

**THE CHALLENGE OF EFFECTIVE DATA USE
WITHIN PRIMARY SCHOOLS SITUATED IN A POST-
COLONIAL LEARNING CONTEXT: A Qualitatively-
driven Mixed Methods Study**

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The study explored the data use practices of educators within the primary schools of Trinidad and Tobago using a qualitatively driven, mixed methods research design. The qualitative component was a multi-site case study with three schools purposively selected from the schools surveyed. The focus of the case studies was to develop grounded theory on data use practices in local primary schools and the influence of institutional context. We argue that the unique contextual features of postcolonial small island states in the Caribbean can influence data use. The results indicated that educators were engaged in various data use practices, but these were often modified to suit the local context. At the school site, educators faced several challenges such as the absence of collaboration and data leadership. This stagnated the effectiveness of data use and led to misuse. Even official guidance sometimes promoted misuse. We concluded that effective data use practices have a cultural and context-specific tint, and improvement requires targeted context-specific training to achieve sustainable and effective practice.

Introduction

The use of data has become instrumental in many educational systems. Several developed countries have therefore incorporated some aspect of data use into regular practice at the system, school, and classroom levels. Understandably, much of the research into the process and models of data use have emanated from these countries (see Datnow et al., 2007; Ikemoto & Marsh, 2007; Love, 2004; Mandinach et al., 2006; Moody & Dede, 2008; Schildkamp, 2012; Verhaeghe et al., 2010; Visscher, 2002). In these contexts, the practices observed in the education system have been a mixture of both desirable and undesirable data uses.

More recently, some transition and developing countries have introduced aspects of data use into their educational system. As such, research into data use practices have also been originating from these countries. Notably, Archer (2010) explored data usage in South African primary schools creating a model that focused on the process

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and use of data. Abdusyakur and Poortman (2019) investigated data use in the primary schools of Indonesia, Ahmed (2019) examined data use in the primary schools of Ethiopia and George (2021) explored data use practices of school leaders in the Virgin Islands. Educators in these contexts were engaged in creative uses of data, but misuse of data was also apparent.

Regionally within the Caribbean and locally in Trinidad and Tobago, the research into data use has been sparse and largely embedded within studies on school effectiveness (e.g., Haughton, 1991; King, 1991) and system approaches (e.g., De Lisle et al., 2011; De Lisle et al., 2014). A void therefore exists on the data use practices of educators within our local context especially given the cache of data available within schools. This study seeks to add to the literature on data use by exploring the data use practices of educators at the primary school level in Trinidad and Tobago. An investigation of this nature will provide insights about the extent to which data use is practiced, and the variables that influence data use in a unique context of being one of the postcolonial small island developing states (SIDS) (McCusker & Soares, 2011).

Theoretical Framework

This study on data use was guided by the models developed by Schildkamp and Kuiper (2010) and extended by Schildkamp (2012). These models identified four categories of factors purported to influence data use and two broad purposes for which educators used data.

Factors Influencing Data Use

Figure 1 illustrates the four possible categories of factors considered to influence data use: (1) characteristics of the data, (2) characteristics of the user, (3) characteristics of the organization and (4) societal and institutional context. Schildkamp (2012) proposed that characteristics related to the quality, usability, and accessibility of data available at schools influenced the extent to which data were utilised by educators. The literature further suggested that educators were more likely to use data that they perceived to be non-threatening, up-to-date and relevant to their needs (Schildkamp & Teddlie, 2008; Visscher, 2002). However, educators sometimes used data which they

did not perceive to be of high quality if stakes were high or it could be used in conjunction with other data (Copland, 2003; Marsh et al., 2006; Supovitz & Klein, 2003).

User characteristics, such as the knowledge, skills, and dispositions to examine and use data, have been found to influence data use practice (Mandinach et al., 2011). Data and statistical literacies are essential skills for using data effectively (Choppin, 2002; Earl & Katz, 2006; Young, 2006). Such knowledge and skills assist educators in evaluating the quality of the data available and engaging in appropriate analyses and interpretations (Herman & Gribbons, 2001; Long et al., 2008). Corcoran et al. (2001) identified buy-in for data use as contributing to individual practice. A lack of acceptance of the data use process was therefore a barrier to meaningful practice (Feldman & Tung, 2001; Ingram et al., 2004). It follows that educators who have the necessary knowledge, skills, and dispositions to examine and use data would be more confident about engaging in this practice, and this may increase their utilization of data.

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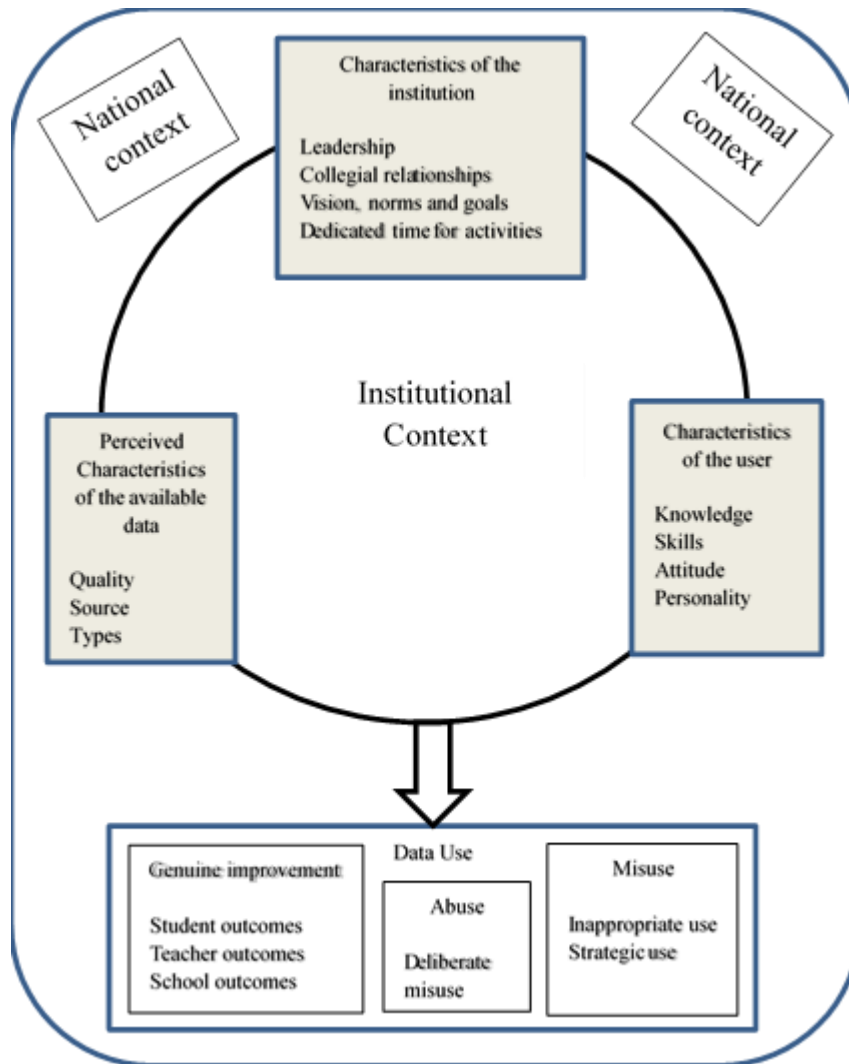


Figure 1. Theoretical Framework of Factors Influencing Data Use and Types of Data Use

Note. Developed from Schildkamp and Kuiper, 2010, and Schildkamp, 2012

The data use environment of any educational institution is shaped by the interaction of several contextual variables. Young (2006) identified leadership and a culture of collaboration as being influential in data use practice at the organizational level. Strong leadership has

been shown to circumvent some obstacles to data use. Leaders who are equipped with the necessary skills to model effective practice and who have sufficient autonomy to create supportive structures and provide critical resources have been observed to be successful in institutionalising this practice (Choppin, 2002; Feldman & Tung, 2001; Herman & Gribbons, 2001). A collaborative culture is also protective. It can promote data use if educators support the learning and practice of their colleagues and work together to establish shared norms and goals and a climate of trust (Latchat & Smith, 2004; Schildkamp & Kuiper, 2010; Wayman, 2005).

Purposes for Using Data

Teachers and principals use data for different purposes (Schildkamp and Kuiper, 2010). In the model (see Figure 1), these purposes are grouped into two main outcomes of data use: (1) genuine improvement and (2) unintended responses. Most often teachers use data to identify the strengths and weaknesses in student learning. This type of use provides them with the necessary information for developing or modifying individual education plans or grouping students for targeted instruction (Young, 2006). Some teachers use data to reflect on and improve their own practice by identifying professional development needs or adjusting instructional strategies (Breiter & Light, 2006). Teachers also use data to provide students with feedback on their learning and to support conversations about students. Using data in these ways can lead to genuine improvement as it directly targets student learning and teaching practices.

Principals may use data differently from teachers because they are focused upon school improvement rather than the improvement of individual students. Data are therefore often used by principals to decide on the resources and structures required to improve achievement at the school. Data are also used to set achievable goals, create school calendars, and modify school routines and practices (Coburn & Talbert, 2006). Principals may use data to evaluate teacher performance and plan professional development activities (Schildkamp et al., 2011). Sometimes, principals use data as evidence for continuing programs or to help focus teaching in weaker areas (Breiter & Light, 2006). These types of uses, which directly address deficits which exist in systems and pedagogy, can genuinely lead to teacher and school improvement.

Another outcome of data use proposed in the model is unintended responses. Schildkamp and Kuiper (2010) found that data may sometimes be used in undesirable ways or for unintended purposes. These types of responses may either be deliberate or accidental. For example, Gillborn and Youdell (2000) discovered that educators in accountability systems deliberately used data for educational triage by

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focusing on the students who can easily meet national standards and hiding students who cannot meet standards in special education classes. Educators may also mistakenly misuse data by responding to data which are easy to interpret and ignoring other data which require further analysis (Schildkamp and Kuiper, 2010). These types of responses do not generally lead to genuine improvement but may give the impression that schools and educators are responding to data for accountability purposes.

Evaluation studies have extended the possible outcomes of data use. In this study, the four outcomes theorised by De Lisle et al. (2013) for the use of evaluation data were also considered: (1) ideal use, (2) abuse, (3) non-use, and (4) misuse (see Figure 2). Cousins (2004) suggested that ideal use was when data were used mainly in legitimate ways to effect change in persons and organisations. Misuse of data may be either mischievous or due to misconceptions like when educators use data for symbolic purposes which do not lead to any change in behaviour or thinking (Patton, 2008). Abuse, however, is when persons deliberately misuse data for unintended purposes. Sometimes, data may not be used at all which constitutes non-use. Non-use may occur for a range of reasons including uncertainty about the quality of the data or the data not meeting expectations.

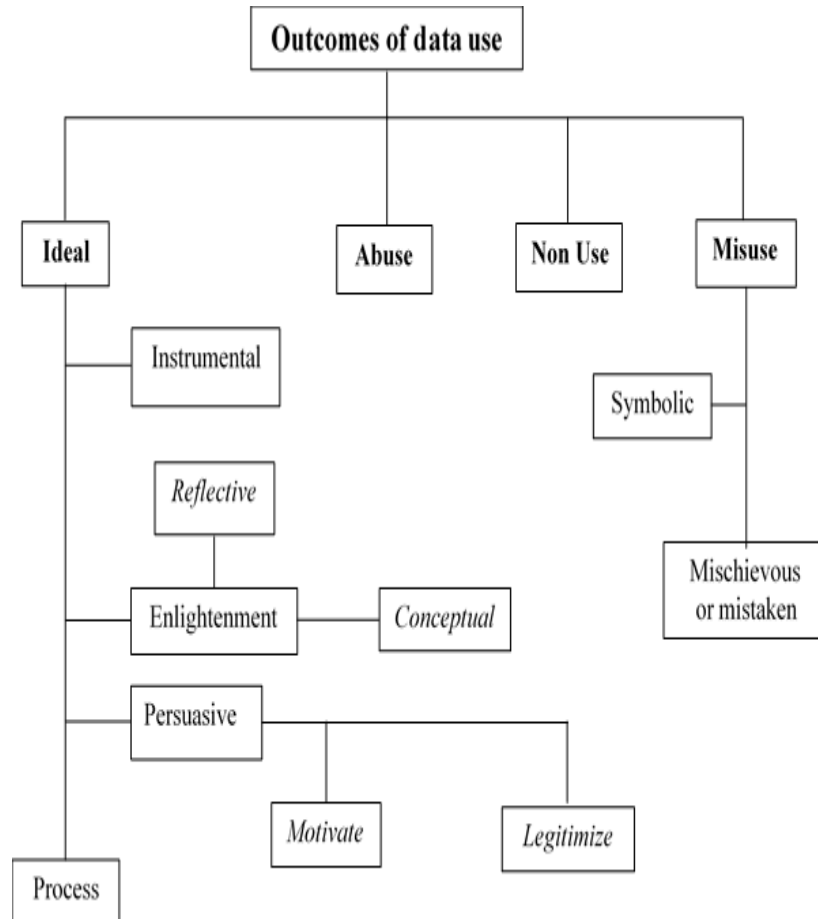


Figure 2. Theoretical framework of outcomes of data use

Note. Adapted from De Lisle et al., 2013

The Unique Nature of the Trinidad and Tobago Policy and Socio-Historical Context

The social and education system in Trinidad and Tobago is strongly influenced by its colonial heritage and status as one of the SIDS. Postcolonial administrative and small island theories are useful tools in explaining the possible influence on data use practices and education (De Lisle, 2012). Small state theory identifies five unique features of states with populations less than 1.5 million. The most salient for data use are: (1) resource constrained environment, (2) managed communal relationships, (3) limited collective capacity, (4) the challenge of managing diversity in multicultural contexts, and (5)

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uneven development and variation across institutions (Bacchus, 2008; Bacchus & Brock, 1987; Baldacchino, 2001; Bray, 1992, Bray & Packer, 1993; Crossley et al., 2009).

Resource constrained environments mean that there are limitations in personnel, materials, and training. Limitations in training is an important factor that impinge on the implementation of educational innovations such as data use. Managed communal relationships reflect on the closeness of ties and the need to manage political and social influences. One of the consequences of this is cautious use of data and the tendency not to foster evidence-informed conversations especially in cases of political sensitivity (Earl & Timperley, 2008). Limited collective capacity within institutions impinges on the expected data use-action link. Multicultural diversity can be a challenge in fostering evidence-informed conversations because the different desires and purposes of team members make it difficult to reach a common mind with shared understandings.

Postcolonial administrative theory is a series of ideas developed by Caribbean researchers in management science to explain the uniqueness of civil service structures in the Caribbean and the continued resistance to innovation and change in an era of public service reform. Jones (1975) and Jones and Mills (1976) distil the key essentials as tendencies to: (1) consolidate power rather than delegate or collaborate, (2) obscure and make vague policymaking, (3) apply multiple standards to administrative processes, (4) demonstrate authoritarian, conservative, and paternalistic leadership, (5) use myth to control subordinates, and (6) adopt a generalist ideology and devalue training. These leadership, management, and institutional factors strongly influence data use processes and outcomes. For example, conservative leadership that is not collaborative will limit the roles of data teams which have been shown to be effective agents of school improvement (Schildkamp et al., 2016).

Despite these contextual and administrative issues, policy in Trinidad and Tobago has promoted greater data use. The most significant shift was seen in the 1993–2003 education policy paper, which proposed greater autonomy through site-based management. Principals were expected to become responsible for the development of school policies and routines on teaching and learning (De Lisle et al., 2011). This shift required educators to collect and use data, so they could monitor and improve the performance of the school (Barrera-Osorio et al., 2009). The 1993–2003 policy paper also upgraded

teacher education to help educators successfully manoeuvre the changes in the system. The revitalised training program included courses that addressed deficits in assessment literacy and school improvement planning.

As part of the proposed reform, a nascent monitoring and evaluation system was implemented to provide educators with school data that could be used to improve teaching and learning. In 2000, the Continuous Assessment Program (CAP) expanded the data that educators had available to them by encouraging data collection and recording at the school level (Ministry of Education [MoE], 2004a). Instruments were also provided for educators to record data on student demographics, classroom/school processes and student achievement. By 2004, centrally administered national learning assessments were dispensed to monitor student progress towards national standards and benchmarks (MoE, 2004b). Data which identify student and school performance were provided to schools. Nevertheless, Marsh et al. (2006) suggest that data and training are not sufficient to ensure effective data use. The aim of this study is therefore to explore the data use practices of educators at the primary school level given the structures that exist in the system.

Method

Research Design

This study employed a qualitatively driven mixed methods research design to examine the data use practices of educators in the primary schools of Trinidad and Tobago (De Lisle, 2011). Both qualitative and quantitative data were collected through interviews, observations, document analysis and a social network survey within a case study format (Yin, 2003). A case study approach allowed for the focus to be on the process of data use rather than the outcomes (Merriam, 1998). Meanwhile, a multi-site case study facilitated an exploration of data use at various sites which operated with different resources and within different contexts (Yin & Davis, 2007). This design permitted a realistic and insightful view into the interaction between institutional context and data use (Yin, 2014).

A pragmatic stance was utilised to accommodate this design which explored both the shared truths of educators in schools as well as the individual realities which shaped these truths. This is in keeping with Deweyan branch of pragmatism which contends that knowledge is developed through the use of evidence from experiences derived from both social interaction and action (Greene, 2007). Multiple ways were therefore used to understand the complexity and multifaceted

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educational innovation of data use from the perspective of individual and institutional practice.

In this mixed methods design, two types of legitimisations were emphasized: (1) inside-outside and (2) multiple validities (Onwuegbuzie et al., 2011). Inside-outside implies that the researcher focused upon the participant view through interviews and observation. In multiple validities, the researcher focused upon the integration of data from qualitative and quantitative components to yield high quality integrated inferences. This process assisted with triangulating and adding substance to the findings. The main researcher also kept a journal for documenting initial impressions and reflective notes on behaviours and activities observed at the sites. This was coupled with memos which helped the researcher to reflect on the experience and own practice. The second author served as an auditor of the process and findings to reduce bias and subjectivity (Miles & Huberman, 1984).

Selection of Participating Schools

This study details the second phase of a larger explanatory sequential mixed methods study on data driven decision making in the primary schools of Trinidad and Tobago. The target population of the first phase of the study was educators in the public primary schools of Trinidad and Tobago. A stratified random sampling scheme was used to select 60 schools based on geographic location (eight education districts) and achievement (Academic Performance Index derived from national test results). An additional 40 schools were selected because they were involved in the pilot of the CAP. This sample was administered the Data Use Questionnaire which was based on the Schildkamp and Kuiper (2010) theoretical framework. This instrument was designed to capture data on the factors hypothesised to influence data use and the use of data for school improvement.

Data from the Data Use Questionnaire gave insight into the institutional context for data use by providing information on the availability of the seven variables hypothesised to influence data use. Based on the data from the questionnaire, leadership, cooperation, and support were found to operate at the organisational level, while perceptions about data, skills, attitude, and vision functioned at the individual level. These criteria were used to group responding schools into three categories:

- (1) schools with high availability of variables at both the individual and organisational level (HIHO)
- (2) schools with low availability of variables at both the individual and organisational level (LILO)
- (3) schools with high availability of variables at the individual level but low availability of variables at the organisational level (HILO).

The sample for the second phase of the study was purposively selected to represent the three data use groupings and a range of contexts. One school from each of the three categories was selected to participate in the case study. The three schools were also selected to represent different community and institutional contexts. The first institutional variable considered was the size of the student population: (1) small - less than 150 students, (2) medium - 150 to 350 students, and (3) large - more than 350 students. The second institutional variable used for selection was the annual yearly progress of the school which was determined based on the API of the school from 2008 to 2012. The final variable considered for selection was the type of community the school served. Table 1 presents the data use and contextual characteristics of the three schools selected to participate in this phase of the study.

Table 1. Characteristics of the Participating Schools

Contextual Characteristics		HIHO Site	HILO Site	LILO Site
Annual Progress	Yearly	Slow improvement	Steady improvement	Rapid improvement
Community type		Rural	Mixed rural	Mixed urban
Student population		36	408	320
Staff population		6	23	16

The Case Study Schools

The LILO Site

This is a medium-sized institution located in a traditionally disadvantaged community. This site has 14 teachers and two administrators serving 320 students. A few years ago, this school was classified as “under academic watch” because of the large number of students not meeting standards in Mathematics and Language Arts. However, the school has progressed out of this classification and, because of the change observed in the API from 2008 to 2014, is now considered to be rapidly improving academically.

There are two classes at each grade level except for grade five which has one large class due to staff shortage. The staffing issues at

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this site are due to aging teachers. There are two specialist teachers in the areas of physical education and library. Educators label this site as a ‘sports school’.

The HILO Site

This institution serves a population of 408 students in a mixed-rural community. Some of the students at this school have been diagnosed with special needs. There are two administrators, two heads of department and 19 teachers assigned to this school. This site was once classified as “under academic watch” because many students were not meeting standards in Mathematics and Language Arts. Educators at this school worked to improve the performance and now it is considered to be showing steady academic improvement, based on the change of the API from 2008 to 2014.

This site has three classes at each grade level. The school has two compounds separated by a road. There is one specialist teacher assigned to teach music. Educators label this site as a ‘community school’ because all the educators have either been teaching at the school for a long time or attended the school as children.

The HIHO Site

This is a very small, rural school with only 36 students, one administrator and five teachers. This institution has been categorised as “under academic watch” for several years. Educators have been unable to reduce the large number of students who are not meeting standards in Mathematics and Language Arts. The change in the API for this school from 2008 to 2014 indicated slow academic improvement, but this has not translated into a change in the categorization of the school.

Due to the small student population, there are fewer teachers than grade levels so two teachers are required to facilitate multiple grades. Despite this situation class size ranges from 3 to 15 fifteen students. This site is unable to attract teachers due to the remote geographical location and poor academic performance of students.

Instrumentation & Data Collection

Multiple sources of data were collected allowing for triangulation and in-depth description of the data use practices of educators. Following the pragmatic stance taken for this study, both individual data use

practice and institutional practice were explored. This necessitated engaging every educator, at each of the study sites, in semi-structured individual interviews to explore their data use experiences and comfort level when using data. The questions for the individual interviews explored the types of data used, appropriateness of data sources available, purposes for which data were used, and comfort level with using data.

Focus group interviews were utilized to obtain information on institutional data use practices and support for data use. These sessions were conducted with two groups at each site: (1) administrative team which included principal, vice principal and HoDs, and (2) teachers comprising one teacher from each level of the school (infants, juniors, seniors). Information obtained during the individual interviews were further explored during the focus group sessions. The protocol for these interviews were based on the factors proposed by Schildkamp and Kuiper (2010) to influence data use. They included questions about the types of data collected at the school, the quality of the data available, specific data use experiences, shared beliefs about data and data use, and organizational structures for data use.

Samples of the documents that educators reported using during the data use process were collected. These documents served both as evidence of the data use process followed by educators as well as for clarification of statements made during interviews. Data use practices and data meetings were also observed and recorded on an observation form. The observation form was adapted from similar checklists designed by Stockslager et al. (2013) and Schildkamp and Poortman (2015). Observations were made in the domains of data analysis, depth of discussion, problem identification, problem analysis, support, intervention, and evaluation.

A social network survey was administered at each of the three study sites. The data from these surveys provided insight into educator interactions at each site and the impact these interactions had on data use. The survey instrument was adapted from similar instruments explored by Moolenaar (2012). In the survey a roster technique was used for educators to identify the colleagues at their site with whom they interacted in the areas of collaboration, discussion, advice, and friendship. Prior to administering the social network survey, each individual educator participated in a semi-structured interview about their collaborative relationships within the school community. This interview consisted of five questions which assisted educators in recalling the colleagues they trusted and sought out for their expertise.

The researcher kept a journal where observations at each study site were recorded during data collection. Observations included descriptive and reflective notes on the school environment, activities at the site and interactions between educators. Notes were also made

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on body language of interviewees and interactions during focus group sessions. These notes served as a reminder of initial impressions, allowed the researcher to work through ideas and biases and provided context for the interview data.

Data Analysis

Data collection and data analysis occurred simultaneously. All interviews were audio taped and either transcribed verbatim or analysed to identify illustrative examples, using a reflexive, iterative process. This involved the main researcher transcribing interviews, reflecting on what was divulged and noting initial thoughts. The researcher then reviewed the observational notes made during data collection in the researcher journal and modified the notes on initial thoughts. As more interviews were transcribed and reflected upon, the researcher returned to notes of initial thoughts and adjusted as connections were made across interviewees. This allowed for insightfulness through continuous meaning making. The researcher journal and notes on initial thoughts were available to the second researcher when performing the audit.

Both line by line and block coding were used to develop analytic codes and categories (Charmaz, 2006). MAXQDA version 11 (VERBI Software, 2013) qualitative software was used to facilitate the within and cross case analysis (Yin, 2003). The focus group interviews were used to inductively construct general themes across the three sites and then the individual interviews were analysed to obtain themes which were similar or different across the sites. The constant comparative method was also used to compare themes across the different data sources.

The data meetings were audio taped and compared to the observation forms. Each activity was inductively coded and compared to the literature. For example, the data analysis observed at the sites were classified based on the four models identified by Ikemoto and Marsh (2007), while the data use process utilised at the sites were classified according to the six models proposed by Verhaeghe et al. (2010). All analysis was conducted by one researcher and audited by the second researcher.

The data use practices observed at the sites were classified into three degrees of utilisation adapted from the framework outlined in De Lisle (2015): (1) full utilisation, (2) partial utilisation, and (3) no

utilisation. Each outcome of data use was scrutinised at each site to determine the forms they took. A variety of purposes were then identified for each form of use. For example, ideal use may have four forms, each of which may have many purposes for which data were used (De Lisle et al., 2013). Full utilisation was assigned to any instance where educators at a site used data for all of the purposes which comprised a form of use. If data were not used for at least one purpose which constituted a form then partial utilisation was assigned, and no utilisation was assigned if a particular form of use was not observed at the site.

A database of the responses to the social network survey was created for each institution and imported into the UCINET 6.0 software (Borgatti et al., 2002) to conduct analyses specific to social networks. Analyses were conducted to determine school-level descriptive statistics which provided an indication of group cohesion, such as the number of ties, relative density of ties and the centrality of actors (Blau, 1977). Ties indicated the educators who interacted or were linked to each other while the density expressed the number of ties as a proportion of the total number of ties in the network (Borgatti et al., 2013). Density was measured on a scale of 0 to 1 with 1 representing a dense network where all educators were connected and 0 representing a network with no connections among educators. Network centralisation was calculated to determine the extent to which the density of the network depended on one or more educators (Prell, 2012). Centralisation was measured as a proportion with a score of 1 signifying that all ties were centered on one educator. Together these two statistics provided information on the extent to which educators within a site collaborated or related with each other. Correlations were also calculated across networks within each site to determine the extent to which networks comprised of the same educators.

Data from the social network survey was integrated with the qualitative findings during analysis. This allowed for expansion of the initial understandings gained from each data source (Teddlie & Tashakkori, 2009). Data from the two data sources were first analysed separately for content and then the two data sets were compared to find areas where they coincided or deviated (Onwuegbuzie & Teddlie, 2003). Integration of the findings occurred where the survey and qualitative findings coincided to provide an in-depth understanding of the organisational factors which influenced data use. Deviations between the data sources were also presented and explained, if possible. This allowed for the creation of meta-inferences and an elaborated understanding of the organisational supports and barriers through the processes of linking and enhancing (Bazeley, 2010; Smith, 1997).

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Findings

The findings from this qualitatively driven mixed methods research are presented by research question in this section. The thematic analysis identified the approaches to data use which were prevalent at the sites investigated, as well as the practices which promoted or hindered data use. The results from the social network survey are interwoven to provide an expanded view of the qualitative data on context. Practice at the individual sites is also presented and compared across sites.

In what ways were data used by educators in the selected primary schools?

Educators used data in a myriad of ways. The major outcomes of these uses were: (1) ideal use, (2) misuse, and (3) abuse.

Ideal Use of Data

Educators were found to use data mainly in legitimate ways to effect change in persons and organisations. This was the most prevalent (91.3%) type of use reported at the sites. This type of use resulted in improved teaching and learning. Four types of legitimate use were identified at the sites: (1) instrumental, (2) enlightenment, (3) process, and (4) persuasive.

Instrumental use. This type of ideal use was found to directly target school and student performance by supporting decision making. Teachers who practiced this type of use were most often using classroom data to assess student understanding and make educational decisions. Sometimes, these decisions targeted students directly through the development of education plans for individual or homogenous groups of students, as this teacher from the HILO site describes:

Every day I would take two or three [students]...you know who [are] having problems with [for example] place value...and I would sit down with them, and we would do some place values on a one to one [basis] instead of on the board.

Other times, the decisions resulted in teachers seeking additional training or guiding parents towards appropriate interventions that could be implemented outside of classroom time.

Principals who engaged in instrumental use were, however, generally using data from external assessments to identify broad areas of concern, as articulated by the principal of the LILO site:

[I use the data] to try to suggest some of the reasons for good performance [and] some of the reasons for poor performance. [I] also try to plan how we could improve. [I] look for areas where we need to make interventions.

This type of use was observed at the annual data meeting at the LILO site. The insights obtained from analysing and discussing data led directly to modifications in the teaching-learning process. Typically, the modifications initiated at the sites involved the development of programs to support learning in the targeted content areas, for example, the implementation of differentiated instruction or a specific reading program. Professional development sessions were also included to standardise the practices of teachers in alignment with the program to be implemented.

Enlightenment use. This type of ideal use was found to be either conceptual or reflective. In many instances, this type of use resulted in cognitive restructuring. For instance, when educators used data to identify strengths and weaknesses in student learning. This type of information often altered the way in which they dealt with students. Similarly, when educators used data to gauge student ability, track student progress and discuss student performance, they were able to better understand the teaching-learning process and make changes, accordingly. The effects of this type of use were almost immediate and prolonged as they usually recorded their insights in educational plans or anecdotal diaries, so they could communicate it to other educators. Educators at the LILO site modelled this type of use in the data meeting observed. Patterns and trends in performance were identified and used to target specific areas for action.

Some educators reported using data to reflect on and evaluate their practice and the decisions they made regarding student performance. Ultimately, this reflexive practice motivated educators to improve their practice by redefining areas they identified as priority or triggering a change in instructional techniques. The principal of the LILO site explained:

I think it can motivate you to do better and to ask questions...what is it that they are doing that we can probably adopt and improve...I feel if you look at it with a view to improve that you can see what others are doing and try to follow.

The effects of this type of use became apparent with time and was more individualised in nature.

Process use. This type of ideal use resulted in educators understanding the data use process and appreciating the need for this practice after having engaged in it. For example, teachers who used data from classroom assessments to adjust instruction and experienced positive results often appreciated the process more. These teachers

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expressed a desire to foster and improve their individual practice and vowed to engage in data use more regularly. Others, like this teacher from the LILO site, could not fathom any other decision-making process:

[There is] no other way to do it. You can't just make a decision without getting the facts to make the decision...Even in your everyday life you can't make a decision just so. You must have a fact to work with to lead you towards your decision.

This type of use was very individualised and, although educators who engaged in process use were eager to share their appreciation, the organisational effects were not immediate.

Persuasive use. This type of ideal use was a favourite with educators because it provided them with the evidence that they required to legitimise decisions and motivate persons. All educators saw this type of use as a way to protect themselves and their practice. Teachers reported recording data so that they could remember issues, confirm their observations, and validate data from other sources. They saw recorded data as a protective measure if they ever needed to convince themselves or others that their decisions were appropriate in the given situation. This type of use was also used as a motivational tool. Principals used data in this way to motivate reluctant teachers to engage in some aspects of data use and to continue interventions which they attributed to improved performance. Teachers who were motivated by positive achievement also used this technique to motivate others, as expressed by this teacher from the HILO site:

When the children do well in any competition, I document it and I put it in their cumulative cards too. When I give prizes for general proficiency and best all round, I document it in the card so that the parents would see is not only the...behaviour or not doing the home lesson but also for the achievement in the class.

These educators used student accomplishments to motivate students to continue to strive for excellence. They also used data in this way to foster a sense of pride in parents, about the role they had in the success, thereby motivating them to continue to support their children. Although all educators did not have the experience of being motivated by data which illustrated improved performance, they all appreciated the need to engage in some aspects of data use as a protective measure.

Misuse of Data

This type of use was related to practices which were unsuitable or not fit for purpose. This was the second most (7.9%) reported type of use at the sites. Two forms of misuse emerged from the sites: (1) mistaken or mischievous use, and (2) symbolic use. External data sources were the ones usually used by educators for unintended purposes because the data were considered to possess desirable data characteristics and were reflective of classroom data. For example, educators confessed to using National Test data to justify promotional decisions because they believed that parents held this data source in high esteem. Although educators were aware that this was not the intended use of this data source, they were unfamiliar with any documents which detailed the appropriate use of this data source. The format in which data from external sources were released was not always aligned to the type of use that was expected and this perpetuated some of the misuse. Sometimes data from external sources were also used for symbolic purposes which did not lead to any change in behaviour or thinking. Teachers at the three sites reported that data from external sources were used to compare performance across schools or years as described by this teacher from the LILO site:

You compare SEA results...The principal...will let you see where the schools are, [the] rank and...whether it decreases by a certain number of points or increases by a certain number of points.

Educators often used data in this way to obtain information on the performance of the school as an accountability measure for external stakeholders. Improvement initiatives implemented at the sites were rarely aligned to the information obtained from using data in this way.

Abuse of Data

This type of use occurred when data were knowingly used for unintended purposes. Interestingly, this type of use was not observed at the study sites, but it was reported (0.8%) by educators as a practice of MoE officials. School Supervisors were accused of using data from external sources to embarrass principals and rank schools. Teachers felt that this was an unfair practice because the variables existing within schools were not considered. One teacher from the HILO site explained this issue:

What they did [was to] put all [of] the schools together. They have the small schools, which would be schools with six students, with schools that are huge, bigger schools, [with] 400, 600 [students].

Educators seemed genuinely disturbed by this practice and expressed that the consequence was that similar practice was perpetuated at the school level. Ironically, the MoE officials accused

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of such abuse of data are tasked with monitoring and supporting the appropriate use of data by educators.

Institutional Practice

Individual sites engaged in a range of data use practices. The extent to which outcomes and their forms manifested across sites was not uniform. Table 2 illustrates a summary of the extent to which each outcome and form of data use presented across the study sites.

Table 2. Types of data utilisation across sites

Outcome	Form of Outcome	LILO	HILO	HIHO
Ideal	Instrumental	PU	FU	PU
	Enlightenment/ conceptual	FU	FU	PU
	Enlightenment/ reflective	FU	FU	FU
	Process	PU	FU	FU
	Persuasive/ legitimise	FU	PU	PU
	Persuasive/ motivate	PU	FU	NU
Misuse	Mistaken/mischievous use	PU	PU	NU
	Symbolic use	PU	PU	PU
Abuse		FU	PU	NU

Note. FU- full utilization; PU- partial utilization; NU- no utilisation

The results indicate that the LILO and HILO sites exhibited similar data use practices, but the forms of outcomes varied. Both sites engaged in the three outcomes reported by educators in the local context. Educators at the HILO site focused on ideal use as they fully utilised five of the six forms of ideal use. These educators were trying to capitalise on the data they had available for genuine student and school improvement. Educators at the LILO site were less focused on the ideal use of data, as they only fully utilised three forms of this outcome. The forms that educators at this site mainly concentrated on were enlightenment and legitimisation. This indicated a need to improve their understanding of students and their own practice so they could legitimise their decisions. This drive towards legitimisation was less prominent at the HILO site. Educators at both the LILO and HILO sites engaged in some misuse and abuse of data. At both sites the educators indicated that these unintended practices were triggered by the accountability measures and malpractices of MoE officials who

visited their sites. These officials used data from the external data sources for unintended purposes and principals and teachers mimicked these practices. The degree of abuse was however more prominent at the LILO site which was located in an urban high performing district and was therefore scrutinized more by MoE officials.

The data use practices observed at the HIHO site were very different from what was observed at the two other sites in this study. There was some manifestation of ideal use, but this outcome was concentrated in the form of reflection and process. This is indicative of a more individualised use where educators are focused on understanding their own practice and the process they follow. Educators at this site did not use data for motivational purposes. This may be because of the low performing context of the site. The students and teachers at this site rarely experienced positive outcomes from their practice and may therefore be unable to use data in this way. There was also no manifestation of abuse at this site. The rural and low performing context of this school may have shielded it from frequent visits from MoE officials and, consequently, educators at this site were less exposed to the malpractices and accountability measures of these officials.

These results illustrate the uneven development and variation which existed across sites. The context of these sites was found to have influenced the outcomes and the degree to which the various forms manifested. The data use practices of educators were also influenced by the contact they had with external persons of power, such as the MoE officials, who coloured their use of external data sources. These results provide an initial glimpse of the national and institutional contextual factors which influence data use practice locally.

Which factors influenced data use in the primary schools of Trinidad and Tobago?

Factors which Promote Data Use

Some organisational practices were found to promote data use across the three sites. These practices included: (1) the use of formal instruments, (2) school routines, and (3) dedicated time to learn.

The use of formal instruments. There was some attempt at the three study sites to standardise data collection through the use of formal instruments. Many of the data collection instruments utilised at the sites were issued by the MoE, so they conveyed an expectation for educators to record and use data at regular intervals. These instruments also standardised the collection of a variety of student data such as demographics, achievement scores, learning challenges, medical issues, and awards. There was also an instrument for

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collecting some data on teaching practice. One data collection instrument used at the sites was created at the school level. One teacher at the HILO site described its use:

Well we use something called a disciplinary matrix. It begins with the teacher and the parent and if its extreme we will involve the principal...three things will happen before it reaches to the principal.

The discipline matrix served as both an instrument for recording student indiscretions, and as school policy for the action teachers should take for different infractions. The creation of this instrument is an indication that educators saw a need for formalising the way data were recorded and communicated to stakeholders.

School routines. Educators across the three sites were observed to be engaging in formal and informal routines. The formal routines observed revolved around accountability demands by the MoE and involved: (1) the establishment of specific intervals and procedures for recording and communicating data, and (2) conducting annual data meeting to analyse performance data and prepare the school improvement plan. The informal routines which existed were usually developed by educators based on their philosophy, skills and needs. These routines were generally focused on the intervals and procedures for collecting, recording, and communicating data. For example, at the LILO site teachers were required to conduct item analysis on data from end of term assessments. The principal of this site explained the need for this routine:

We look not only at the mark sheet, but we will look at the item analysis to [see] the areas of strength and areas of weakness. To see what subject areas, what specific strands in the subject areas that may need to be improved.

Although the informal routines observed at the sites were more fluid than the formal routines, they provided a vehicle for principal leadership and teacher participation in data use.

Dedicated Time to Learn. There were many opportunities available for educators who wanted to learn and upgrade their skills for data use. Educators at the three sites indicated that they were exposed to sufficient training to engage in the initial steps of data collection and analysis. They also had the option to engage in more advanced training in data use through postgraduate courses and professional development sessions offered by the MoE. Principals at

the sites have the autonomy to provide teachers with the training and support they require but this autonomy was rarely used to support data use.

Factors which Hindered Data Use

Data from the social network survey incorporated with other data sources revealed that a limited culture of collaboration at both the individual and organisational levels hampered effective data use practice at the three study sites. Two other factors also negatively impacted individual data use practices: (1) beliefs about data, and (2) the value placed on data.

Limited Collaborative Culture. Educators at the study sites lamented the lack of collaborative culture. However, some educators indicated this issue emanated from a wider national issue as described by the principal of the LILO site:

I don't know if that is new but what I have seen is that the culture of teaching in Trinidad and Tobago...is not...a collaborative culture where you would share information on how to improve your practice. Sometimes it is viewed as coming down on them and I feel it that improves well then they would be more open.

The results from the social network survey indicated that educators collaborated with less than 60% of their colleagues and discussed data with less than 40% of them. Although principals were aware of this pervasive problem, there were limited structures established to encourage more collaboration among colleagues. The MoE allocates two hours of non-contact time to primary schools each month to engage in collaborative planning or team discussions, but this time is rarely used. Even when principals initiated some level of collaboration through staff and class level meetings some educators always opted out. This may be an indication that some educators lacked the desire to engage in collaborative practice and resisted any efforts to foster professional learning communities. There may also be some trust issues among colleagues as evidenced by the few educators (7%–40%) who approached colleagues for advice and the less than 20% who approached colleagues for advice about using data. This is an indication that educators at the three study sites either did not see colleagues as experts or were unwilling to admit their own deficiencies to others.

Beliefs about Data. Although the beliefs held by educators at the study sites were not always based on facts or changing circumstances, these beliefs accounted for variations in data use practice. Educators across the three sites indicated that they engaged in the data use process because they wanted to use the data for persuasive purposes. They therefore became disenchanted and demotivated with the process

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when stakeholders dismissed the data they provided as evidence. One teacher at the HILO site shared her experience with a parent:

[The parent] was seeing it being documented and she did not want to accept it...[she felt that] we were being unfair to her child and it was documented...other teachers spoke to her [and] she just turn[ed] a blind eye and a deaf ear to that.

The beliefs educators held about the accessibility, quality, and credibility of the data available to them was also found to shape their data use practice. Educators who believed that data from external sources were not timely or applicable to their needs were less inclined to use this type of data. One teacher from the LILO site explained her reason for not using data from the Secondary Entrance Assessment (SEA):

The SEA data [yes] we use it. But not as much as the national test data because...the SEA data is going to come after the children leave us. So its not going to be effective for us as it would be for the secondary school.

Some reliability and validity concerns related to the data collected by colleagues at the classroom level were also expressed at the study sites. The source of these concerns was shared by a teacher at the LILO site:

Now [from] another teacher I may trust [the data] to a certain extent because they may tend to...bend the truth just a little bit [so] that they may look good.

These concerns stemmed from both the limited collaborative culture and the need to record additional student and teacher data. These circumstances limited the data sources utilised by educators.

Value of Data. Although educators were required to collect different types of data, they indicated that they had preferences when it came to their individual practice. Educators across the three sites believed that observational data provided them with the most realistic view of students, so they valued this data source. One teacher at the HIHO site describes how observational data were useful:

I have noticed sometimes you give them a worksheet...and its correct...when you [are] looking at them you see children actually copying. So, the observations are sometimes more important than what you see on the paper.

A lack of formal instruments for recording and communicating observational data resulted in variability and limited its use outside of the classroom. The level of the school to which the educator was attached was also found to influence the types of data they utilised the most. For example, teachers at the senior level of the school and administrators succumbed to societal norms and utilised the types of data valued by the stakeholders with whom they communicated. These educators believed parents were partial to student learning data from tests. As such, this type of data had the most impact on parents even when other types of data were also utilised. The MoE perpetuated this partiality to achievement data by focusing on the collection and reporting of this type of data at both the school and system level. Achievement data were therefore valued by stakeholders, so educators engaged mainly in the collection and use of this type of data.

Institutional Context

The sites explored in this study operated within different contexts. Each context influenced the interactions which existed among educators, the data use practices of educators, and their individual practice, in unique ways. Some contextual factors supported effective data use practice while others hindered it. The main factors which were found to influence data use were: (1) leadership, (2) collaboration, and (3) training and support. Table 3 presents the qualitative data on these three factors at each of the three study sites. Table 4 shows the social network data related to leadership and collaboration at the study sites.

Table 3. Qualitative data on the factors which influenced data use across sites

Practices	Component	LILO	HILO	HIHO
Leadership	Years at site	5	30+	7
	Focused on Data use	Yes	No	No
	Leadership style	Democratic	Autocratic	Laissez-faire
	Models of data use	Yes	Yes	No
	Teams	Teacher	Administrative	-
Collaboration	Principal sought for advice	Yes	No	Yes
	Collaborative culture	No	No	No

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Practices	Component	LILO	HILO	HIHO
Training and Support	Interaction within school	lunch period	lunch period	-
	Collaboration across schools	Yes	No	Yes
	Collaboration structure	Grade level	Grade level	Staff level
	Who initiates teams	Principal	Staff	Principal
	Data meetings	Annual	Annual	-
	Professional development	Based on needs	Teacher mentorship	Individual
	MoE Instruments used	4	2	2
	School instruments	Creating	Discipline matrix	-
	Data collection	Monthly	Monthly	Termly
	Data analysis	Diagnostic tests	Item analysis	-
	Share data	Parents	Parents	-

Leadership was strikingly different across the three study sites. The principal of the LILO site was the only administrator focused on improving data use at the institution. She modelled appropriate practice and fostered teacher participation by encouraging individual data use practice at the classroom level, required conversations be supported by evidence and supporting teacher-led teams. The indegree centrality of 4 suggested that this principal was, however, not central to the data network at this site because only 25% (4/16) of the teachers sought her advice on data use. She was therefore the formal leader of the site, but she did not hold a position of power to influence the actions of teachers.

Table 4. Social network data on the factors which influenced data use across sites

Analysis	Component	LILO	HILO	HIHO
Indegree Centrality	Advice	4	4	3
Density	Collaboration	0.28	0.36	0.57
Significant correlation	Between networks	$r = 0.38^*$ Discuss data/ friendship	$r = 0.54^*$ discuss students/ discuss teaching strategies $r = 0.27^{**}$ discuss students/ friendship $r = 0.36^*$ discuss teaching strategies/ friendship	$r = 0.86^{**}$ collaboration/ discuss teaching strategies $r = 0.87^{**}$ advise about classroom management/ advise about teaching strategies

Note. $^* \rho < 0.001$, $^{**} \rho < 0.01$

The principals at the HIHO and HILO study sites were not focused on improving data use at their sites. They claimed to encourage individual practice through either deploying members of the administrative team or trusting teachers. Interestingly, the principal of the HIHO site seemed to have the most power although her leadership style was very laissez faire. The indegree centrality of 3 indicated that half of the educators (3/6) at this site relied on the principal for advice on using data. This placed her in the unique position of being central to the data use network at this site, so teachers offered her no resistance. This principal was, however, not focused on data use and therefore did not use her power to leverage increased data use at the site. Although the principal of the HILO site was not central to the data use network, he received no resistance from teachers because he has been a stalwart at this site for over 30 years. He, therefore, could have increased data use at this site if he so desired. The environment created at the sites to support data use was found to be indicative of the leadership styles of the principals which resulted in variability and the underdevelopment of a conducive environment for data use.

Collaboration at the three study sites was not very different. The HILO site displayed the most collaborative environment, and this was evident through the interaction of colleagues throughout the day. Educators at this site were all connected to each other through family, church, and community ties. This resulted in strong bonds and a perceived collaborative culture at the workplace. The density of the collaboration network, however, indicated that educators at this site only collaborated with 36% of colleagues. This translated to educators

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interacting with approximately 8 colleagues about work related matters. The correlations that were considered to be significant at this site indicated that educators tended to engage in discussions with their friends. Although to an outsider the educators at this site appeared to have a collaborative culture, the statistics suggest that collaboration for work related issues remained fixed within small groups of friends.

Some collaboration was evident at the LILO site where educators interacted with each other during breaks and some teachers engaged in grade level planning. The density of the collaborations network supported this limited interaction with evidence that educators at this site only collaborated with 28% or 4 colleagues. Like the HILO site, the significant correlations at this site indicated that educators tended to engage in discussions with their friends. The HIHO site was very different from the other two sites. No collaboration was evident at this site, but teachers indicated that they interacted with a few colleagues. This was confirmed by the density results which indicated that educators collaborated with 57% of colleagues. At this small school, this was equal to 3 colleagues. The correlations that were found to be significant at the HIHO site indicated that discussion networks were fluid with educators not engaging any specific colleagues in discussions. The professional learning networks at the study sites were found to be sparse and mainly dependent on existing ties that were not necessarily work specific.

Training and support for data use varied across the study sites. At the HIHO site there were little to no structures or routines to support data use. The educators at this site engaged in the minimal practice required to satisfy MoE accountability demands. The routines and structures observed at the HILO site were well established and long-standing ones meant to facilitate continuous school improvement. These structures and routines also supported data use since they involved the use of standardised instruments for collecting student data as well as routines for collecting, analysing, and sharing data with stakeholders. At the LILO site the structures and routines were newly established specifically to support and encourage data use. These structures and routines were similar to those established at the HILO site but involved the development and use of more standardised instruments.

Training at the study sites were less evident. At the HIHO site training was teacher directed and therefore fluid and variable. Meanwhile, mentorship was the main source of training at the HILO

site. The focus at this site was on maintaining the quality which existed rather than developing new expertise. At the LILO site there was a teacher-led team for planning professional development. Training was seen as a priority and teachers were encouraged to fill needs and develop expertise. The lack of focus on training at the study sites resulted in minimal staff capacity for data use.

These results illustrate the uneven development and variation which existed across institutions. Leadership was found to be the main factor which influenced data use. Principals at the study sites had the power to provide the structures and routines required to support the data use practices of teachers. However, the limited focus on data use stunted both the development of staff capacity as well as the development of an environment conducive to successful data use. These results provide a glimpse of the importance of the institutional context.

Discussion

Data Use

Many of the data use practices observed at the study sites were consistent with data use practices detailed in the literature (Feldman & Tung, 2001; Light et al., 2005; Moody & Dede, 2008; Schildkamp & Kuiper, 2010). The three major outcomes of data use detailed in the theoretical framework were evident across the sites. Notably, the major outcome of data use at the study sites was genuine improvement of student learning, teacher practice and school performance. There was some evidence of abuse and misuse of data similar to the responses to data discussed in the literature (Cullen & Reback, 2006; Figlio & Getzler, 2002; Gillborn & Yondell, 2000; Schildkamp & Kuiper, 2010). Interestingly, these incidents were minor at the study sites and can be reduced and eventually eliminated with some guidance and monitoring from the MoE.

Some of the data use practices observed at the sites were less common and may be unique to this local context. For instance, process use was evident at the three study sites, but is not prominent in the literature of data use. This type of use facilitated individual practice by renewing teacher commitment to the process and may therefore be related to novice data practitioners. It may also be a data use practice which is now emerging as more developing nations are engaging in data use and has been discussed by De Lisle et al. (2013) as a use of evaluation data. Similarly, while persuasive uses are discussed in the literature on data use, the use of data as a motivational tool is not widely developed. These uses require further exploration and may

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bode well for the use of data in the local context if educators are using data in unique ways based on their needs.

Factors which Promoted and Hindered Data Use

The findings from this study confirmed that the four factors identified in the theoretical framework as influencing data use existed in the local context. Some interaction among the factors were also evident. For instance, the perceptions educators had about the quality of the data available were found to be closely related to the characteristics of the user. Educators with limited data literacy were usually the most sceptical about data sources that they did not collect themselves. This scepticism often hampered the data use process by encouraging non-use or underutilisation of the suspicious data source (Corcoran et al., 2001).

In this study, the organisational characteristics appeared to be the most influential factor related to data use. Principal leadership and collaboration were found to be connected to the extent to which educators at the study sites engaged in data use. Both factors were related to the managed communal relationships and resource constrained environments typically found in SIDS (Bacchus, 2008; Bacchus & Brock, 1987; Baldacchino, 2001; Bray, 1992, Bray & Packer, 1993; Crossley et al., 2009).

Although principals in Trinidad and Tobago had the autonomy to make the environment conducive to data use, the principals at the study sites did not possess the assessment or statistical prowess to model appropriate practice. The principal of the LILO site practiced a democratic leadership style and this facilitated data use as she provided opportunities for data conversations and utilised teacher experts on staff. Meanwhile, the leadership style of the principal at the HILO site provided evidence that supported the claims of Jones & Mills (1976) who posited that in a resource constrained environment, some principals tended to consolidate power through autocratic leadership styles rather than delegate or encourage collaboration. These findings are aligned to the important role of principal leadership in encouraging data use (Choppin, 2002; Earl & Katz, 2006; Lachat & Smith, 2004).

Collaboration was generally very limited at the study sites. Educators believed that this issue was cultural and difficult to circumvent. The study sites had very few structures which encouraged collaborative practice, but any attempts made by colleagues to foster shared practice were usually resisted by some. The results from the

social network survey confirmed that while educators interacted with colleagues, they had very limited professional or friendship ties within the organisation. Educators therefore appeared to be managing their communal relationships within the organisation to ensure they maintained power and status (Bray, 1992). This greatly reduced the exchange of ideas and strategies between colleagues and the development of shared beliefs and a climate of trust (Chen et al., 2005; Holcomb, 2001; Lachat & Smith, 2005; Sutherland, 2004; Wohlstetter et al., 2008).

Conclusion

The findings of this study illustrated the data use practices of educators at three primary schools in Trinidad and Tobago. The outcomes of data use identified at the sites were reflective of those detailed in the literature and included some undesirable outcomes. This study also highlighted the variability of data use practice which existed across the three study sites. A formal coherent data use policy is therefore required, in the local context, to standardise practice and reduce incidents of undesirable practice. A formal policy would describe the purposes of different data sources, provide protocols for collecting, analysing and using data, and implement resources and structures required for effective data use. Moody and Dede (2008) suggested that the policy context was a major influencing factor on data use practice while Datnow et al. (2007) and De Lisle (2008) identified an over-arching policy as a fundamental aspect of any national evaluation system. The lack of a formal policy in the local context provided a glimpse into the importance of this factor.

The type of leadership described in the literature as conducive to data use was not found at the three primary schools investigated in this study. The principals at the study sites did not possess the data literacy skills and commitment to data use required to model and scaffold effective practice (Choppin, 2002; Feldman & Tung, 2001; Lachat & Smith, 2005; Mieses & Foley, 2005). Additionally, principals were not aware of the structures required at the school level to support data use. The MoE therefore needs to cultivate data driven leadership in principals by developing their data and assessment literacies and establishing professional learning communities where principals can receive guidance and support as they institutionalise data use at their sites.

The culture of educators and the context of the study sites appeared to inhibit collaborative work. Educators at the study sites were found to be isolated in their practice and this isolation was preserved through their need for individualised classrooms and a lack of non-contact time in the timetable. The competitive nature valued by the society and

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perpetuated through the SEA and the ranking of the students and schools was not aligned with the sharing of knowledge, skills and resources required for collaborative work. This type of culture severely hampered the environment considered to be conducive to data use and building endogenous capacity (Earl & Katz, 2006; United Nations Secretariat, 1998). The MoE can reduce this competitive culture by changing the reporting structure of performance data to limit its use for ranking purposes. Additionally, the MoE can initiate the collecting of other types of data to reduce the focus on performance. Developing the data and assessment literacies of educators would also assist educators in using data for its intended purpose and diminish the scepticism that revolved around some data sources.

This study provided initial evidence of data use in the primary schools of Trinidad and Tobago. As such, it established a platform for further research in the areas of significant findings. The culture of the sites appeared to influence the data use practices of educators, but there is a need to explore the extent to which this variable influences the beliefs and practices of educators. Principal leadership was also established as a major driving force for data use. There is therefore a need to explore the strategies used by principals to institutionalise data use in the local context. It may also be possible to extend existing models of data use if further research into data use provides nuances based on context.

References

- Abdusyakur, I., & Poortman, C. (2019). Study on data use in Indonesian primary schools. *Journal of Professional Capital and Community*.
<https://doi.org/10.1108/JPCC-11-2018-0029>
- Ahmed, Y. A. (2019). Data-based decision making in primary schools in Ethiopia. *Journal of Professional Capital and Community*.
<https://doi.org/10.1108/JPCC-11-2018-0031>
- Archer, E. (2010). *Bridging the gap: Optimising a feedback system for monitoring learner performance* [Unpublished doctoral dissertation]. University of Pretoria.
- Bacchus, M. K. (2008). The education challenges facing small nation states in the increasingly competitive global economy of the twenty-first century. *Comparative Education*, 44(2), 127-145.
- Bacchus, M. K., & Brock, C. (Eds.). (1987). *The challenge of scale: Educational development in the small states of the Commonwealth*. The Commonwealth Secretariat.
- Baldacchino, G. (2001). Human resource management strategies for small

- territories: An alternative proposition. *International Journal of Educational Development*, 21(3), 205-215.
- Barrera-Osorio, F., Fasih, T., Patrinos, H. A., & Santibanez, L. (2009). *Decentralized decision-making in schools*. The World Bank.
- Bazeley, P. (2010, July). *Metaphors for integrated analysis in mixed methods research* [Conference presentation]. 6th International Mixed Methods Conference, Baltimore, MA.
- Blau, P. (1977). *Inequality and heterogeneity*. Free Press.
- Borgatti, S., Everett, M., & Freeman, L. (2002). *UCINET for windows: Software for social network analysis*. Analytic Technologies.
- Borgatti, S., Everett, M., & Freeman, L. (2013). *Analyzing social networks*. SAGE.
- Bray, M., & Packer, S. (1993). *Education in small states: Concepts, challenges and strategies*. Pergamon Press.
- Bray, M. (1992). Colonialism, scale and politics: Divergence and convergence of educational development in Hong Kong and Macau. *Comparative Education Review*, 36, 322-342.
- Breiter, A., & Light, D. (2006). Data for school improvement: Factors for designing effective information systems to support decision-making in schools. *Journal of Educational Technology and Society*, 9(3), 206-217.
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. SAGE.
- Chen, E., Heritage, M., & Lee, J. (2005). Identifying and monitoring students' learning needs with technology. *Journal of Education for Students Placed at Risk*, 10(3), 309-332.
- Choppin, J. (2002, April 1-5). *Data use in practice: Examples from the school level* [Conference presentation]. American Educational Research Association Annual Meeting, New Orleans, LA. https://www.researchgate.net/publication/245838727_Data_Use_in_Practice_Examples_from_the_School_Level
- Coburn, C., & Talbert, J. (2006). Conceptions of evidence use in school districts: Mapping the terrain. *American Journal of Education*, 112(4), 469-495. <https://doi.org/10.1086/505056>
- Copland, M. (2003). Leadership of inquiry: Building and sustaining capacity for school improvement. *Educational Evaluation and Policy Analysis*, 25(4), 375-395.
- Corcoran, T., Fuhrman, S., & Belcher, C. (2001). The district role in instructional improvement. *Phi Delta Kappan*, 83(1), 78-84.
- Cousins, J. (2004). Commentary: Minimizing Evaluation Misuse as Principled Practice. *American Journal of Evaluation*, 25(3), 391-397. <https://doi.org/10.1177/109821400402500311>
- Crossley, M., Bray, M., & Packer, S. (2009). Education in the small states of the Commonwealth: Towards and beyond global goals and targets. *The Round Table*, 98(405), 731-751.
- Cullen, J., & Reback, R. (2006). *Tinkering towards accolades: School gaming under a performance accountability system* (NBER Working Paper No. 12286). National Bureau of Economic Research. <https://doi.org/10.3386/w12286>
- Datnow, A., Park, V., & Wohlstetter, P. (2007). *Achieving with data. How high performing school systems use data to improve instruction for*

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- elementary students. Center on Educational Governance, University of California.
- De Lisle, J. (2008). Can standards-referenced, large-scale assessment data lead to improvement in the education system? Judging the utility of student performance standards in the primary school national assessments of educational achievement. *Caribbean Curriculum*, 15, 71-114.
- De Lisle, J. (2011). The benefits and challenges of mixing methods and methodologies. *Caribbean Curriculum*, 18, 87–120.
- De Lisle, J. (2012). Explaining whole system reform in small states: The case of Trinidad and Tobago secondary education modernization program. *Current Issues in Comparative Education*, 15(1), 64-82.
- De Lisle, J. (2015). Evolving data use policy in Trinidad and Tobago: The search for actionable knowledge on educational improvement in a small island developing state. *Educational Assessment, Evaluation and Accountability*, 28(1), 35-60.
- De Lisle, J., Ferret, S., Doyle, J., & Seecharan, H. (2011, January 4-7). *Data-driven decision-making as a tool in decentralization: Empowering education districts and schools in Trinidad and Tobago through enhanced data use* [Conference presentation]. International Congress for School Effectiveness and Improvement Annual Congress, Limassol, Cyprus.
- De Lisle, J., Mohammed, R., & Joseph, S. (2013, January 3-6). *The tyranny of data: Non-use and misuse of education data in Trinidad and Tobago by practitioners, policymakers, and politicians* [Conference presentation]. International Congress for School Effectiveness and Improvement Annual Congress, Santiago, Chile.
- De Lisle, J, Mohammed, R & Lee-Piggott, R. (2014). Explaining Trinidad and Tobago's system response to international assessment data. *Journal of Educational Administration*, 52(4), 487-508.
- Earl, L., & Katz, S. (2006). *Leading schools in a data-rich world. Harnessing data for school improvement*. Corwin Press.
- Earl, L., & Timperley, H. (2008). *Understanding how evidence and learning conversations work*. https://doi.org/10.1007/978-1-4020-6917-8_1
- Feldman, J., & Tung, R. (2001, April 10-14). *Whole school reform: How schools use the data-based inquiry and decision-making process* [Conference presentation]. American Educational Research Association Annual Meeting, Seattle, WA. <https://files.eric.ed.gov/fulltext/ED454242.pdf>
- Figlio, D., & Getzler, L. (2002). *Accountability, ability and disability: Gaming the system* (NBER working paper No. 9307). National Bureau of Economic Research. <http://www.nber.org/papers/w9307>
- George, C. (2021). *How educational leaders utilise core subject assessment data in English Language Arts in decision making aimed at school improvement: A qualitative case study* [Unpublished doctoral dissertation]. Grand Canyon University.

- <https://www.proquest.com/openview/50af5038df6527372a4c55b76a70a351/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Gillborn, D., & Youdell, D. (2000). *Rationing education: Policy, practice, reform and equity*. Open University Press.
- Greene, J. (2007). *Mixed methods in social inquiry*. Jossey-Bass.
- Haughton, B. (1991). What makes effective schools effective: A look at new secondary schools [Unpublished master's thesis]. University of the West Indies, Mona, Jamaica.
- Herman, J., & Gribbons, B. (2001). *Lessons learned in using data to support school inquiry and continuous improvement: Final report to the Stuart Foundation* (CSE Technical Report 535). UCLA Center for the Study of Evaluation.
- Holcomb, E. (2001). *Asking the right questions: Techniques for collaboration and school change* (2nd ed.). Corwin.
- Ikemoto, G., & Marsh, J. (2007). Cutting through the "data-driven" mantra: Different conceptions of data-driven decision making. In P. A. Moss (Ed.), *Evidence and decision making* (National Society for the Study of Education Yearbook, Vol. 106, (1), pp. 105-131). National Society for the Study of Education.
- Ingram, D., Seashore, L., & Schroeder, R. (2004). Accountability policies and teacher decision making: Barriers to the use of data to improve practice. *Teachers College Record*, 106(6), 1258-1287.
- Jones, E. (1975). Tendencies and change in Caribbean administrative systems. *Social and Economic Studies*, 24(2), 239-256.
- Jones, E., & Mills, G. (1976). Institutional innovation and change in the Commonwealth Caribbean. *Social and Economic Studies*, 25(4), 323-346.
- King, E. (1991). School effectiveness: A study of some related variables in the primary schools of Tobago [Unpublished master's thesis]. The University of the West Indies, St. Augustine, Trinidad and Tobago.
- Lachat, M., & Smith, S. (2004). *Data use in urban high schools*. Brown University, The Education Alliance.
- Lachat, M., & Smith, S. (2005). Practices that support data use in urban high schools. *Journal of Education for Students Placed at Risk*, 10(3), 333-349.
- Light, D., Wexler, D., & Heinze, J. (2005). Keeping teachers in the center: A framework of data-driven decision-making. In C. Crawford, et al., (Eds.), *Proceedings of society for information technology and teacher education international conference 2005* (pp. 128-133). Association for the Advancement of Computing in Education (ACCE). <https://www.learntechlib.org/primary/p/18964/>
- Long, L., Rivas, L., Light, D., & Mandinach, E. (2008). The evolution of a homegrown data warehouse: TUSDStats. In E.B. Mandinach & M. Honey (Eds.), *Data-driven school improvement: Linking data and learning* (pp. 209-232). Teachers College Press.
- Love, N. (2004). Taking data to new depths: There's a ton of data being collected. The trick is to know how to use it effectively. *Journal of Staff Development*, 25(4), 22-26.
- Mandinach, E., Gummer, E., & Muller, R. (2011). *The complexities of integrating data-driven decision making into professional preparation in schools of education: It's harder than you think*. CAN Education/Education Northwest/WestEd.

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- Mandinach, E., Honey, M., & Light, D. (2006, April 7-11). *A theoretical framework for data-driven decision making* [Conference presentation]. American Educational Research Association Annual Meeting 2006, San Francisco, CA.
https://cct.edc.org/sites/cct.edc.org/files/publications/DataFrame_AERA_06.pdf
- Marsh, J., Pane, J., & Hamilton, L. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research* (OP-170). Rand Corporation.
https://www.rand.org/pubs/occasional_papers/OP170.html
- McCusker, M., & Soares, A. (2011). *Islanded identities: Constructions of postcolonial cultural insularity*. Rodopi.
- Merriam, S. (1998). *Qualitative research and case study applications in education*. Jossey-Bass.
- Mieles, T., & Foley, E. (2005). *From data to decisions: Lessons from school districts using data warehousing*. Annenberg Institute for School Reform.
- Miles, M., & Huberman, A. (1984). *Qualitative data analysis: A sourcebook of new methods*. SAGE.
- Ministry of Education. (2004a). *National report on the development of education in Trinidad and Tobago 2004*. Trinidad and Tobago
- Ministry of Education. (2004b). *Report on national testing 2004*. Trinidad and Tobago.
- Moody, L., & Dede, C. (2008). Models of data-based decision making: A case study of the Milwaukee public schools. In E. Mandinach & M. Honey (Eds.), *Data-driven school improvement: Linking data and learning* (pp. 233-254). Teachers College Press.
- Moolenaar, N. (2012). A social network perspective on teacher collaboration in schools: Theory, methodology and application. *American Journal of Education*, 119(1), 7-39.
- Onwuegbuzie, A., Johnson, R., & Collins, K. (2011). Assessing legitimation in mixed research: A new framework. *Quality & Quantity*, 45(6), 1253-1271. <https://doi.org/10.1007/s11135-009-9289-9>
- Onwuegbuzie, A., & Teddlie, C. (2003). A framework for analyzing data in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioural research* (pp. 351-383). SAGE.
- Patton, M. (2008). *Utilization-focused evaluation* (4th ed.). SAGE.
- Prell, C. (2012). *Social network analysis*. SAGE.
- Schildkamp, K. (2012, January 5-8). *The use of data across countries: Development of a data use framework* [Conference presentation]. International Congress for School Effectiveness and Improvement Annual Congress, Malmo, Sweden. <https://www.icsei.net/icsei2012/>
- Schildkamp, K., & Kuiper, W. (2010). Data informed curriculum reform:

- Which data, what purposes, and promoting and hindering factors. *Teaching and Teacher Education*, 26, 482-496.
- Schildkamp, K., & Poortman, C. (2015). Factors influencing the functioning of data teams. *Teachers College Record*, 117(4).
- Schildkamp, K., Poortman, C., & Handelzalts, A. (2016) Data teams for school improvement. *School Effectiveness and School Improvement*, 27(2), 228-254. <https://doi.org/10.1080/09243453.2015.1056192>
- Schildkamp, K., Rekers-Mombarg, L., & Harms, G. (2011, January 4-7). *Student group differences in examination results and utilization for policy and school development* [Conference presentation]. International Congress for School Effectiveness and Improvement Annual Congress, Limassol, Cyprus.
- Schildkamp, K., & Teddlie, C. (2008). School performance feedback systems in the USA and in the Netherlands: A comparison. *Educational Research and Evaluation*, 14(3), 255-282.
- Smith, M. (1997). Mixing and matching: Methods and models. In J. C. Greene & V. J. Caracelli (Eds.), *Advances in mixed methods evaluations: The challenges and benefits of integrating diverse paradigms. New directions for evaluations*, No. 74 (pp. 73-85). Jossey-Bass.
- Stockslager, K., Castillo, J., Hines, C., Batsche, G., & Curtis, M. (2013). *The Florida problem solving/response to intervention project: Year 4 evaluation report*. http://floridarti.usf.edu/resources/format/pdf/yr4_eval_report.pdf
- Supovitz, J., & Klein, V. (2003). *Mapping a course for improved student learning: How innovative schools systematically use student performance data to guide improvement*. Consortium for Policy Research in Education, University of Pennsylvania Graduate School of Education.
- Sutherland, S. (2004). Creating a culture of data use for continuous improvement: A case study of an Edison project school. *American Journal of Education*, 25(3), 277-293.
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences*. SAGE.
- United Nations Secretariat (1998). Human resource development in small island developing states. Addendum 9 of *Progress in implementation of the programme of action for the sustainable development of small island developing states* <https://islands.unep.ch/dd98-7a9.htm>
- VERBI Software. (2013). MAXQDA (Version 11) [Computer software]. VERBI Software. <https://www.maxqda.com>
- Verhaeghe, G., Vanhoof, J., Valcke, M., & Van Petegem, P. (2010). Using school performance feedback: Perceptions of primary school principals. *School Effectiveness and School Improvement*, 21(2), 167-188.
- Visscher, A. (2002). A framework for studying school performance feedback systems. In A.J. Visscher & R. Coe (Eds.), *School improvement through performance feedback* (pp. 41-71). Swets & Zeitlinger.
- Wayman, J. (2005). Involving teacher in data-driven decision-making: Using computer data systems to support teacher inquiry and reflection. *Journal of Education for Students Placed at Risk*, 112(4), 521-548.
- Wohlstetter, P., Datnow, A., & Park, V. (2008). Creating a system for data-

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Mixed Methods Study*

- driven decision-making: Applying the principal-agent framework. *School Effectiveness and School Improvement*, 19(3), 239-259.
- Yin, R. (2003). *Case study research: Design and methods*. SAGE.
- Yin, R. (2014). *Case study research: Design and methods*. SAGE.
- Yin, R., & Davis, D. (2007). Adding new dimensions to case study evaluations: The case of evaluating comprehensive reforms. *New Directions for Evaluation*, 2007(113), 75-93. <https://doi.org/10.1002/ev.216>
- Young, V. (2006). Teachers' use of data: Loose coupling, agenda setting and team norms. *American Journal of Education*, 112(4), 521-548.