will provide a better decision making • Data are easy to access because we have an operator to help us when we need it • Data are accurate and update because we can not make school data recklessly	• We can analyze which student have an increasing or a decreasing progress • We can analyze each of problems in examination results • data are useful to see student progress • I can analyze data	• We analyze the guidance from the government together at the meeting of teachers and head of school • Before the end of school year, head of school gather the teachers to evaluate student report • Head of school are supportive, for example in reporting data, head of school collaborates with us • We are sometimes discussing data, for example in a break time, we talk about student weaknesses and the solution • I think that head of school is one of the experts in using data • I think teachers have the same understanding in data use	• Because supervisor will ask about the analyze of examination results • Government policies should require data from school, which demand the school to submit data, for example financial report • at the end of the school year there will be accreditation of school rank from the government within the region

			• We have a guidance book in using data, for example in assessing students grade • We have time after schooling for two hours, we use it to analyze data • Supervisors come to check the data such as daily report, examination result, and the result analysis of the examination • At the beginning of the school year, we start with a meeting of teachers	
School LI	• by teachers, head of school keep it by himself • We assume the social economic status of students only by intuition • I am using intuition to decide attitudes of students • The curriculum is a copied version from the other schools • I do not know the kind of data are used in the curriculum and lesson plan • I cannot get the students data from the Head of school • Financial report are confidential • Data generally are hard to access for teachers • Data are not accurate because full of manipulation • Lack of access of technology	• There are some teachers that do not want to make the student progress data • I do not know how to analyze data • Teachers are lack of knowledge in using data • I believes that data such as student reports can help us to see the student progress	• Head of school does not invite teachers in discussing curriculum • I did not make the lesson plan because teachers got the lesson plan ready from Head of school • There is no collaboration in planning school program • There is no collaboration in planning for the expenses of school programs, Head of school makes it all by himself • Head of school does not support and encourage us to use or analyze data • Teachers are not discussing data with each other • Teachers does not have a shared vision about the use of data • There is no norm in using data at school • There is no dedicated time for teachers to analyze the data • Head of school are requesting teachers only to collect the data without discussing it	• Teachers data are used also for salary and certification applications • Usually supervisor comes to school to check data such as student data and report • There is a government policy for teacher to use data such as for promotion and certification

			• There is no expert in school to have a consultation • There is no information and training about using data from Head of school