

Data use in public secondary schools
in the Philippines

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Abstract

This study aimed to investigate the present situation concerning data use in public secondary schools in the Philippines. This study is a replication study, which replicates studies conducted in the Netherlands, Tanzania, Ethiopia, and Indonesia. Research questions regarding the kinds of data available in the schools, the purposes of data, and factors promoting or hindering data use were formulated to guide the study. Quantitative and qualitative research methods were used to explore data use in the Philippines. Nineteen schools, with nineteen principals, and one hundred thirty teachers, participated in the survey. The total scores of every school was computed and the median was used as a cut off score to identify the participants for the interview. Two schools with higher median scores on data use and two schools with low median scores were selected for the interviews.

The results of the analysis of variance (ANOVA) show that there is a significant difference between high and low data use schools in terms of data use for accountability, $F(14,996), p \leq .001$, as well as school development $F(24.043), p \leq .001$, and instructional purposes, $F(4.465), p (.036)$. Multiple regression analysis were used to examine to what extent the factor variables influences data use for instruction, accountability, and school development. Data use for instruction is significantly influenced by data characteristics. Data use for accountability and school development is influenced by school organizational characteristics. Furthermore, interview results conclude that data use for different purposes are influenced by several factors such as data, school organizational, data user characteristics, and collaboration. Low data use schools use more data for accountability purposes.

Key words: *data, data use, kinds of data, purposes of data, and factors promoting data*

CHAPTER ONE

1.0 Data use in Education

1.1 Introduction

Today's education grapples with the challenge of changing current high school structures into more effective learning environments (Lachat & Smith, 2005). Research (Mason, 2002; Earl & Katz, 2002) suggests that using data is important in the school improvement process. Data are "information that is collected and organized to represent some aspects of the schools" (Schildkamp, Lai, & Earl, 2013). Schildkamp and Kuiper (2010, p.10) cited examples of these data such as school inspection data, school self-evaluation data, final examination results, data on intake, transfer, school leavers, student and parent questionnaire data, and assessment results. Data use or data-based decision making defined by Schildkamp & Kuiper (2010) is a systematic way of analysing existing data sources within the school, applying outcomes of analysis to innovate teaching, curricula, and school performance and lastly, implementing and evaluating the innovations (e.g. genuine improvement actions).

The importance of data driven decision making is to create a more effective school (Armstrong & Anthes, 2001; Killion & Bellamy, 2000). Therefore, teachers and school leaders are encouraged to use data effectively in school improvement processes (Mason, 2002; Earl & Katz, 2002). Schools are expected to use data to understand their students' academic standing, to establish improvement plans, expected to chart effectiveness of their strategies, and lastly to use assessments to monitor and assure progress accordingly (Herman & Gribbons, 2001).

Several studies (e.g. Coburn & Talbert, 2006; Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006; Wayman & Stringfield, 2006a, 2006b; Young 2006) showed that data can be used for different purposes. Firstly, data can be used for instructional improvement. In the study for example by Love, Stiles, Mundry, & DiRanna (2008), teachers used relevant data

(e.g. assessment about fractions) to identify student learning problems, to verify the causes of the learning problems, generate possible solutions strategies, to implement the instructional strategies and monitor their outcomes.

Secondly, data can be used for achieving accountability demands or complying with regulations (Coburn & Talbert, 2006). Data can be used to legitimize school improvement actions taken by school staff (Diamond & Spillane, 2004). Schools are accountable to provide parents and stakeholders information related to quality education.

Lastly, data can be used for school development purposes. Schildkamp, Karbautzki & Vanhoof (2014) showed that data can help school development efforts. Breiter & Light (2006) stated that data can be used as a basis for planning and policy development. They argued that analysis of test results might prompt schools to adjust policies related to testing, timetables, grouping students per the help or intervention they need. Several studies (e.g. Breiter & Light, 2006; Coburn & Talbert, 2006) show that school leaders can use data to plan, develop policies, plan test activities, and make annual school calendars.

When data are purposely used for school development and instructional improvement, this can lead to increased student achievement (Carlson, Borman, & Robinson, 2011; Lai, Wilson, McNaughton & Hsiao, 2014; Poortman & Schildkamp, 2015). Despite the positive contribution of the use of data, several schools are struggling with the use of data (e.g., Schildkamp & Kuiper, 2010).

Studies on data use (e.g. Schildkamp & Lai, 2013; Coburn & Turner, 2011; Supovitz, 2010) show that data use is influenced by several factors that can either hinder or promote data use in schools. Firstly, characteristics of the user can contribute to the effective use of data. For example, it is important that teachers and school leaders possess data analysis and use skills (Choppin, 2002; Earl & Katz, 2006; Young, 2006; Mingchu, 2008; Feldman & Tung, 2001). Secondly, school organizational characteristics, can influence the use of data.

For example, the school leader should support teachers to use data (Sutherland, 2004). School leaders should provide teachers an opportunity to engage in team- based inquiry that will aim at understanding student outcomes, and an increased understanding of the relationship between instruction and achievement (Picciano, 2006). Thirdly, characteristics of data can influence the way data are used in schools. Limited access to data is often a problem to school is data use (Thorn, 2002; Wayman, Stringfield, Yakimowski, 2004). Lastly, collaboration among teachers may foster data use within schools and helps teachers to learn from each other how to use data, and allows for a fertile exchange of ideas and strategies (Park & Datnow, 2008; Wohlsetter et al., 2008; Wayman, 2005).

Several studies of data use have been conducted in western countries for the last decade such as The Netherlands (Schildkamp & Kuiper, 2010; Schildkamp, Ehren, & Lai, 2012; Ehren & Swanborn, 2012; Van Der Kleij, Vermuelen, Schildkamp, & Eggen, 2015; Van Geel, Keuning, Visscher, & Fox, 2016; Schildkamp & Poortman, 2015) United States of America (Schildkamp & Teddlie, 2008; Diamond & Spillane, 2004; Wohlsetter, Datnow, & Park, 2008; Reed, 2015; Crone, Carlson, Haack, Kennedy, & Fien, 2015) and New Zealand (Lai, McNaughton, Amituanai- Toloa, Turner, & Hsiao, 2009). However, data use has not been studied much in developing countries such as the Philippines. It is important to study data use to gain deeper understanding how teachers and school leaders used data to make decisions and to explore the similarities and differences for data use between the Philippines and western countries. It is also important to educators to have knowledge for analyzing and interpreting data to monitor students' performance and to reduce achievement gaps.

Therefore, the aim of this study is to investigate the present situation concerning data use in public secondary schools in the Philippines.

The study has three main questions:

1. What are the available data in public secondary schools in the Philippines?

2. For which purposes are these data being used?
3. What are the factors promoting or hindering data use in schools?

CHAPTER TWO

2.0 THE THEORITICAL FRAMEWORK

This chapter introduces the framework which is used to guide the study. The framework presents the important concepts included throughout the research: kinds of data, the purposes of data use, and several factors promoting or hindering data use.

In conducting the study, there is a need for a theoretical framework about the use of data use in the school environment. The conceptual framework modified by Omoso (2012) from Schildkamp & Kuiper's (2010) model was used to study data use in Philippines schools. The framework was based on factors hypothesized to influence data use in organizations (see Figure 1). The framework was used by Schildkamp & Kuiper (2010) in Dutch schools and was used as a fundamental guide for their study. In the framework, part A shows the kinds of data available in schools. Part B, C, D and E present the factors influencing data use: data characteristics, school organization characteristics, data user characteristics, and collaboration. Lastly, part F shows the purposes for which the data are used.

The study is a replication study, it replicates previous research conducted on the availability of data in schools, purposes of data, and factors that promote or hinder data use in schools (Schildkamp & Kuiper, 2010; Schildkamp, Karbautzki, & Vanhoof, 2014; Omoso, 2012; Abdusyakur, 2015; Yibrie, 2015; Hawa, 2014). Replication can be defined as “purposeful repetition of previous research to verify on the previous results” (Makel & Plucker, 2014 p.2). On the contrary, Lindsay & Ehrenberg, 1993 in Makel & Plucker (2014) stated that replication studies are often viewed as lacking originality, prestige, and excitement. However, to develop a robust knowledge base on what works in education, and under which conditions it works, replication studies are needed (Granger & Maynard, 2015; Leithwood & Jantzi, 2000; Makel & Plucker, 2014). Therefore, this study is focused on replicating a study conducted in the Philippines. The data collected are new and from the Philippines, however

the theoretical framework, data collection instruments, and data analysis procedure are like the previous study (Omoso, 2012; Schildkamp & Kuiper, 2010; Abdusyapur, 2015; Yibrie, 2015; Hawa, 2014).

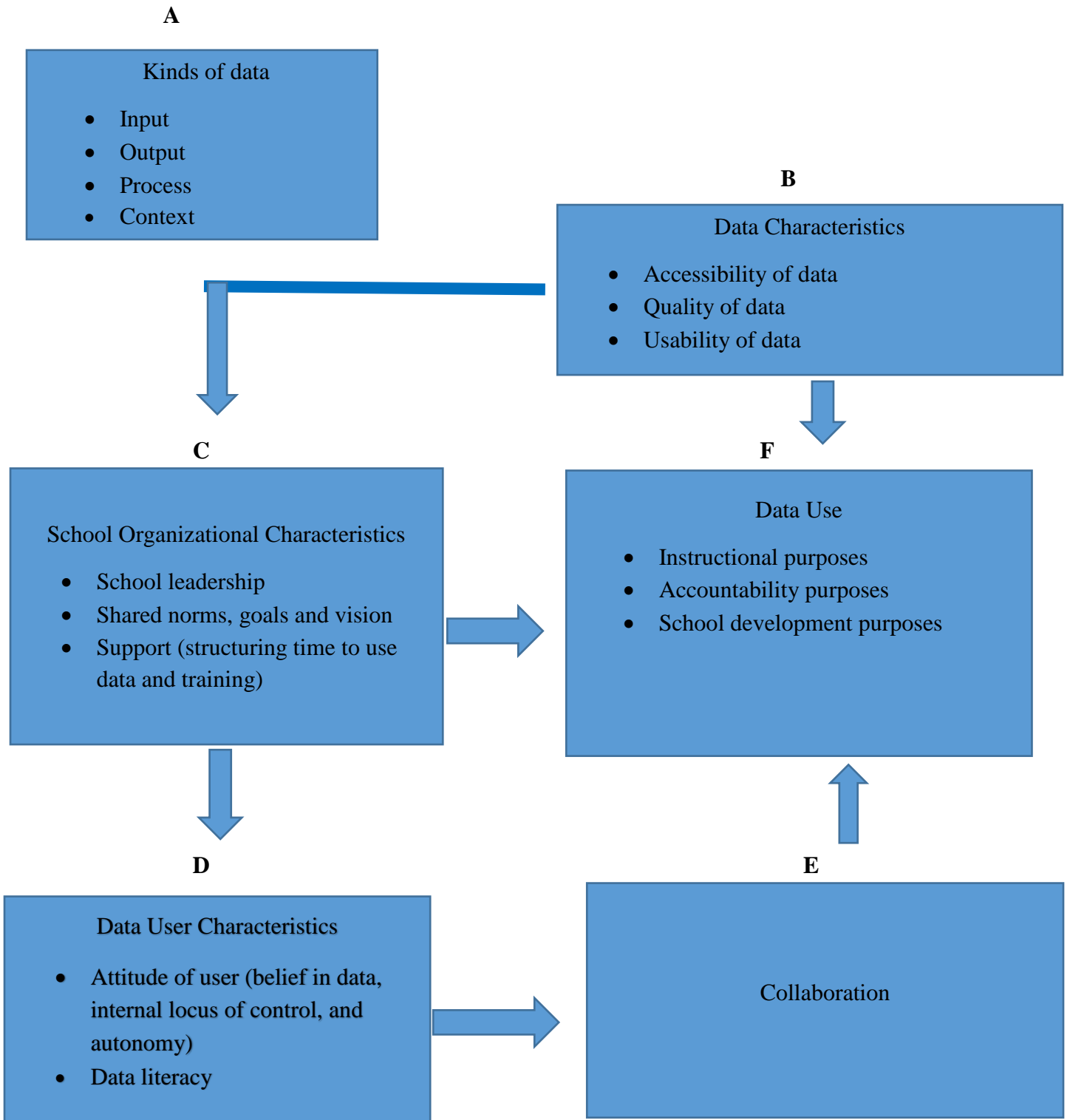


Figure 1: Factors to influence data kinds and use

2.1 Data sources in the school

Teachers, principals, and administrators should be systematically collecting and analyzing data for making decisions to help to improve student and school successes. Data are important in the process of interpretation, analysis and judgment. Ikemoto & Marsh (2007) identified four sources of data in the school environment: input data, process data, context data, and output data. Input data includes, for example, data such as demographics of the student population. Next are process data, a type of data that can be taken from teacher's instruction (e.g.; lesson plans and assessments). Then, the output includes data such as student achievement data and lastly, context data refers to data on policy and resources. Many schools nowadays are mainly focused on achievement scores (Schmoker, 2003).

2.2 Purposes of data use in schools

Data can be used for instructional purposes

Data use is effective when teacher decisions about instructional effectiveness are based on assessments of student's actual proficiencies in various skill areas (Pardini, 2000). Teachers can use data to innovate their teaching, innovate existing (ineffective) programs in the schools, and improve the functioning of the school in terms of increasing student achievement (Feldman & Tung, 2001; Young, 2006; Boudett & Steel, 2007). Assessment data can be used by teachers for instructional purposes to move students between groups mid-year, and to create and review intervention strategies for individuals (Young, 2006). There are several ways teachers can use data for example by changing teaching techniques, choosing teaching instruction, and determining the speed of their teaching in classroom (Young, 2006; Louis, 2008).

Aside from assessment data, according to Lachat & Smith (2005) other data, such as demographic, perception, and education program data are also useful data, for example data such as classroom observations and student work samples (NFIE, 2003). By using these kinds

of data teachers can modify their instructional strategies because they have the current information about the skill and competencies of their students.

Data can be used for accountability

Schools can use data for accountability purposes towards different stakeholders such as parents and school inspectors. Schools are also encouraged to use data to prove to students and parents that the education provided is up to standard. Therefore, use of data also produces evidence whether the decision taken by the teachers' and school leader have added value for changing teachers practice and improve student learning and achievement (Coburn & Talbert, 2006). In addition, schools use data because inspectorates or other accountability organizations provide supervision and schools must comply with the regulation by implementing the advices given to them. In other words, by regular inspection, monitoring of progress, assessment and testing (Harris, 2002), the educational inspectorates and school governing bodies ascertain the effective functioning of schools.

Data can be used for school development

For administrators who know how to use data it means that they are using data to make decisions such as programming, staffing, and resource allocation (Mandinach, 2012). Moreover, school leaders can use data to identify areas of need and target resources (policy development and planning). In addition, decisions related to staff (e.g., evaluating team performance and determining and refining topics for professional development) can also be based on data (Kerr et al., 2006; Wayman & Stringfield, 2006a). Focus on increasing student achievement should be present in the planning of professional development (Kowalski, Lasley, & Mahoney, 2008). Therefore, to maximize results, school leaders should limit the number of specific goals identified to guide improvement process (Reeves, 2006; Schmoker, 2004) and provide training centered on issues specific to schools (Kowalski et al., 2008).

School leaders should recognize the need for the development of new skills in data analysis and application (Bernhardt, 2009; Elmore, 2005; Park & Datnow, 2009).

2.3 Factors that hinder or promote data use in schools

The following factors are perceived to influence data use: data characteristics, school organizational characteristics, data user characteristics, and collaboration.

Data Characteristics/ Data systems

Accessibility of data

Limited access to data is often a barrier to school data use (Thorn, 2002; Wayman et al., 2004). For data to be effectively used, a school should have a plan on how data will be regularly collected and stored. Therefore, it is important that schools should have an information management system and technology tools to use to gather and analyse the data needed (Schildkamp & Kuiper, 2010) and these tools lead to easy data access (Keer et al., 2006; Mingchu, 2008; Wayman & Stringfield, 2006a, 2006b).

Quality and usability of data

Educators may question the validity of some data such as whether the test scores are accurately reflecting students' knowledge, whether the students take the test seriously or whether the test is aligned with the curriculum. These doubts affect some educators "buy in", or acceptance, or support for the data, which research identified as an important factor affecting meaningful use of data (Feldman & Tung, 2001; Herman & Gibbons, 2001; Ingram, Louis, & Shroeder, 2004). Educators are hesitant to make decisions affecting students if they view the data as inaccurate or unreliable (Choppin, 2002). Concluding, it is important that teachers and school leaders use reliable, relevant data, and data which coincide with the needs of the students (Schildkamp, 2007; Visscher, 2002).

School organizational characteristics*School Leadership*

The principal plays an important role in motivating the staff to use data as a basis for their own decisions. The role of the principal is important for explaining differences in data use in schools (Schildkamp, Ehren, & Lai, 2012). School leadership should be a shared endeavour (Henson, 2010; Spillane, 2005; Abbot & McKnight, 2010; Bernhardt, 2004; Park & Datnow, 2009; Wayman, 2009). A school leader should create a team from members of the organization with a desire to engage in the work of school improvement. On the other hand, there are also barriers that make leadership problematic in a data initiative (Wayman, 2006). For instance, effective data use has shown to be too burdensome for one individual (Stringfield et al., 2001) and the principal may be hesitant to pass off data exploration to others for fear of mistakes (Supovitz & Klein, 2003). In addition, school leaders play a vital role in implementing data use within school (Abbot & McKnight, 2010; Kowalski et al., 2008; Park & Datnow, 2009; Picciano, 2006; Wayman, 2005). Therefore, school leaders should foster a school culture that understands and values data (DuFour, 2002; Kowalski et al., 2008; Abbot & McKnight, 2010; Schmoker, 2004; Park & Datnow, 2009) to accelerate student achievement

Shared norms, goals and vision

Vision, norms and goals for data use are also important (Earl & Katz, 2006, Feldman & Tung, 2001; Sharkey & Murmane, 2006). There should be an open channel of communication from teachers, principals and stakeholders to set goals, discuss the present problems, and to develop activities that might improve schools. Therefore, a school leader is responsible in creating a climate with shared vision and norms for data use with a focus on continuous inquiry and improvement (Schildkamp & Kuiper, 2010).

Support

Support can be either internal or external. A data expert or somebody from within the school who has access to own data and help with analysis and interpretation is an example of an internal support, while external support is obtained from workshops, on-site support from somebody outside the school (Breiter & Light, 2006; Coburn & Turner, 2011; Honig & Venkateswaran, 2012; Mandinach & Honey, 2008; Young, 2008). Training and support programs are mostly given in the form of professional development that focus on challenging teachers to thinking and practice in data use (Katz & Dack, 2014).

Another type of support is that the school leader must structure time to use data (Earl, 2005; Feldman & Tung, 2001; King, 2002; Park & Datnow, 2008; Sutherland, 2004; Wayman & Stringfield, 2006b; Young, 2006) not only in collecting, analyzing and interpreting data, but also in meeting time for teachers to discuss the data and to learn from each other (Choppin, 2002; Park & Datnow, 2009; Wayman, 2005; Young, 2006). School leaders also should allow time for educators to immerse themselves in daily inquiry into their classroom practice (Armstrong & Anthes, 2001). To summarize, it is important that school leaders and teachers should be supported by the schools to grow professionally to meet the needs of students (Elmore, 2005; Picciano, 2006; Reeves, 2006).

Data user characteristics*Data Literacy*

Data literacy refers to an understanding of how to apply data from a variety of sources such as summative, formative, classroom assessments and activities, and to transform this data into actionable instructional steps (Mandinach & Honey, 2008; Herman & Gribbons, 2001; Mason, 2002). Several studies show that one of the most important factors that promote or hinder the use of data is the skills that a person possess (Keer et al, 2006). Educators should

have the necessary knowledge and skills to analyse and interpret the different data in the schools.

User 'belief' in data use

The users 'belief in data use' is another factor influencing data use in schools. It is important that buy in/belief in data or data empowerment exists (Feldman & Tung, 2001; Kerr et. al.; 2006; Mingchu, 2008; Sutherland, 2004). Schildkamp (2007) presented that teachers are in the position to promote the use of data when they believe that data is important to guide their practice.

Internal locus of control

Another factor that contributes is the *internal locus of control* (Schildkamp & Kuiper, 2010). It is belief of someone that he or she is sufficiently competent to organize and arrange activities that will lead to a desired outcome and referred to as self- efficacy beliefs (Deci & Ryan, 2000). In this case, a teacher with a strong efficacy is convinced that she can use data successfully to achieve her objective. However, teachers with high external locus of control when their students fail, the teachers use to blame the factors such as the examination is difficult rather than blaming themselves (Kerr et. al 2006.; Schildkamp, 2007).

Autonomy of the teacher

Ownership or teacher autonomy is another influencing factor that hinders or promotes the use of data (Feldman & Tung, 2001; Sutherland, 2004). Teachers can take ownership and responsibility when they collect, analyse and interpret their own data rather than looking at the data collected by others such as researchers and colleagues (Huffman & Kalnin, 2003).

Collaboration

Collaboration that engages teachers in inquiry, reflection, and data based decision making have shown all to be powerful tools for influencing an individual's beliefs and theories in learning (Huffman & Kalnin, 2003). In the study conducted by Means, Chen,

DeBarge, & Padilla (2011) found that collaboration around data can provide a useful professional discourse and can compensate for individual teachers who lack data skills. Moreover, teachers can learn from one another for example, by sharing successful instructional strategies. Collaboration and information sharing is important in educational improvement because combining a data initiative with professional collaboration, not only offers the opportunity for teachers to learn the art of data use from each other but also allows a fertile exchange of strategies and ideas (Wayman, 2005). Therefore, data use may increase if teachers have time for teacher collaboration (e.g. time to review data). Using data should be a team effort where teachers collaborate such as: identify school's strengths and weaknesses, lessons and strategies targeted to improve student learning (Schmoker, 2003). Through collaboration it helps teachers to exchange ideas regarding data use.

CHAPTER THREE

3.0 METHODOLOGY

This section provides information about the research method. First, the research design will be elaborated, as well as context of the study, and the target respondents. Then, the instruments and procedure will be explained. Finally, the way of analyzing will be described as well as the ethical considerations of the study.

3.1 Research Design

A mixed method research was used in this study. Mixed methods is an approach that combines quantitative and qualitative research methods to develop rich insights into a certain phenomenon that cannot be fully understood by using only one research method (Venkatesh, Brown, & Bala, 2013). Quantitative research was mainly used to investigate the purposes of data use and factors influencing data use in secondary schools. Whereas, a qualitative method was used to investigate the kinds of data in secondary schools, for what purpose data are used and the factors influencing data use. The study is a replication study because it replicates previous researches to verify on the previous result (Maker & Plucker, 2014). In addition, this study was conducted to repeat the previous study on the availability of data in schools, purposes of data, factors that promote or hinder data use in schools (Schildkamp & Kuiper, 2010; Schildkamp, Karbautzki, & Vanhoof, 2014). In this study, the data are new and collected in the Philippines. However, the data collection instruments, data analysis procedure were similar to the previous studies in Kenya (Omoso, 2012); Ethiopia (Yibrie, 2015); Tanzania (Hawa, 2014); Indonesia (Abdusyakur, 2015).

3.2 Context of the study

The Philippine K to 12 Education system

Philippines have both public and private schools at all levels (elementary, secondary and tertiary). Education in the Philippines is regulated by the three independent agencies: Department of Education (DepEd), Commission on Higher Education (CHED) and Technical Education and Skills Development authority (TESDA).

The Department of Education is responsible for the K- 12 basic education and enforces the national curriculum. The CHED and TESDA are mainly responsible for higher education. The CHED regulates academically- oriented universities and colleges. Whereas, the TESDA regulates the development of technical and vocational education and programs of the country (Symaco, 2013). Philippine is committed to achieve Education for All (EFA). Under the EFA plan of action 2015, under the critical task No. 5 ‘is the expansion of basic education in the Philippines through a major education reform known as K-12. K-12 means kindergarten, 6 years of elementary, and 6 years of secondary education. The expansion of the basic education is by adding kindergarten and 2 years in high school. This study focuses on the public secondary schools’ children aged 12-15 years old considered to be in grade 7-10 (junior high school), and 16- 17 years old (senior high school) grade 11-12.

Formerly the secondary schools in the Philippines consisted of only four levels and with each level focused on a particular theme or content such as: English, Science, Mathematics, Filipino, Social studies covering Philippine history and government, Asian studies, World History and Economics, MAPEH stands for Music, Arts, physical education and health, Values education, and Technology and Home Economics (Marinas & Ditapat, 2000). Because of the implementation of the K-12 curriculum, the high school system now has 6 years which has been divided into two parts. The lower exploratory high school system which is called ‘junior high school’ (Grade 7-10) whereas the upper specialized high school is

now called senior high school' (grade 11-12). Senior high school will be implemented in the school year 2016-2017. Senior high school curriculum offers core classes and specialization classes based on student choice of specialization (e.g. academic, technical vocational and entrepreneurship). Students can choose a specialization based on their aptitude and interest.

Junior high school students (aged 12-15) are required to take 8 compulsory subjects (e.g. English, Filipino, Mathematics, Science, Technical and Livelihood Education, and MAPEH). Grades 7 and 8 are exploratory. Therefore, students are given to explore four TLE subjects such as: care giving and household service (group 7-8) depending on the community needs and resources. Aside from TLE subject's students are also taught 5 basic competencies (e.g. use of tools and equipment and maintenance of tools and equipment's). Whereas, Senior High School (SHS) consist of a core curriculum preparing students for college and career pathways that prepare students for employment. The contents of the learning areas are based on the College Readiness Standard of the Commission on Higher Education (CHED).

The Technical Education and Skills Development authority (TESDA) is an agency that is responsible in issuing Certificate of Competence (COC) to students who satisfactorily demonstrate competence to a particular unit of competency. The COC leads to certification beginning with NC 1 which indicates the performance of a routine and predictable task, requiring little judgement and supervision, and NC 2, the performance of a prescribed range of functions. Aside from TESDA, recognition from both government and non-government agencies are considered. However, for example" art related career pathways are assessed by National Commission for Culture and Arts (NCCA), sports related career pathways are assessed by the Philippine Sports Commission (PSC), and for foreign languages will be assessed by TESDA or foreign language institutes. Students can only receive this certificate after passing the national assessment for competency skill.

Under the new K-12 curriculum, the permanent record will only be issued after the completion of senior high school. The Philippine educational system prepared some programs and reforms to improve the quality of education however, there is a need for the Philippines secondary schools to use data. There are several forms of data available, such as:

- *Lesson plans*: the most important document to teachers. It provides a detailed description of the course of instruction. Lesson plans are prepared before and used during the actual lesson. It also contains the objectives of the topic, time of coverage, activities to be done in the lesson, and the materials needed.
- *Student report card*: it is used to communicate student performance. The report card is issued by the school to the students four times yearly. It summarizes student performance in the selected term and all the previous terms in all subjects. It contains a grading scale to identify the quality of student work.
- *Teacher made assessment*: Student are assessed on a regular basis by the teacher/ subject teachers. It is conducted both oral and written assessments.
- *Students and teacher's daily attendance data*: it is a tool to monitor students and teacher's attendance in schools. Student daily attendance is checked by the teacher before the classes start. It is used by the teachers to monitor the number of absences of students and it will be used by the school to get the average percentage of students attending school each day in each year.
- *National assessments*: is a country wide collection of information on what students know, understand, and perform. The result of national assessment can be used by individual students as a basis on where to proceed in the next step in the educational ladder. Whereas the result of this national assessment educators can have used this for making an informed decision about what to do

next in the educational process. The national assessment will be conducted at the end of each schooling level: elementary, junior high school and senior high school.

- *Summative assessment*: This kind of assessment is conducted at the national level at the end of grade 3 to determine the impact of the use of the mother tongue as a medium of instruction

3.3 Respondents

A convenience sampling strategy was used. A questionnaire was distributed to schools by the Division office in-charge, the Assistant Schools Division Superintendent (ASDS) of the Division of Sultan Kudarat. There are 49 public secondary schools in Sultan Kudarat. However, 22 schools were chosen as target participants because the location of the schools has ensured access in terms of public transportation and time of travelling is lesser compared to the schools located at the coastal areas. The target participants of this study were 220 participants. The respondents were composed of 22 principals and 198 teachers. We sampled 1-2 teacher participant's in each year level. However, there were only 19 schools who participated in the research questionnaire and 149 participants (68% response rate) who filled out the survey, consisting of 19 principals and 130 teachers. Only the gender of the teachers represents the entire population, 30.8% representing male teachers and 69.2% for female teachers. We used a survey questionnaire on data use to select respondents for the interview.

The survey aimed to find out the extent to which teachers and principals in high and low data use schools use data for instructional purposes, accountability purposes, and school development purposes. Teachers and principals rated the strength of their agreement describing the extent of data use for each purpose. Based on the total score, the median was computed and used as a cut off score. Fifty percent below the median were identified as high data use schools. Table 1 presents descriptive statistics such as means and standard deviation

in each purposes of data use in high and low data use school. Using data for accountability purposes ($M=3.60$, $SD=.43$; $M=3.33$, $SD=.40$), school development ($M=3.49$; $SD=.37$; $M=3.22$, $SD=.31$), and use of data for instructional purpose ($M=4.99$, $SD=.59$; $M=4.76$, $SD=.67$).

Table 1. Descriptive statistics for teachers and principals' data use for accountability, school development and instructional purposes for high and low data use schools.

Data use purposes	High data use schools	Low data use schools	Total
	(N= 58)	(N= 91)	(N= 149)
	M (SD)	M(SD)	M (SD)
Accountability	3.60 (.43)	3.33 (.40)	3.43 (.43)
School Development	3.49 (.37)	3.22 (.31)	3.32 (.36)
Instructional	4.99 (.59)	4.76 (.67)	4.48 (.65)

For accountability and school development purpose, alternatives were: 1=strongly disagree; 2= disagree; 3= agree; 4= strongly agree. While for instructional purposes, there were six possible alternatives 1= almost never; 2= yearly; 3= twice a year, 4= monthly. 5= weekly; and 6= twice a week.

Analysis of variance (ANOVA) was calculated to examine whether there was a significant mean score difference between high and low data use schools in terms of accountability, school development, and instructional purposes. The result suggested that there was a significant mean score difference in high and low data use schools. Data use for accountability, $F(14,996)$, $p \leq .001$, as well as the school development $F(24.043)$, $p \leq .001$, and instructional purposes, $F(4.465)$, $p (.036)$. The table of the analysis of variance is presented below.

Table 2. One-way analysis of variance (ANOVA) of data use for accountability, school development, and instructional purposes for high and low data use schools.

	Source	SS	df	MS	F	Sig.
Accountability	Between	2.545	1	2.545	14.996	.000
	Within	24.945	147	.170		
School development	Between	2.740	1	2.740	24.043	.000
	Within	16.754	147	.114		
Instructional	Between	1.839	1	1.839	4.465	.036
	Within	60.534	147	.412		

Two schools with the highest average score and two schools who had the lowest average score were the target participants for the interviews. 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 whereas, low data use schools were expected to enhance the understanding of factors hindering data use. Therefore, interviews were conducted with 2 teachers and 1 principal in each of the 4 schools. There were 12 respondents in the interview. For more information on the respondents see table 2.

Table 3. Sampling of respondents on interview

Teachers	High data use school						Low data use schools					
	School 1			School 2			School 3			School 4		
	1	2	3	1	2	3	1	2	3	1	2	3
Sex	M	M	M	F	F	M	F	F	F	F	F	M
Age	56	38	47	48	36	38	58	38	36	46	28	47
Years of Experience	35	14	22	25	8	10	35	10	13	24	3	11
Designation	P	CT	CT	P	CT	CT	P	CT	CT	P	CT	CT
Year level (Grade)		9	10		8	9		11	11		7&11	9, 10 & 11
Subject specialization		Pre-Cal	Sci		Eng	Math		P.E & H.	Math Org Mgt.		Eng PD VE	TVL

Total teachers interviewed: 12 (5 males & 7 females)

Key: P- Principal, CT- Classroom teacher, PreCal- Pre-Calculus, Sci- Science, P.E &H- Physical Education and Health, Math- Mathematics, Org Mgt- Organizational Management, Eng- English, PD- Professional Development, TVL- Technology, Vocational, Livelihood, VE- Values Education

3.4 Instrumentation

Survey

The survey was consisted of questions with regards to data use for school development, data use for accountability, data use for instruction, perception of school organizational characteristics, perception of user characteristics, and perception of data characteristics.

As this is a replication study, the researcher used the existing survey previously used in Tanzanian context (Hawa, 2014) to use in the Philippines. Similar studies have been conducted in the Netherlands (Schildkamp & Kuiper, 2010; Ethiopia Yibrie, 2015; Indonesia

Abdusyakur, 2015). The existing survey was based on the conceptual framework from Schildkamp & Kuiper (2010) which investigate kinds of data available in schools, purposes of data use, and factors promoting or hindering data use. Respondents can choose their agreement with the items on a 4- point scale: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). For the questions regarding “data use for instructional purposes” for validity reasons, different response category was used. Respondents are asked to indicate their agreement how they often used data for instructional purposes on a 6-point scale: never (1), yearly (2), a couple of times per year (3), monthly (4), weekly (5), and a couple of times per week (6). In total, the survey consists of 58 items to collect information of data use. Also, participants were asked to answer questions on demographical background (gender, age and educational background), and number of years of working.

Interview

The researcher used interview questions. As this is a replication study, the instrument for the interview was based on the previous instrument used by (Hawa, 2014) in Tanzania, Netherlands (Schildkamp & Kuiper, 2010); Ethiopia (Yibrie, 2015; Indonesia (Abdusyakur, 2015). A semi-structured interview was used to collect information from the principal and teachers. The interview guidelines covering all research themes: kinds of data, purpose of data use and factors promoting or hindering data use. The interview was used to gather more information from the interviewees’ perspective about data use in secondary schools in the Philippines. Table 4 below shows the examples of interview questions for each research theme.

Table 4. Example question for each research theme

Research theme	Research question
Kinds of data available in schools	What kind of data do you use in your job?
Purposes of data use	For what purpose, did you use data? For what purpose do teachers and principals use data?
Factors promoting or hindering data use	Did you receive any support in the collection, analysis, interpretation and/ use of data? Are there any barriers in the school that prevent the use of data?

3.5 Procedure

To collect data, the questionnaires was distributed to 22 schools. The questionnaires were given to the school principal. The school principal handed down the questionnaire to teachers. The questionnaire was administered to at least one principal and 1-2 teachers per year level. The duration of the questionnaire was no longer than 15 minutes. For the interview part, the researcher visited the four identified schools that were identified based on the analysis of the data from the survey. The researcher interviewed the principal and two teachers in each school who participated in the survey and it was recorded with consent. The time for each interview was 30-45 minutes and it was conducted in English because this is the language use for instruction and communication.

3.6 Data Analysis

Survey

The survey is consisted of fifty-eight questions. For the first research question, what kinds of data were available in the schools, a checklist in the survey was used to determine the availability of the specific data such as student demographic data, student transfer, school annual policy, and school financial reports.

For the second research question, concerns the extent to which teachers and principals use data for instructional purposes, accountability purposes, and school development purposes. Descriptives statistics for each purposes was calculated based on the survey data.

Furthermore, a one-way analysis of variance (ANOVA) was calculated to determine whether there was a significant mean score difference between high and low data use schools.

Regarding with the last research question, to determine to which extent data use for accountability, instructional, and school development purposes were influenced by data characteristics, data user characteristics, school organizational characteristics, and collaboration. Before performing the regression analysis, the variables were checked on multi-collinearity. Multi-collinearity was used to apply in a particular regression analysis with multiple predictors. According to Field (2009), high level of multi-collinearity between predictors leads to difficulties in determining the unique contribution of the predictors that is highly correlated. On the other hand, correlation was performed to be exactly sure in determining the degree of relationship between the predictors and the dependent variables. Finally, a multiple regression analysis was performed to examine to what extent there is a correlation between the factor variables such as data characteristics, data user characteristics, school organizational characteristics, and collaboration and the dependent variables were data use for instructional purposes, data use for accountability, and data use for school development purposes.

Interview

For the interview part (refer table 1), two teachers and one principal from high and low data use schools were the respondents. First, the interview was audio-taped with approval from the respondents to preserve anonymity. Secondly, the data from the interview was transcribed using the software Atlas. Ti software. Next, the interview transcripts were coded according to the themes on conceptual framework (see Figure 1). For instance, the available data in schools were classified into four groups: input, output, outcome, and context data. Themes related to purposes of data use were classified such as, data use for instructional purposes, accountability purposes, and school development purposes. However, themes

related to factors promoting or hindering data use in schools were classified into 4 groups: data characteristics, data user characteristics, school organizational characteristics, and collaboration.

3.7 Reliability and Validity

The quality and validity of the survey questionnaires was determined using confirmatory factor and reliability analysis. All items are sufficiently loaded to the factors above 0.40 (See appendix 4). In addition, reliability analysis measured by Cronbach's alpha shows the following results: data characteristics (0.89), data user characteristics (0.85), School organizational characteristics (0.91), Collaboration (0.81), data use for accountability (0.80), data use for school development (0.89), and data use for instruction (0.89).

For the semi- structured interview, the interrater reliability check of transcribed interview responses was conducted. Two researchers participated in the inter-rater reliability. The two researches were given a copy of transcribed interview data matching the research questions to check the categories relevant to the presented information. The rates of the coders were calculated from 16 codes and 132 responses with Kappa of 0.75.

3.8 Ethical considerations

The Research Ethical Committee of the University of Twente approved the application for ethical clearance of the study before data collection. In addition, permission from the Sultan Kudarat Division office was granted for collecting data samples from selected schools. Participation in the study was fully voluntary, and respondents were informed about the goal and objectives of the study including the anonymity of the responses. The approval of consent was obtained before distributing the survey questionnaire and tape recording the interviews.

CHAPTER FOUR

4.0 Results

This study aimed to investigate data use for school improvement in public secondary schools in the Philippines. The aim of the study is to assess the kinds of data commonly available and used in schools, examining the purpose for which schools uses data, and to identify factors influencing data use. The data were collected from survey questionnaire and interviews.

4.1 Presentation of the respondents

Interviews about kinds of data currently present in low and high data use schools were collected and analysed. The presentation of the results for the first and second high data use will be labelled as school HDU1 and school HDU2. The first and second low data use school will be labelled as LDU1 and LDU2. Whereas, the principals for HDU1, HDU2, LDU1, and LDU2 will be termed as HDU1P1, HDU2P2, LDU1P1, and LDU2P2. It is important to use this labels to secure anonymity of the respondents. For the same reason teachers, will be termed using the school letter (HDU1) followed by the teacher (T) with the serial number assigned of the teacher interviewed. For example, HDU1T1 represent teacher number one interviewed in school HDU1 and LDU2T2 is a teacher number two from LDU2.

Table 5. Letters used to represent principals of the school as well as teachers

Labels	High data use school 1	High data use school 2	Low data use School 1	Low data use school 2
School	HDU1	HDU2	LDU1	LDU2
Principal	HDU1P1	HDU2P2	LDU1P1	LDU2P2
Teacher 1	HDU1T1	HDU2T1	LDU1T1	LDU2T1
Teacher 2	HDU1T2	HDU2T2	LDU1T2	LDU2T2

4.2 Kinds of data in school

4.2.1 Input data

The checklist result and interview regarding *input data* available in the public secondary schools in the Philippines both show that the following data were available: student demographic data, parent demographic data, teacher data (qualification, experience, salary, and age), and student transfer (number of intake and student leavers).

In addition, the interview result show that both group of schools use data pertaining to number of students per class and per year level. However, data such as student- teacher ratio was not available to LDU1 and LDU2.

4.2.2 Output data

The checklist results show that the following types of output *data* were used in the schools: student report card, examination result, student daily progress, school evaluation report, and teacher evaluation report.

Interviews confirmed that both high and low data use schools used similar data such as examinations and assessments results. HDU1 mentioned that they are conducting item analysis based on the quarterly exam to determine the competencies that were difficult to students. After identifying those difficult competencies, teachers has to reteach the topic again. One of the teachers in HDU2 also mentioned that weekly test results for example was used to identify the high and low performing students. Intervention such as tutorial classes usually conducted by one of the teachers to assist low performing students. On the other hand, both LDU1 and LDU2 mentioned that they used results from the exams to identify the strength and the areas to improve in terms of their teaching.

4.2.3 Process data

Regarding *process data*, the result of the checklist and interview show that the following data were available: school curriculum, lesson plans, school annual policy, student attendances, and student logbook (student daily activities and student attitude).

Interviews were used to confirm the availability of the process data in the schools. As observed most of the data on this category were those in the possession of the teachers. In addition, interview results show other data used by teachers such as: scheme of work and time spent on each subject. On the other hand, data such as information on the annual policy of the school is not accessible to LDU2 because there was no written policy at all but it is only

handed down verbally. On the contrary, HDU1, HDU2, and LDU1 have a written annual policy of the school. Specifically, the HDU1 has a student handbook which contains policies of the school and it is distributed to the students particularly to the new comer. In this way, students and parents are aware about the regulations of the school. Both high and low data use schools also mentioned the significant importance of the students' attendances. One of the teachers in LDU1 uses the attendance as one of the references to identify student performance. The students who were always absent tend to have a lower result on the test. Based on the number of absences (maximum of five), teachers usually call the attention of the parents to talk about the problem and to discuss the possible solution to lessen the absences of this particular student.

4.2.4 Context data

Regarding context data, the result of the checklist showed that schools have the following data available: financial report, school facilities, and school profile (address, accreditation, and achievement).

Interviews revealed that these kinds of data were available in both groups of schools. However, teachers and principals also stated that several other types of context data were available, such as a School Improvement Plan (SIP), which is a plan that serves as a guide for principals and teachers in managing the school and it is a good source of information for the stakeholders on which area, objective or goal they can extend assistance to the school. Another data mentioned in the interview were calendar of activities and opinion of parents. Context data used in high and low data use schools show more similarities than differences.

4.3 The purposes of using data in public secondary schools in the Philippines

The goal of the study is also to determine the extent to which principals and teachers in high and low data use schools use data for instructional purposes, accountability purposes, and school development purposes. Results will be described in the following paragraphs.

4.3.1 Data use for instructional purposes

The second research question concerns the extent to which teachers and principals use data for instructional purpose. For this scale the possible answers were the following: almost never, once a year, twice a year, once a month, once a week, and twice a week. Schools scored relatively high on data use for instructional purposes (see Table 1). Survey results showed that teachers generally agree with the statements such as: identify teaching and learning content to use in class and make or adapt my teaching to individual student's needs. They also use data in setting the speed of the lessons as well as determining the topics and skills that students have not yet acquired. Data are also used for instructional purposes in which teachers set learning goals for individual students.

Table 6. Descriptive statistics for teachers and principals for data use for instruction

Questions	M	SD
Identify teaching and learning content to use in class	5.06	.81
Make or adapt my teaching to individual students 'needs	5.04	.93
Set the speed of my lessons	4.91	.81
Determine which topics and skills students do and do not possess	4.91	.86
Give student feedback on their learning process	4.79	.85
Determine progress of students	4.73	.83
Form small groups of students for targeted teaching and learning	4.73	.96
Study why students make certain mistakes	4.82	.90
Set learning goals for individual students	4.66	1.03

Data use for instructional purposes alternatives were: 1= almost never; 2= yearly; 3= twice a year, 4= monthly. 5= weekly; and 6= twice a week.

4.3.2 Interview analysis of data use for instruction in high data use schools

In high data use schools, we found three different purposes for using data for instruction. The first example pertains to *identifying competencies of students* to check students' progress. Students are identified as low performing students based on the result of the assessments, quarterly exam, and weekly test, student attendance data, and even the previous student report card. For assessment data for example the mean, percentage and score (MPS) and item analysis were conducted by teachers per section and per subject to determine the competencies that are mastered by the students as well as the competencies that are

lacking. By using this kind of analysis, teachers are aware which competencies must be given extra attention in teaching. Teacher 1 of HDU2 mentioned that *“if the MPS from the first grading is low, as a teacher we are going to exert our effort to make the MPS higher on the next grading period”*.

Secondly, *teachers provide interventions to students*. For example, if 50% of the student failed in a Mathematics exam, it means that the teacher can give remedial classes to these students. Remedial classes are one of the interventions provided by high data use schools. Principals of HDU1 and HDU2 mentioned *“We give intervention to students who identified with academic problems by providing teachers to tutor them during vacant time”*. Another intervention is reteaching the specific topic, which is only used when most of the students failed or did not understand the lesson at all.

Lastly, *teachers are adapting strategies according to the needs of the students*. By using the examination result (quarterly exam) teachers can change their strategies in teaching for example giving simpler task to students who have difficulties in understanding a certain concept or related topic (Science subject) and providing more challenging activities to students who performed better. Some of the teaching strategies mentioned by the teacher include cooperative learning by working in group activities and integrating technology in teaching. One of the teachers commented *“I integrate information and communication technology (ICT) on classes to catch student’s attention”*. *Increasing classroom participation in the form of group activities is important so that students can share their ideas and opinions to their classmates*”. Moreover, one of the teachers added *“Some students are silent in the class or never participated at all because they are scared to be laughed by their classmates if they give the wrong answer, by using this strategy student can easily express their ideas with their classmates in a small group”*.

4.3.3 Interview analysis of data use for instruction in low data use schools

In low data use schools, four purposes were mentioned for using data for instructional purposes: Two of these purposes were also mentioned in the high data use schools: (1) *teachers provide intervention to students*, and (2) *teachers are adapting strategies according to the needs of the students*. There were two other purposes added. These are the following: (3) *preparing activities and materials to be used in the class*, and (4) *showing students the class record*.

One of the examples of using data for instruction in low data use schools, similar to what was found in the high data use school's *teachers provide interventions to students*. Based on the assessment result (quarterly exams and weekly test) teachers usually conduct item analysis to identify the competencies that are mastered by the students as well as the competencies that have low scores. Competencies with low scores during item analysis will be reviewed and discussed again by the teachers during remedial teaching. The principal uttered "*As a principal I instructed the teachers to do the intervention such as conducting remedial teaching to review these identified competencies*". Another teacher explained "*By conducting the item analysis we can identify especially those competencies with low scores and to decide to conduct remedial classes to help students to master these competencies and helping students to improve their results*".

Secondly, similar to high data use schools, *teachers are adapting strategies according to the needs of the students*. The result of different data such as examination test (quarterly exam, weekly test, and individual or group projects) were used to evaluate the students, evaluate how effective teachers are, or the result will be used by teachers to reteach the lesson or change the teaching strategy to cope with the learning needs of the students. For example, one of the students has the difficulty in Science subject because the topic for him is too difficult. A teacher of LDU2 said "*As a teacher, I can use a simple example that my student can relate from previous knowledge or by giving him a different learning material and*

activity for better understanding". A teacher in LDU1 said "The teacher should consider the learning ability of the student by giving them different activity from the others".

Aside from the teachers, the principals use the observation data to identify the strengths and the areas need to improve by the teachers specifically in terms of teaching strategy. For instance, the teacher is asking questions to the students and most of them are silent. It means that the question might be difficult or the students has no background of the topic. So, in this way, using observation data, the principal can suggest several strategies that might help teachers to arouse classroom participation such as: in presenting a new topic to students, the teacher should first search out what the students understands and prior experiences about a concept before teaching it to them. Another strategy, teachers also encouraged to use critical thinking and inquiry by asking students open-ended questions and encouraging students to ask questions to each other. One of the principals in low data use explained "I encouraged my teachers to become a constructivist teacher for example: teachers should present the concept related to the prior knowledge of the students and use critical thinking by asking students open-ended questions rather than by answering yes or no".

Next, curriculum data with the list of competencies is used for preparing *activities and materials to be used in the class*. By using a competency list in Science subject for example, the teacher can provide students the right materials and activities that is related to the topic. Teachers provide activities that encourage student's participation for example, involving students in conducting experiments would be one of the activity that will arouse student's curiosity and as well as providing students the adequate materials for the activity where students can manipulate and explore the materials such as microscopes or other measuring materials. One of the teachers explained "We need to provide students the right materials in teaching the topic so that they will understand the topic clearly".

The last purpose *is showing students the class record*. By showing this data, students can see the result of their assignments, group works, quizzes, and projects and it will give them the idea how they are performing. For the students that have low scores in a certain activity by showing this kind of data it might encourage them to work harder. One of the teachers in LDU2 explained “*I can also use the class record to help my students to understand and know their academic status and come up to a particular solution that might improve their academic performance*”.

To summarize, high and low data use schools show similarities in terms of using data for instruction. Both group of schools also demonstrated differences in terms of using data. High data use schools use data to identify the competencies of students whereas, low data use schools use data such as class record to motivate students to work harder and the competency list of the subjects were used to prepare activities and materials to be used in the class.

4.4 Data use for accountability purposes

Principals and teachers also scored relatively high on using data for accountability purpose. This means that they generally agree with statements such as: We provide data for our school improvement, the data we use for accountability purposes (giving reports to parents and school inspectorate) represent the reality of the school, and in our school, we use external evaluations (e.g., school inspectorate) for our school improvement.

Table 7. Descriptive statistics for teachers and principals for data use for accountability

Questions	M	SD
We provide data for our school improvement	3.49	.54
The data we use for accountability purposes (e.g., to give reports to parents and school inspectors) represents the reality at school	3.46	.51
We provide data for our school improvement to our inspectors	3.35	.48

4.4.1 Interview analysis of data use for accountability in high data use schools

In high data use schools, there are four examples of using data for accountability. In the first place, they *show parents and students how the school is doing*. The parents were invited to collect the report card of their children at the end of every grading period, and parents whose children need assistance or in trouble are also invited by the teachers to discuss the solutions to help their children. One of the teachers in HDU2 mentioned “*Parents and teachers should work hand in hand to help our students to improve their grades, to discuss the behaviour of their children, and possible help that parents can contribute to improve their children result*”. Furthermore, parents are also invited to attend the first assembly for Parents and Teachers Association (PTA) and Homeroom Parents and Teachers Association (HPTA) which is usually held at the beginning of the school year to inform the parents about the regulations of the school, the intended school project and to present what the school has done the previous school year. Moreover, schools also provide student handbooks to inform students about the present regulations of the school. The principal of HDU1 explained “*We have a student handbook which contains policies of the school and it is distributed to every student particularly to new student*”.

In addition, *they show principals and visitors from Division and Region Office how the school is doing* by reporting the final examination results to Division office. In addition, teachers should always prepare their lessons with a guided lesson plan in case there will be an observation by the principal or representatives from the Division and Regional Office. One of the teachers added “*the data pertaining to lesson activities should be ready in case there will be an observation by the principal or visitors coming from Division or Region Office*”.

Schools are also accountable to the Division office for example, for physical improvement wherein one of the schools will be hosting a certain activity. In this case, the host school is accountable to improve physical aspects such as: the surrounding of the school by purchasing

the materials for beautification and to prepare the area where the meeting will be held. In this case, schools use financial data and a letter of communication requiring the school and type of activities to be conducted. Principal of HDU2 explained “*Next month our school will be hosting for Division Management Committee (MANCOM) we are accountable to improve the physical aspect of the school particularly the surrounding. In this activity, we use data such as the number of teachers coming, the area of the meeting will be held and the financial data to augment our finances as well as to purchase materials for beautification*”.

Lastly, *teachers monitor the attendance of the students* because attendance data is used to communicate with parents specifically with student with five or more absences. Teacher 1 of HDU2 explained “*Attendances for both students and teachers particularly students is important because we use the attendance as our reference based on the number of absences to talk with the parents*”. On the other hand, based on the number of absences by the student’s teachers also conducting home visitation. The purpose of home visitation is to look at the situation of the students and to find out some other factors that might be the reason of the absences.

4.4.2 Interview analysis of data use for accountability in low data use schools

In low data use schools, there are four examples of using data for accountability. In the first place, similar to high data use schools, they *show the Division Office and Region Office how the school is doing*. The school is inspected by the administrators coming from the Division Office mostly compared to Region Office. The school is always expected to prepare both in academic and physical aspect. Teachers are always encouraged to prepare their lessons because visitors sometimes observe classes and check the facilities provided by the school. Principal of LDU1 said “*Coming visitors are usually from Division office sometimes from the region. They look at our facilities and they go to classes much more to supervisors than in region. They come to see our strengths and weaknesses. For strengths, they appreciate*

it, and for weakness they give technical assistance and what better things to do". However, the examples of what kind of technical assistance were provided was never been mentioned during the interview.

Secondly, something not mentioned by high data use schools is that low data use schools are *accountable for transmitting the data to the national office*. For example, demographic data of the students should be transmitted to the national office. Nowadays, public secondary schools in the Philippines are using an online system to record the demographic data of the students which they called Learning Information System (LIS). One of the teacher assigned acted as LIS coordinator. The LIS coordinator is responsible to transmit the data to the National office. By using the LIS teachers and principals can monitor the survival rate, drop outs, and transferred students during the school year. The LIS coordinator explained *"I am responsible on this data to transmit to the National office. Using the LIS, we can monitor students who survive, drop outs, transferred in and out during the school year because every student has their own Learners' Reference Number (LRN)"*.

Furthermore, similar to high data use schools' low data use schools also use data for *informing the parents how their children are performing*. Schools are responsible in informing and communicating to parents regarding with the performance of their children. Parents are well informed about the grades of their children so that parents are aware how the grades are computed. Parents are also invited by the teacher to discuss if there are some problems related to their children and they also collect the report card. One of the teachers mentioned *"We update the parents about the performance of their children, we informed them about the grades and how the grades are computed so that they are aware and they can also guide their children in doing assignments or projects at home"*.

Lastly, the inspection report is needed by *passing the safety requirement conducted by the Fire Department*. Schools also considered the safety of the teaching staff and students by

passing the inspection conducted by the Fire Department. The school has been inspected for safety for several years but they always fail. Based on the inspection report, the school initiated some safety precautions by changing some electrical wirings and to do more based on the criteria for passing the safety inspection. The principal pointed out “*Based on this inspection report, it became a basis of the school to have some safety precautions by changing step by step the electrical wirings*”.

4.5 Data use for school development

Regarding the use of data for school development purposes. The mean scores for the nine question are between 3.16 to 3.43. This means that teachers and principals usually agree with the statements such as: results of students are used to evaluate teachers’ performance, we used data to show teachers the extent to which the school is achieving its goal, and in my school, we use student examination results to plan yearly goals and targets for school improvement

Table 8. Descriptive statistics for teachers and principals for data use for school development

Questions	M	SD
Student examination results are used to identify gaps in the curriculum.	3.43	.50
In my school, we use student examination results to plan yearly goals and targets for school improvement.	3.43	.52
Results of students are used to evaluate teachers’ performance.	3.39	.53
In our school, we use external evaluations (e.g., from the school inspection) for our own improvement	3.34	.50
In my school student examination results lead to decisions with regards to professional development of teachers.	3.32	.50
School leaders use data to show teachers the extent to which the school is achieving goals.	3.32	.47
In my school, we use data as a tool to determine effective teaching methods.	3.32	.50
The division of teaching time in my school is based on identified learning needs of students.	3.31	.50
We used detailed data analysis as an essential part of improvement process in my school.	3.16	.53

4.5.1 Interview analysis of data use for school development in high data use school

High data use schools mentioned four examples of using data for school development purposes for example, *by conducting summer classes* for low performing students. Summer classes are usually conducted in the months of April or May. There are teachers assigned to teach students who were identified as slow learners. The competencies to be discussed throughout this session were also identified and students were also provided materials for the lesson, assignments, and assessment at the end of the summer class to measure what have they learned. The students were identified by the teachers and principal by using their grades. The principal of HDU1 mentioned “*As a principal I instructed the guidance office in- charge to list the names of the students and to work together with the registrar (record office) for that purpose*”.

Secondly, *organizing professional development activities for teachers*, data such as subject specialization of the teachers (English or Mathematics) and grade level are used to select teachers to attend training, seminars and workshops initiated by the Division Office. Most of the time the principal chooses who will attend the seminar. The teachers were chosen for instance based on the subject of specialization and year level. The teacher who attended the seminar will also share what has been learned during the activity to the colleagues. In this way, colleagues will be informed and use the information which they think is useful in teaching. The teacher explained “*There are trainings provided for us by the Division office to keep us updated and be provided the knowledge about the present development in education such as new techniques or strategies in teaching*”.

Lastly, using *the School Improvement Plan (SIP)* is used to identify the projects and some other needs such as related to student achievement. The SIP is the mother of all plans in a school that provides direction and touches all aspects of school development. However, schools have different priorities in terms SIP. For example, HDU2 wants to increase student

literacy, to realise this plan, teachers should identify students who have difficulties in reading. Another example is to reduce the number of drop outs by paying home visitation to see the actual situation of the students and identify the factors of dropping out. In order to increase the result in the National Achievement Test teachers identify those least learned competencies and make a catch up plan. The SIP is intended for three to five years' plan and it is updated annually by removing the projects that has been done. One of the teachers explained "*We usually conduct home visitation to see our students and to identify the factors of dropping out and we also want to increase the result of the National Achievement Test. Therefore, we teachers need to identify the least learn competencies and make concrete decision or interventions to help our students*".

4.5.2 Interview analysis of data use for school development in low data use schools

Low data use schools use data for school development purposes for example, *by evaluating individual performance of the teachers and principals*. The Individual Performance Commitment and Review Form (IPCRF) is a form of data which teachers and principals can use for evaluating their performance. The criteria of evaluating the performance of the teachers were particularly based on the number of activities participated in as well as the attachment of the general weighted average of the students. For every activity, teachers and principals are required to have Mode of Verification (MOV). Mode of verification is a reference that teachers or principals attended the specific activities (seminars, scouting, school demonstrator or coach from a specific contest) and it is demonstrated in the form of certificates or photos. The form is also discussed by teachers one on one with the principal or sometimes with the master teacher. The rating of the teacher's performance also depends on the principal. This kind of data also will be used by teachers for promotion. One of the teachers explained "*At the end of the school year, teachers and principals are required to*

submit the evaluation form to the Division Office, this form will inform us the activities we have done and to reflect students' performance”.

Another purpose of data use for school development is by *implementing the open high school programs*. Open high school program is a school initiative to give drop out students and students with problems such as early marriages an opportunity to educate themselves again. Drop out data and report card were used to identify the target participants. The students were given a module as their learning tool to guide them in complying their assignments, projects and exams. One of the principals explained “ *Using the drop out data and report card our school was identified by the Division office that there were students with problems such as early marriages and students are working at an early age. We use those data to identify our target students to be in the program. The report card was used as a guide in choosing the available module to be used by the students”.*

Next, observation data is used for *providing students a conducive learning environment*. Physical aspect of the classroom was the main point in providing conducive learning to students such as cleanliness of the classroom, fixed windows and well ventilated classrooms. Using this data, schools identified the needs for renovation. Parents and other stakeholders contributed their time, effort and resources to provide students an ideal place for learning. Principal of LDU2 explained “*The rooms before are not conducive for learning because papers are scattered and some windows are broken. As a principal, it is my responsibility to include our stakeholders such as parents to help us fixing our classroom by painting, windows will be replaced, and even we ask for donations from barangay officials. We solicited paint from them”.*

Moreover, observation data was used by the schools *to evaluate materials that are needed by the students in learning*. One of the principals mentioned that there are some materials and tools needed to support students in their learning especially those students who

specialized in areas of cookery and electrical installation. Observation data for principal of LDU2 was used not only for evaluating teachers but also to evaluate the materials of the students and teachers needed in learning. The principal added “*We don’t have enough measuring cups, knives, and chopping boards and some other materials and tools related to electrical installation.*”

Lastly, similar to the high data use schools, low data use schools also *using School Improvement Plan* to monitor the projects and activities that has been done within this school year. For example, the school is aiming for high test result for the National Achievement Test for the next school year. Based on the result from the previous year, teachers identify those competencies with low scores and discuss the plan what to do next to help students to have a better performance. The SIP is updated every three to five years by removing those activities that has been done. One of the teachers mentioned “*We use SIP as a basis of what project or activities are we going to perform to achieve higher results in the National Achievement Test for the next school year*”.

4.6 Comparing data use for each purpose between high and low data use schools

To sum up (See table 9), in terms of data use for instructional purposes, high data use schools use data such as summative test, weekly test and attendance data to identify slow learners. Teachers also conducting Mean Percentage and Score and item analysis to identify the competencies that are lacking. High and low data use schools also provide interventions in the form of remedial classes or reteaching the lesson, and lastly different type of strategies in teaching are also implemented according to the needs of the students.

In terms of data use for accountability purposes, high and low data use schools use data to show the Division and Region Office how the school is doing. Low data use schools and high data use schools also use data to communicate to the parents regarding with the

performance of their children. Low data use schools also indicated that schools are accountable for passing the safety requirements provided by the Fire Department. Whereas, high data use schools pointed out, that schools are also accountable for physical improvement wherein financial data was used for this purposes. It seems that in low data use schools, the focus is more on data use for accountability than in high data use schools.

In terms of school development purposes, high and low data use schools use different types of data for school development. In high data use schools, schools used data to conduct summer classes, involving teachers for professional development in the form of seminars, trainings and workshops, and lastly using performance indicators such as graduation rate for the SIP. Three of the schools implemented different programs to assist students such as giving summer classes, involving teachers for professional development, and open high school program. Low data use schools were more concerned with the future improvement of the school, especially in the delivery of instruction by providing students the necessary materials and tools.

Table 9. Similarities and differences of high and low data use schools in three data use purposes.

Purposes	High data use schools	Low data use schools
Instructional	Teachers provide intervention to students. Identifying competencies of students. Teachers are adapting strategies to the needs of the students	Teachers provide interventions to students Showing students, the class record Teachers are adapting strategies to the needs of the students. Preparing activities and materials to be used in the class
Accountability	They show parents and students how the school is doing. They show principals and visitors from division and region office how the school is doing. Teachers monitor attendances of the students.	Informing the parents how their children are doing. They show to the Division and Region office how the school is doing. Accountable for transmitting the data to National office. By passing the safety requirement by the Fire Department.

School Development	Conducting summer classes	Evaluating performance of the teachers
	Organizing professional development activities for teachers	Implementing the open high school programs
	Using the School Improvement to plan, to identify the projects, and some other needs related to student achievement	Using the School Improvement to plan, to monitor the projects, and activities that has been done within this school year To evaluate materials needed by the students in learning Providing students a conducive learning environment

4.7 Factors promoting or hindering data use in schools.

Based on the conceptual factor and factor analysis, the factors promoting or hindering data were grouped into four variables: data characteristics, school organizational characteristics, data user characteristics, and collaboration. Table below presents the descriptive for influencing factors.

Table 10. Descriptives for influencing factors

Factors influencing data use	M	SD
Data characteristics	3.26	.39
School organizational characteristics	3.32	.33
Data user characteristics	3.39	.36
Collaboration	3.29	.41

Four-point scale, rating from 1= “totally disagree to 4= “totally agree”

Based on the descriptives, all the four components received a mean score above 3:00 which means teachers and principals in both groups of schools relatively agree. Data user characteristics shows the highest mean score 3.39 among the four components.

4.7 The different factors influencing data use

For the analysis for the data use for *instructional purposes* as a dependent variable, results of multiple regression analysis (see Table 6) explained that the overall model was significant ($R^2=0.18$, $F= 7.746$, $P\leq.001$). The variables together explained 18% of the variance in data use for instruction. The result showed that only data characteristics had a significant

influence ($b = .63$, $SE = .20$, $p \leq .002$). This explained that a one score of one unit higher on data characteristics relates to an increase of the score on data use for instructional purposes with $.63$.

For the analysis for the data use for *accountability purposes* as a dependent variable, the multiple regression analysis explained that the accountability model was significant ($R^2 = 0.58$, $F = 49,358$, $p \leq .001$). The variables together 58% of the variance in data use for accountability purposes. The result showed that only school organizational characteristics significantly influenced data use for accountability purposes ($b = .73$, $SE = .12$, $p \leq .001$). This explained that a one score unit higher on school organizational characteristics relates to an increase of the score for data use for accountability purposes with $.73$.

Lastly, for the analysis with data use for school development as a dependent variable, multiple regression analysis result shows that the overall model was significant ($R^2 = .49$, $F = 34.006$, $p \leq .001$). The variables together explained 49% of the variance in data use for school development. However, result showed that only school organizational characteristics significantly influenced data use for school development ($b = .63$, $SE = .11$, $p \leq .001$). This explained that a one score unit higher on school organizational characteristics relates to an increase of the score for data use school development purposes with $.63$. Table 6 below shows the summary of the regression coefficient and standard error of the variables that influence data use for instruction, accountability, and school development purposes.

Table 11. Regression coefficient and standard error of the regression analysis

Variable	Instruction	Accountability	Development
	B (SE)	B (SE)	B (SE)
Data characteristics	.63 (.20) **	.16 (.09)	.04 (.09)
Data user characteristics	.02 (.20)	.17 (.09)	.14 (.09)
Data school organizational Collaboration	.01 (.25)	.73 (.12) **	.63 (.11) **
R (Regression)	.42	.76	.70
R Square	.18	.58	.49
Adjusted R-Square	.15	.57	.47
df	148	148	148
F	7.746	49.358	34.006

** $p \leq 0.01$ the p- value is smaller than 0.01

4.8 Interview results for factors influencing or hindering data use in schools

4.8.1 Data characteristics

Most of the respondents in both high and low data use schools mentioned that data in schools were easy to access. In terms of *accessibility of data*, all schools provide a soft (computer file) and hard copy of data. There are data in schools to be accessed online such as demographic data of students and calendar of activities. The calendar of activities is usually provided by the National office. Teachers or principals can access this kind of data anytime and usually teachers and principals print this data to be posted its either in the classroom, faculty room or in the principal's office. One of the teachers of HDU2 explained "*With the help of the online system teachers and principals can access the demographic data of the students anytime*". Another teacher of LDU2 mentioned "*we usually make three copies of the data one for myself, one copy for the school file, and one copy for the principal so in case I lost my copy I can still access the data by asking permission to the in-charge or to the principal*".

On the contrary, the principal of LDU1 explained that there are some data in schools that are not supposed to be accessible to all teachers: The data such as the final grade and the class record of the individual teachers. The reason for this is for confidentiality of the result

and it is only accessible if it is needed. The principal of LDU1 mentioned “*the data such as the grades of the students has a limited access in the school. Only the teacher or subject teacher can access on the class record but sometimes other teachers or principal can access to the data but there should be a reason for that*”.

Another type of data characteristics is the *usability of data*, which pertains to the following examples: teachers can access and use the result of the assessment or the weekly test of the student to plan the lesson for the following day. Data can also be used by teachers to adjust the lesson based on the results. By using data, teacher can also monitor how the students are performing. Most of the teachers in high and low data use explained that data is important to identify the performance of the students. One of the teachers in high data use schools explained “*I use data to compare if my student improved this grading exam from the previous exam*”.

Lastly, in terms of *quality of data* teachers and principals in both groups of schools shared similar answers that the data they collected and received are accurate, up to date and on time.

Even though teachers and principals mentioned some factors that promote data use in schools in terms of data characteristics, there are also factors that hinders teachers and principals using data in school. Three of the four schools mentioned and explained that sometimes using the online system is a bit of problem. One of the teachers in LDU2 explained “*We have a very slow internet connection*”.

4.8.2 School organizational characteristics

There are several factors that might promote or hinder data use within the school organization. First is the role and influence of the school leaders towards data use in schools. With regards to *school leadership* both high and low data use schools mentioned that their

school leader encouraged them to use data by checking the result of the students and reflect as a teacher what you can do to help these students. The school leader also helps and assists teachers in analyzing and interpreting data for instance, one of the teacher had some difficulties in analyzing the results of the quarterly exam, the principal spent time together with the teacher to discuss and explain how it should be analysed and interpreted. One of the teachers in high data use schools said “*Our school leader is approachable and willing to help in times we need to discuss about the performance of our student*”. School leaders also supervise teachers by conducting classroom observations. After conducting the classroom observation, the principal spend extra time to discuss the results of the observation. The principal of LDU1 added “*I observed classes to monitor my teachers and students. I usually list down the strengths of my teachers and students as well as the things that need to improve such as student’s participation*”. In both high and low data use schools, the role of the principals in school leadership is important.

Furthermore, high and low data use schools revealed that the schools have a clear vision and goals to achieve such as improving student performance, increase student’s participation, and aim for high results on the National Achievement Test. The principal in the high data use schools added that improving student learning is one of the goals of the school. In order to improve student learning teachers should use data as their guide. One of the teachers in high data use school commented “*We are using data to check if we achieve our goals and as a teacher it is my role to help the administration to attain our vision to make our students useful someday*”. In this case, it seems that high data use schools have a clear vision and goals compared to low data use schools, which is connect to student learning.

Lastly, with regard to *support*, there was a dedicated time for teachers to support data use. Teachers per subject department use to gather and discuss the results of the assessments and examinations. Teachers from high and low data use school reported that they have enough

time to discuss data such as the result of the examinations with their teachers. One of the teachers in HDU1 also added “*sometimes we extend extra time to discuss with my colleagues regarding student results and performance and to discuss the possible ways we can help our students*”. Moreover, most of the teachers and principals show willingness to engage themselves in training or in any form of enrichment programs that might increase understanding.

4.8.3 Data user characteristics

With respect to the *belief of using data*, teachers and principals in both high and low data use schools shared that data is very important in identifying student’s needs. They believed that using data properly will help them to make decisions to improve student learning. They believed that using data provides a concrete evidence how the school is doing. One of the principals in low data use schools explained “*I use data to guide me to make decisions or actions for the betterment of students, teaching staff and the whole school*”.

Another factor mentioned by the respondents in both high and low data use schools is the *knowledge (data literacy) regarding* collecting, analyzing and interpreting data. High and low data use schools have several ways in analyzing and interpreting data. For example, teacher one of the LDUI interpreted the result of the students based on the percentage who passed the test. “*I interpret data on my own way for example if 80 % of my students got a passing grade on my subject it means that my students understand the topic and I teach the lesson well*”. In high data use schools, the result of the test is being analysed by performing the item analysis. This technique was used to identify which competencies need to teach again so that students will have better understanding on the certain topic. Teacher 2 of HDU2 added “*I use item analysis after I checked the weekly test, by using this technique I can identify those topics that need more explanation or will reteach the topic again. In this way, students will be*

given a chance to understand the topic better and it is also possible that they have a higher score on the quarterly exam if in case this topic is included.

4.8.4 Collaboration

Another factor that promotes data use is collaboration among teachers. In school’s teachers collaborated by discussing the possible ways to improve student performance by achieving high results on the test. In terms of teacher’s collaboration, most of the respondents answered that they are supported by their colleagues in analyzing and interpreting data. One of the teachers in HDU1 explained “Most of the mathematics teachers in our school can analyse and interpret data, so if someone needs help we are there to help them”. Furthermore, another teacher from low data use schools also added that they also conducting separate session per grade level in analyzing and interpreting data. The principal of LDU2 added “During our Session Learning Action Cell (SLAC) session teachers with problems in specific grade level they usually do the meeting to discuss and brainstorm the possible solutions”.

Table 12. Factors promoting or hindering data use in high and low data use schools

Factors promoting/hindering	High data use schools	Low data use schools
Data Characteristics	Accessibility of data Quality of data Usability of data	Accessibility of data Quality of data Usability of data
School organizational	Slow internet connection School leadership Clear vision and goals connected to student learning	Slow internet connection School leadership Clear vision and goals connected to student learning
Data user characteristics	Support from colleagues Belief in using data Knowledge regarding analyzing and collecting data	Support from colleagues Belief in using data Knowledge regarding analyzing and collecting data
Collaboration	Collaboration among teachers	Collaboration among teachers

Table 12 shows that high and low data use schools shared more similarities in terms of factors promoting data use. To conclude, school organizational characteristics in both high

and low data use schools were composed of the following. First, school leader plays an important role by encouraging teachers to use data. Secondly, teachers and principals share a common vision and goals (which is connected to student learning in the case of high data use schools), and lastly, teachers are supported by the principal and colleagues in terms of using data.

Teachers and principals in high and low data use schools believe that using data properly will help them to make decisions to improve student learning. Teachers and principals have enough knowledge to analyse and interpret data.

CHAPTER FIVE

5.0 Discussion

The study results are discussed, explained, and associated with other literature findings. Conclusions and recommendations are presented based in the Philippines context.

5.1 Discussion of the results

Regarding with the first research question, “what are the available data in public secondary schools in the Philippines?”. The results of the study showed that schools in the Philippines have a wide range of data available. Different types of data collected by teachers and school heads can be categorised into input, output, process, and context data according to the proposition of Ikemoto and Marsh (2007). The data available in the Philippines came from students’ test results, attendances, school inspections, and observations were used by teachers to make decisions to improve student learning. Data such as lesson plans, school curriculum, and school annual policy are data relating to school management and teachers’ instruction. Schools use the School Improvement Plan to stimulate school performance and achievements. Different kinds of data in schools can also be used in different purposes.

Regarding with the second research question, “for which purposes are these data being used?”. Findings of the study showed that high and low data use schools use data for different purposes: instructional, accountability, and school development. The survey results showed high data use schools scored higher means than low data use schools in all three scales regarding on the purposes of data use. However, qualitative analysis of the interview responses indicated mixed results. Both high and low data use schools have similarities on certain aspect of data use and they also differ in some aspects. With regard to the purposes of using data for instructional purposes, respondents from high and low data use schools talked about the use of data for providing intervention to students, identifying competencies of the

students, teachers are adapting strategies to the needs of the students, preparing activities and materials to be used in the class, and showing students the class record. Both groups of schools also described concrete examples how assessment and examination results were used to target the high and low performing students. Teachers also used these data to examine and identify the reasons why students responded on certain ways of assessment (Mandinach, 2012). Intervention such as remedial classes were also conducted to help students improve their performance. Furthermore, low data use schools used more data than high data use schools because they may be having more problems and by using data it will help them to brainstorm possible solutions to the problems.

Data use for accountability is also common to the secondary schools in the Philippines. Results showed that there is a difference between high and low data use schools in data use for accountability. Low data use schools use more data than high data use schools. The findings agreed with several previous studies (Schildkamp et al., 2014; Ehren & Swaborn, 2012) the focus of data use is more on accountability rather than on school improvement and instructional purposes. This difference can be expected due to the context of these studies and the current study have also different features and demands for data use between high and low data use schools. Schools were accountable to report the quality of their education to relevant stakeholders such as parents and school inspectors (Wohlstetter et al, 2008; Schildkamp & Ehren, 2013; Schildkamp & Kuiper, 2010; Schildkamp, Lai, & Earl, 2013). For example, the interview results showed schools were required to transmit data to certain offices.

Furthermore, schools are accountable to the parents by informing them how their children are performing. Therefore, the report card and student attendances were used as a basis for the conversation. Another unique finding regarding accountability to the parents, the schools established a committee which consisted of parents as representatives. The opinions

and ideas of the parents are valued for instance, in the planning of the school project for this school year. This result is supported by Earl & Louis (2013) that the contribution of the parents in the views of accountability.

Regarding data use for school development, findings from the interview analysis showed that schools used data such as report card to conduct summer classes to low performing students and to conduct open high school programs to students who dropped out due to some problems. The results were supported by (Herman & Gribbons, 2001) that schools are expected to use data to understand their students' academic standing and to establish improvement plans accordingly. Data such as School Improvement Plan (SIP) is used as guide to plan, organised, and monitor projects in the schools. Principals used data for school management and for instructional purposes whereas, teachers used data more for adjusting instructions. Principals also used data such as teacher profile for choosing teachers to participate in professional development activities. In other words, not all the teachers have the chance to engage in professional development activities. Studies (e.g., Timperly, Wilson, Barran, & Fung, 2007) emphasized the importance of professional development in improving student learning.

Regarding with the third research question, "what are the factors promoting or hindering data use in schools?". With regard to what extent data characteristics influence data use. Survey result showed that data characteristics is significantly influence data use for instruction. Similarly, interview results also projected the same reasons. Previous studies revealed that limited access to data is often a barrier to school data use (Thorn, 2002; Wayman et al., 2004). On the contrary, most of the respondents in both groups of schools mentioned that they have access to relevant data. Therefore, the availability of different types of data is generally seen as enabling factor to data use. The data received by teachers were also accurate, up to date, and on time because of these characteristics of data, teachers can use

specific data to make right decisions for a specific purpose. Overall findings were supported with previous studies proposed that easy access to accurate and updated data (Kerr et al., 2006) reliable, valid, and relevant data (Keer et al., 2006; Mingchu, 2008) might improve data use.

With regards to school organizational characteristics influence data use. Survey results showed that school organizational characteristics is significantly influence data use for accountability and school development purposes. A supporting school leader plays an important role. Schools that use data effectively showed to have supportive school leaders who emphasized and encouraged the importance of data use. In this study, high data use schools have a clear vision and goals compared to low data use schools, which connects to student learning. In terms of support, teachers were given sufficient time to use data to discuss with their fellow teachers the results of the assessments and examinations. According to Wohlsetter et al (2008), stated that planning time to use data also enhanced data use in schools. Moreover, findings revealed that most of the teachers and principals in high and low data use schools never had trainings about data use.

With regards to data user characteristics, the survey results revealed that the mean score of data user characteristics have the highest score among the other factors. It is because teachers and school leaders believe in data. They believed by using data it provides evidences how the school is performing. The results are supported by several studies (Mingchu, 2008; Wohlsetter et al., 2008, Schildkamp, 2007, Keer et al., 2006) buy- in belief on data is important to enhance data use practice. Study finding results also showed that teachers from high and low data use schools analyse and interpret data based on their intuitions. Therefore, the motivation of the teachers to acquire knowledge and skills regarding data use reflect that teachers' lack of data literacy skills.

With regards to collaboration, results showed that teacher collaboration may also influence data use. Collaboration among teachers is another way to increase data use in schools wherein teachers are working as a team in reviewing and planning about data (Young, 2006; Wohlsetter et al., 2008). It can also be concluded that strong leadership influence the working relationships among teachers toward data use.

5.2 Limitations of the study, implications for future research and recommendations

The research was conducted using quantitative and qualitative method. However, there are still limitations we need to address. The research was only conducted in one area or division and included 149 respondents. This sample size is too small to represent the total number of teachers and principals in the country. The Philippines is consisted of 18 administrative regions therefore, it is suggested for future research to collect data from every region so that the results will be comparable. Another limitation of the study was focused on public secondary schools, therefore it is suggested that private secondary schools should be included to gain deeper understanding regarding data use within these two types of schools.

The survey and interviews are based only on the self-perception of the respondents and it may be also influenced by social desirability, wherein the respondents gave answers according to the expectations of the researcher. Therefore, the researcher for future research should use another method such as direct observation to see the real situation how the teachers and principals use data. The analysis of the present study was only focus on high and low data use schools. It should be better if the analysis will include the different perspectives of the teachers, school leaders, and stakeholders to anticipate the unexplained school context that causes the different practices of data use.

From the study findings, two recommendations are as follows: first, teachers should be assisted to strengthen professional development by introducing some instructional materials

such as manuals and rubrics that is designed to promote effective data use in the schools. As an example, is using an intervention like data team procedure (Schildkamp & Handelzalts; Schildkamp, Poortman, & Handelzalts, 2016). Data teams are composed of principals and teachers working together to solve certain problems within the school using an iterative cyclic procedure (Earl & Katz, 2006) consisting of eight steps (Schildkamp & Ehren, 2013; Schildkamp & Handelzalts, 2011; Schildkamp, Handelzalts, & Poortman, 2012). In such a process, teachers, and principals would learn to use data systematically to enhance functioning of the school and it helps more collaboration among school staffs.

Lastly, the government should invest additional information systems to help and guide teachers and school leaders in using data. For instance, the achievement test of the students can be easily stored, manipulated, and retrieved by using the students monitoring system. Student monitoring system allows schools to monitor students' progress throughout their entire school careers (Kamphuis & Moelands, 2000).

5.3 Conclusion

The aim of the study is to investigate the present situation concerning data use in public secondary schools in the Philippines. Survey and interviews were used to identify the kinds of data, purposes, and factors promoting or hindering data use. School leaders and teachers are collecting different kinds of data. Different types of data can be used for different purposes such as instructional, accountability, and school development purposes. The different purposes for data use are also influenced by several factors that might promote or hinder data use. Results confirmed that data characteristics, school organizational characteristics, data user characteristics, and collaboration were factors promoting data use in public secondary schools in the Philippine.

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APPENDICES**Appendix 1. Survey Questionnaire**

The survey questionnaire consisted of nine pages and is divided into three parts.

A. The demographic information of the participants

B. The second section is a list of data options available in schools.

C. The third part are the statements with regards to data use for school development, data use for instructional purposes, data use for accountability, perception of school organizational characteristics, perception of user characteristics and perception of data characteristics.

A. Please answer the following questions:

1. What is your age: _____

2. What is your gender:

- Male
- Female

3. What is the highest level of education you have completed?

- College graduate
- Master's degree
- Doctorate degree

4. Name of School: _____

5. What is your function?

- Principal
- Teacher

6. Number of years you spent in this school. _____

B. The list of choices of available data on school.

Give a check mark (✓) in the box that corresponds to your answer.

- Student demographic data
- Parent demographic data
- Teacher data (qualification, Experience, Salary, Age)
- Student transfer (number of intake and student leavers)
- School curriculum
- Lesson plans
- Student attendances
- Student logbook (student daily activities, student attitude)
- School annual policy (vision and mission of the school, school program)
- Student report card (final grade for each subject)
- Examination result
- Student daily progress
- School evaluation report
- Teacher evaluation report
- School profile (address, contact, accreditation and achievement)
- School financial report
- School facilities
- Others: Specify_____

C. Below are the statements with regards to data use for school development, data use for instructional purposes, data use for accountability, perception of school organizational characteristics, perception of user characteristics and perception of data characteristics.

For each of the questions below, encircle the response that best characterizes about the statement, where: 1= strongly disagree, 2= disagree, 3= agree, and 4= strongly agree.

Accessibility of data		Strongly disagree	Disagree	Agree	Strongly agree
1	I have access to student data in either hard or soft copy files (computer file).	1	2	3	4
2	I can find all the data of my students in one file.	1	2	3	4
3	I have access to relevant data on my students from various offices in my school.	1	2	3	4
4	Data on my current students are available from various offices in my school at the beginning of each school year.	1	2	3	4
5	When students start in the middle of the school year, their data becomes quickly available from various offices in my school.	1	2	3	4
Usability of data		Strongly disagree	Disagree	Agree	Strongly agree
6	The student data I have access to, helps me plan my lessons.	1	2	3	4
7	With the data, I have on my students, I can determine the academic growth of my students from year to year.	1	2	3	4
8	I have data on the progress of my student.	1	2	3	4
9	The student data I have access to, helps me adjust my teaching.	1	2	3	4
Quality of data		Strongly disagree	Disagree	Agree	Strongly agree

10	The data I have on my students are up to date.	1	2	3	4
11	The student data I have are accurate because they are similar despite the different sources (schools).	1	2	3	4
Data Literacy		Strongly disagree	Disagree	Agree	Strongly agree
12	I can adjust my teaching based on data.	1	2	3	4
13	I am able to use data to diagnose student learning needs.	1	2	3	4
14	I understand the quality criteria and concepts for data use (e.g. correlation, validity, reliability).	1	2	3	4
15	I know how to interpret data and reports I received (exam results, student achievement results of previous years) according to the quality criteria (correlated, validity, reliability, etc.).	1	2	3	4
16	I can comfortably interpret data that are presented in graphs.	1	2	3	4
Attitude		Strongly disagree	Disagree	Agree	Strongly agree
17	It is important to use data in determining individual student needs.	1	2	3	4
18	Data is important in changing my teaching.	1	2	3	4
19.	Students benefit when teaching is based on data (e.g. teaching techniques, contents, etc.)	1	2	3	4
Leadership		Strongly disagree	Disagree	Agree	Strongly agree
20	Our school leader encourages data use as a tool to support effective teaching.	1	2	3	4

21	Our school leader is a good example of an effective data user.	1	2	3	4
22	Our school leader creates many opportunities (e.g. time) for the teachers and other staffs to use data (e.g., analyzing data for planning improvement actions).	1	2	3	4
23.	Our school leader and head of departments discuss the results of their data analysis in the school.	1	2	3	4
24	Our school is aware that we need to keep developing the skills of teachers to analyse data.	1	2	3	4
25	Our head of department discusses data with me.	1	2	3	4
Collaboration		Strongly disagree	Disagree	Agree	Strongly agree
26	I share and discuss the results of my students with students.	1	2	3	4
27	I share and discuss my students' result with parents.	1	2	3	4
28	I share and discuss the results of my students with other teachers.	1	2	3	4
Shared Vision		Strongly disagree	Disagree	Agree	Strongly agree
29	Teachers in my school share a common understanding about what good teaching is.	1	2	3	4
30	Teachers in my school share a common understanding of what student learning is.	1	2	3	4
31	Teachers in my school share a common understanding about effective ways to evaluate student learning.	1	2	3	4
Norms		Strongly disagree	Disagree	Agree	Strongly agree

32	Data use is a priority in my school (i.e. almost every decision depends on data).	1	2	3	4
33.	In my school, we use a structured method to analyse and to interpret data before any action.	1	2	3	4
Support		Strongly disagree	Disagree	Agree	Strongly agree
34	I am adequately supported by school in the effective use of data.	1	2	3	4
35	There is someone within the school whom I can contact for help about using data.	1	2	3	4
36	There is someone within the school who helps me change my practice (e.g., teaching) based on data.	1	2	3	4
37	There is specific time to set aside by the school for me to use data.	1	2	3	4
Data use for accountability		Strongly disagree	Disagree	Agree	Strongly agree
38	We provide data for our school improvement	1	2	3	4
39	The data we use for accountability purposes (e.g., to give reports to parents and school inspectors) represents the reality at school	1	2	3	4
40	We provide data for our school improvement to our inspectors.	1	2	3	4
Data use for school development		Totally disagree	Disagree	Agree	Strongly agree
41	In our school, we use external evaluations (e.g., from the school inspection) for our own improvement.	1	2	3	4
42	Results of students are used to evaluate teachers' performance.	1	2	3	4

43	School leaders use data to show teachers the extent to which the school is achieving its goals.	1	2	3	4
44	We used detailed data analysis as an essential part of improvement processes in my school.	1	2	3	4
45	The division of teaching time in my school is based on identified learning needs of students.	1	2	3	4
46	In my school, we use student examination results to plan yearly goals and targets for school improvement.	1	2	3	4
47	In my school student examination results lead to decisions with regard to professional development of teachers.	1	2	3	4
48	Student examination results are used to identify gaps in the curriculum.	1	2	3	4
49	In my school, we use data as a tool to determine effective teaching methods.	1	2	3	4

	Data use for instruction	Almost never	Once a year	Twice a year	Once a month	Once a week	Twice a week
50	Set learning goals for individual students.	1	2	3	4	5	6
51	Determine which topics and skills students do and do not possess.	1	2	3	4	5	6
52	Determine progress of students.	1	2	3	4	5	6
53	Make or adapt my teaching to individual students' needs.	1	2	3	4	5	6
54.	Set the speed of my lessons.	1	2	3	4	5	6

55	Give student feedback on their learning process.	1	2	3	4	5	6
56	Form small groups of students for targeted teaching and learning.	1	2	3	4	5	6
57.	Identify teaching and learning content to use in class.	1	2	3	4	5	6
58	Study why students make certain mistakes.	1	2	3	4	5	6

Appendix 2. Interview

Interview guideline for principals

I'm working on master thesis concerning the use of data, such as assessment results and self- evaluation results for school improvement. I would like to ask you a couple of 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 data, 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 45- 60 minutes. 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. Could you tell me something about recent curriculum or school improvement initiatives in your school?

Let the respondents 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.

- a. What is your role in this initiatives?
- b. Does the school use data in these initiatives? If yes, which data? _____
- c. By whom are these data being used?
- d. How are these data being used?
- e. For which purposes are these data being used?

2. Which data do you use in your job and how do you use these data?

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.

- a. How are these data being used?
- b. How often do you use this type of data?
- c. 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 data sources? *Some of the data sources may have been addressed in question. You can skip these data sources. For the other data sources, ask if the respondents use these data. If the respondent uses 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 report
- Student progress report (offering an educational track of the student)
- Information in the annual school programme of events
- Information on the annual policy plan of the school
- School self- evaluation results, including teacher and management questionnaires
- Data on intake, student transfer/ turn over and school leavers
- Final examination results
- Assessment results

- Student demographic data
 - Student questionnaire data and focus groups
 - Parent questionnaire data and focus groups
 - Fees payment data
 - Schemes of work, records of work and lesson plans
 - Student and teacher daily attendances
- 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 which 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, and 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.*
 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 analyse data, or 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 you 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 all the data that I would like to use.
 - We receive a lot of 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 this 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.
 - I have the skills and knowledge needed to use data.

This was my last question. Thank you very much for your time. Again, I want to stress that these results will be treated anonymously.

Appendix 3. Interview

Interview guideline for classroom teachers

I'm working on master thesis concerning the use of data, such as assessment results and self- evaluation results for school improvement. I would like to ask you a couple of 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 data, 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 45- 60 minutes. 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. Could you tell me something about recent curriculum or school improvement initiatives in your school?

Let the respondents 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.

- a. What is your role in this initiatives?
- b. Does the school use data in these initiatives? If yes, which data? _____
- c. By whom are these data being used?
- d. How are these data being used?
- e. For which purposes are these data being used?

2. Which data do you use in your job and how do you use these data?

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.

- a. How are these data being used?
- b. How often do you use this type of data?
- c. 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 data sources? *Some of the data sources may have been addressed in question. You can skip these data sources. For the other data sources, ask if the respondents use these data. If the respondent uses 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 report
- Student progress report (offering an educational track of the student)
- Information in the annual school programme of events
- Information on the annual policy plan of the school
- School self- evaluation results, including teacher and management questionnaires
- Data on intake, student transfer/ turn over and school leavers
- Final examination results
- Assessment results

- Student demographic data
- Student questionnaire data and focus groups
- Parent questionnaire data and focus groups
- Fees payment data
- Schemes of work, records of work and lesson plans
- Student and teacher daily attendances

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 which 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, and 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.*
 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 analyse data, or 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 you 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 all the data that I would like to use.
 - We receive a lot of 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 this 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.
 - I have the skills and knowledge needed to use data.

This was my last question. Thank you very much for your time. Again, I want to stress that these results will be treated anonymously.

Appendix 4. Result of factor analysis**Result of Factor Analysis****Component Matrix for school leadership**

	Component 1
Our school leader creates many opportunities for the teachers and other staffs to use data (e.g., analyzing data for planning improvement actions)	.74
Our school leader and head of departments discuss the results of their data analysis in the school	.72
Our head of department discusses data with me	.68
There is someone within the school whom I can contact for help about using data	.63
Our school leader is a good example of an effective data user	.63
There is someone within the school who helps me to change my practice (e.g., teaching) based on data	.61
Our school is aware that we need to keep developing the skills of teachers to analyse data	.55
There is a specific time to set aside by the school for me to use data	.50
I am adequately supported school in the effective use of data	.45
We provide data for our school improvement	.44
Data use is a priority in my school (e.g. almost every decision depends on data)	.42

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix of data use for school development

	Component 1
In my school student examination results lead to decisions with regard to professional development of teachers	.80
In my school, we use student examination results to plan yearly goals and targets for school improvement	.76
Students examination result are used to identify gaps in the curriculum	.75
In my school, we use data as a tool to determine effective teaching methods	.74
The division of teaching time in my school is based on identified learning needs of student	.59
We used detailed data analysis as an essential part of improvement processes in my school	.50
School leaders use data to show teachers the extent to which the school is achieving its goals	.49
In our school, we use external evaluations (e.g., from the school inspection) for our own improvement	.43

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix of data use for instructional purposes

	Component 1
Make or adapt my teaching to individual student's needs	.79
Set the speed of my lessons	.76
Identify teaching and learning content to use in class	.75
Study why students make certain mistakes	.74
Give student feedback on their learning process	.73
Form small groups of students for targeted teaching and learning	.71
Determine the topics and skills students do and do not possess	.68
Determine progress of students	.64
Set learning goals for individual students	.60

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix of data use for accountability

	Component 1
The data we use for accountability purposes (e.g., to give reports to parents and school inspectorate) represents the reality at school	.43

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for accessibility

	Component 1
I have access to relevant data on my students from various offices in my school	.73
Data on my current students are available from various offices in my school at the beginning of each school year	.72
I have access to student data in either hard or soft copy files (computer files)	.68
I can find all my data of my students in one file	.56
I have data on the progress of my student	.49
When students start in the middle of the school year, their data becomes quickly available from various offices in my school	.48

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for usability

	Component 1
With the data, I have on my students, I can determine the academic growth of my students from year to year	.72
The student's data I have access to, helps me plan my lessons	.70
The student I have access to, helps me adjust my teaching	.64
I am able to adjust my teaching based on data	.55
I am able to use data to diagnose student learning needs	.48

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for attitude

	Component 1
It is important to use data in determining individual student needs	.74
Students benefit when teaching is based on data (e.g., teaching techniques, content etc.)	.73
Data is important in changing my teaching	.72
Our school leader encourages data use as a tool to support effective teaching	.40

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for shared vision and norms

	Component' 1
Teachers in my school share a common understanding about what good teaching is	.81
Teachers in my school share a common understanding about what good learning is	.81
Teachers in my school share a common understanding about effective ways to evaluate student learning	.66

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for quality of data

	Component 1
The data on my students are up to date	.42

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for data literacy

	Component 1
I know how to interpret data and reports I receive exam results, student achievement result of previous year according to the quality criteria (correlated, validity, reliability)	.75
I can comfortably interpret data that are presented in the graphs	.74

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for collaboration

	Component 1
I share and discuss the results of my students with other teachers	.77
I share and discuss the results of my students with students	.74
I share and discuss my student's result with parents	.60

Extraction Method: Principal Component Analysis.

a.1 component extracted

Component Matrix for support

	Component 1
I understand the quality criteria and concepts for data use (e.g., correlation, validity, reliability)	.60
In my school, we use structured method to analyse and to interpret data before any action	.43

Extraction Method: Principal Component Analysis.

a.1 component extracted

