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Total Quality Management in Mauritian education and principals’ decision-making for school improvement: “Driven” or “informed” by data?

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Abstract:

Purpose
– Reflecting the Mauritian government's “quality” agenda and its focus on school leadership, this paper reports the findings of research exploring Mauritian principals’ views about the use of total quality management (TQM) for school improvement. While aspects of this research have been reported elsewhere, the purpose of this paper is to focus on school leaders’ use of data and evidence in making decisions for school improvement.

Design/methodology/approach
– The paper reports on qualitative aspects within a mixed methods research with data collected by means of semi-structured interviews conducted with a purposive sample of six principals. The analysis of the data were an exercise in grounded theory building.

Findings
– The paper expands the knowledge of principals as quantitative data users arguing that qualitative information based on professional discourses, human judgements and lived experiences should be equally valorised if TQM is used for making informed educational decisions.

Research limitations/implications
– The research relied on principals’ views as the unique source of data. The perspectives of the other stakeholders would offer a richer description of leadership reality in Mauritian schools.
Practical implications

– The paper suggests a more participatory decision-making model for effective change that could rightfully engage all stakeholders through various complementary quantitative and qualitative processes. It further recommends that alongside the core systemic qualities of TQM, there are ethical, moral and cultural dimensions of leadership that could enhance the teaching and learning environment.

Originality/value

– While confirming some extant research, the paper brings new thinking to understanding the critical role of principals within the TQM scenario of data-driven decision making.

Introduction

Mauritius, being a small isolated island country, is fully aware that its future economic viability in the global market is dependent on its human capital and innovative hi-tech industry. However, it is acknowledged that the Mauritian education system has not been adequately preparing students for work and life outside school (Bah-lalya, 2006). This is exacerbated by the fact that education examination structures systematically segregate students into so-called “star” (elite) schools and less desirable schools that curtail the education experience of the majority of Mauritian children (Ah-Teck and Starr, 2012a, b). In view of repositioning Mauritius as a global player and meeting the needs of an increasingly competitive, knowledge-based and globalised economy, Mauritian education authorities have attempted various educational reforms to raise educational standards and produce an efficient and dynamic workforce. One idea being canvassed is that total quality management (TQM) could provide the framework for Mauritian school leaders to deliver imperatives for change and improvement and achieve the government's often-stated aim of “world-class quality education” (Ministry of Education and Human Resources (MEHR), 2006; Ministry of Education and Scientific Research, 2003).

However, whilst there is a burgeoning literature on TQM and a quality culture in education (e.g. Blankstein, 2004; Bonstingl, 2001; Mukhopadhyay, 2005; Sallis, 2002; West-Burnham, 1997), little research attention has been given to the practical processes of implementing TQM concepts in the realisation and sustainability of “quality” in schools, and when this has been done it has tended to be limited to higher education institutions but is rare at school levels. Moreover, no research has covered this topic in the Mauritian context. Even with the growing body of evidence, additional research is necessary to determine the impact and relative importance of school leadership in its adaptation to local contexts.

In this paper, we report the findings of an interview study within a mixed methods research project exploring Mauritian principals’ views about the usefulness or otherwise of TQM principles in implementing school improvement initiatives. The research investigated all aspects of school leadership (see Ah-Teck and Starr, 2012a), but this paper focuses specifically on how transparent leadership based on data and evidence could facilitate participative decision making and problem
solving, based on the TQM tenet of systematic quantitative data use for continual improvement of the system and processes of an organisation (school). This specific area of investigation is spurred by the Mauritian government's “quality agenda” and its focus on the work of school leaders pertaining to evidence-based improvement in schools (MEHR, 2006).

TQM in education: data-driven decision making

The philosophy of TQM was developed by Deming and Juran (Deming, 2000; Juran, 1999) to increase the productivity of industry. Deming argued, however, that TQM principles could equally be applied to the service sector, including education. TQM's strongest emphases are leadership commitment and the support of formal leaders in the quest for quality, constancy of purpose, quality consciousness, employee empowerment, continuous improvement and a systemic approach as a way of organisational life (Mukhopadhyay, 2005). Such ideas are reinforced by education researchers such as Leithwood et al. (2006) who contend, similarly, that school leadership focused on school improvement should be based on flexibility, persistent optimism, motivating attitudes and dispositions, commitment through teacher empowerment and an understanding of one's actions on the daily lives of others.

De Jager and Nieuwenhuis describe the key principles of TQM in education (see Figure 1) as:

[…] leadership, scientific methods and tools and problem-solving through teamwork. These three specific features are linked to form an integrated system that contributes to the organisational climate, [professional learning] and provision of meaningful data with [stakeholder] service at the centre of it all (De Jager and Nieuwenhuis, 2005, p. 254).

Another important TQM tenet commonly referred to in educational research literature is a “focus on systemic thinking” about the school (e.g. Bonstingl, 2001; Deming, 2000; Mukhopadhyay, 2005).

In particular, TQM emphasises the principle of decision making based on data (Deming, 2000). TQM aims at continuous quality improvement with baseline information being foundational for the formation of strategy. In other words, data and information are critical bases for decision making for continuous quality improvement. Proactivity and responsiveness are valorised above reactive decision making thereby requiring a different orientation – a shift from the emotional and expedient to rational, evidence-based decision making and policy making (Mukhopadhyay, 2005). Importantly, it is necessary to develop a “data culture” in the school which facilitates participative decision making, for it provides transparency in leadership, is fact-based and hence more systematic (Deming, 2000). The collection and analysis of data to identify and obtain feedback on the needs, expectations and satisfaction of stakeholders over time lie at the heart of TQM. Obtaining and acting upon feedback is considered to be a major factor that differentiates TQM from many other leadership and management theories (Bonstingl, 2001; National Institute of Standards and Technology, 2004, 2009-2010; Sallis, 2002; Schwahn and Spady, 1998).
Quality improvement tools and techniques

Using tools to measure stakeholder satisfaction is a central feature of the TQM tenet of data-driven decision making (Frazier, 1997; Kerzner, 2003). This means that schools are responsible to consider and respond to their stakeholders’ requirements, endeavour to satisfy them and determine the degree to which they have been satisfied. Correspondingly, there is an obligation on stakeholders to express clearly their needs and to participate in providing feedback for monitoring and review. These tools provide a means to enable facts and data to be collected to inform decision making for continuous improvement (Jenkins, 2003; Kerzner, 2003; Okes, 2002; Weller and McElwee, 1997).

Emphasis is on “the extent to which listening takes place and action results” (West-Burnham, 1997, p. 52). It is important to place data gathering and usage in the context of effective team functioning, to see them as skills and tools that facilitate a team approach. Whilst tools and techniques are useful in many ways, critics express concerns about them taking time, resources and focus away from teaching and learning (Jenkins, 2003). Hence TQM recommends that feedback devices are negotiated to best meet the needs of the context and its stakeholders.

The Plan-Do-Study-Act (PDSA) cycle

Achieving “quality” is a journey and not a destination (Mukhopadhyay, 2005) – with processes continuously improved by reflection, alteration, adding to, subtracting from and refinement. The process of continuous improvement emphasises a cyclical process which can be visualised by the PDSA cycle (Czarnecki et al., 2000; Langley et al., 2009). This cycle is recommended for schools in implementing TQM (Steyn, 2000) and is aligned with what many call “action research” amongst practitioners (e.g. Hewitt and Little, 2005; Stringer, 1999). The process consists of a logical sequence of four repetitive steps for reflective practice and continuous improvement and learning. Langley et al. (2009) provide a description of the PDSA cycle summarised in Figure 2. The numbering represents the kinds of activities that occur in a logical sequence although in reality some processes occur concurrently, for example, 7-9 and 10-11. TQM proponents suggest these activities occur in teams (e.g. Deming, 2000; Bonstingl, 2001; Sallis, 2002; West-Burnham, 1997, 2004).

After testing a change on a small scale, learning from reviews and refining the change through several PDSA cycles, the change can be implemented on a broader scale. The overall plan includes application and practice in teams using feedback loops (Langley et al., 2009; Schwahn and Spady, 1998), similar to an action research model which focuses on reflective practice, in-situ and continual cycles of improvement. The process fosters teacher involvement and empowerment.

When the application of this TQM tenet is aimed at changing people's behaviour, it calls for ethical school leadership that emphasises trust, respect and collaboration to produce optimal outcomes (Schwahn and Spady, 1998). Otherwise, school leaders would be using mainly formal positional power to demand adhesion to an imposed vision, with the danger of promoting inauthentic practices, such as teachers “teaching to the test”.
Critiques of TQM in schools

Some researchers remain sceptical, however, about the application of TQM in schools. Capper and Jamison (1993) warn against an uncritical acceptance of the TQM paradigm within the educational practice because it was originally developed in and for the business sector. Reed et al. (2000) criticise TQM on the ground that it provides a rhetoric that is individually interpreted and therefore carries inconsistent meaning across contexts. For instance, whilst the perception of TQM as an error-free philosophy (aimed at the establishment of an organisational culture where mistakes are reduced or eliminated) is a desirable ideal in an industrial context, its feasibility and value within an educational institution are debatable. It seems that the educational process is more compatible with experimentation and the examination of alternative ideas as requirements of the learning process (Berry, 1997).

According to others, the failure rate of implementing TQM in schools is as high as 70 per cent (Carlson, 1994; Gilbert, 1996). George and Weimerskirch (1998) assert that TQM failure could be ascribed to lack of leadership, middle management and union's misunderstanding, lack of participation and failure to include stakeholders in its implemention. Ali and Zairi (2005) identifies various root causes of quality system failure in education, including poor inputs, poor delivery services, lack of attention paid to performance standards and measurements, unmotivated staff and the neglect of students’ skills.

Blankstein (2004) identified several reasons why TQM could fail in schools, one of which is that educators generally do not use data to improve systems. Historically, educators have relied on intuition, routine and experience to solve complex problems in the process of schooling. Whilst emotions are important measures of personal well-being, they do not help to evaluate the stability or efficacy of a whole school system. Instead, data-driven decision making informs practitioners when determining a course of action involving policy and procedures (Picciano, 2006). Moreover, examination of data regarding inputs to schooling has strategic implications as school leaders attempt to readjust resource allocations to achieve different results. However, many researchers indicate that educators, in general, do not use or understand how to use such data (e.g. Earl and Fullan, 2003; Schildkamp and Kuiper, 2010; Shen and Cooley, 2008).

On the other hand, some believe that the quality movement is the answer to educational needs because it provides a structured, inter-connected, systematic educational delivery system, which leads to improvement in student performance, motivation, self-esteem and confidence (Bonstingl, 2001; Sallis, 2002; Weller and McElwee, 1997), which is the stance being accepted by Mauritian education authorities. TQM is seen to offer opportunities for its adaptation to improve the quality of schools in a holistic manner and on a continuing basis. Hence, TQM is believed to hold the potential to draw out Mauritian schools from their current quality crisis, which is the view of policy makers. It is the aim of this research to investigate whether Mauritian school leaders endorse elements of TQM or whether they believe elements of TQM could be usefully adopted if they are not already using them, since the Ministry of Education rhetoric endorses quality management (see also Ah-Teck and Starr, 2012a), particularly with reference to using data for evidence-based decision making and problem solving.
Research methodology

A mixed methods research was employed to investigate Mauritian principals' views about school and systemic improvement and the application of TQM principles. The research investigated all aspects of school leadership (see Ah-Teck and Starr, 2012a), but this paper reports on qualitative aspects of the study related to data collected by means of semi-structured interviews conducted with a purposive sample of six principals. The quantitative findings have been adequately reported elsewhere (see Ah-Teck and Starr, 2013).

Qualitative research usually works with a small sample since cases are nested in their context and studied in depth, unlike quantitative research where large samples are used to provide statistical significance (Cresswell, 2002). Hence, in this qualitative study, a purposive sampling strategy was employed, in which only as many participants as necessary were used to gain a comprehensive understanding of the phenomena under consideration (Streubert Speziale and Carpenter, 2003). Another justification for using purposive sampling in this study is that the research process was one of an exploratory nature or theory development rather than testing of hypotheses. This meant using common sense and judgement in selecting the right sample of schools to allow high-analytic work for the purpose of the research (Robson, 2002).

Six schools were involved (two primary and four secondary schools), representing diversity of sector, level of schooling, the gender of leaders and socio-economic status of the enrolling families. Three schools were in urban areas and three were rural, three were state and three Catholic schools (also controlled by Mauritian education authorities). Two principals were females, four were males. One school had children predominantly from professional families, another with a large population from working class families, and the others with students from mixed backgrounds. Difference between schools was seen as valuable for the research in exploring TQM's relevance and applicability in divergent contexts (Ah-Teck and Starr, 2012a).

The research was an exercise in grounded theory building (Glaser and Strauss, 1967). In this approach, theory emerges from the data gathered through an inductive process whereby emerging research insights are analysed and continually tested, producing further evidence and/or new theoretical insights (Corbin and Strauss, 2008). This iterative process of developing claims and interpretations is responsive to research situations and the multiple layers of meaning produced by the people in them (Gray, 2009). “Open coding” identified several categories of causal conditions, phenomena, strategies and consequences. “Axial coding” classified the data and enabled connections between categories to be made, while “selective coding” refined the integration of categories.

Issues of reliability and validity were addressed using Guba and Lincoln's (1989) set of standards for establishing the “trustworthiness” of data in qualitative research. Participating principals were allowed to listen to their audio-recorded responses and read the observational field notes taken immediately after the interview, and were asked if these reflected what they intended them to mean. Transcripts and analysed results were also taken back to the interview participants so that they could judge the credibility of the results.
Limitations of the study

There are a few limitations of the study which should be acknowledged. First, the literature review and the research evidence collected as a background to this study predominantly emanated from a western point of view. While this could be a criticism, there is no extant research data on this topic that pertains specifically to Mauritius. Second, the normal cautions regarding limited sample size and generalisability undoubtedly apply to this study's data. However, the survey on which the interviews were based was sent to the principals of all 415 state and private schools (consisting of 258 (62.2 per cent) primary schools and 157 (37.8 per cent) secondary schools) in Mauritius in a quantitative phase which preceded the present qualitative study (see Ah-Teck and Starr, 2013). Furthermore, Mauritius has a small population and therefore, a small schooling sector in comparison with many others. The interview sample produced data that were saturated and which substantiated data collected in the quantitative phase. Finally, the dependence of this research on principals’ views as the unique source of data about school leadership could be a limitation as school leaders may be consistently more optimistic than other role players about the impact of their own leadership on efforts at school reform (Mulford et al., 2000, 2001). Thus over-reliance on principals’ perspectives may restrict understandings of the role and influences of leadership to some extent, and may even lead to inaccurate or erroneous results. However, it has been made clear from the start that this study focused solely on principals’ opinions and perceptions. Other studies may take a different focus.

Findings and discussion

Lack of a “data culture” in schools

In this study, all the participating principals declared that they were employing a variety of informal qualitative data collection methods, including discussions and interviews with students, teachers and parents to determine their concerns and to ascertain their needs and expectations. For example:

I meet informally with members of the SRC (School Representative Council) to listen to them and to find out what their needs are (PC).

Dean of studies, the assistant rector (principal) and myself have personal talks with students and also conduct informal interviews occasionally with students to determine their aspirations and how the school could address them (PA).

The views of parents are obtained through informal interviews either on the phone or in person to consult role players on particular issues (PE).

In the context of gathering data, all principals openly expressed their adherence to an open-door policy which they believed produced an atmosphere in which teachers, students and parents felt free to communicate with those holding formal leadership positions (although sometimes they contradicted themselves by stating that formal arrangements had to be made before meetings with them were possible due to their heavy work schedules). Many such instances were expressed by the interviewees:
We have an open-door policy […] Staff and students regularly come to me to say things which are not working and we then find out how to solve these problems collectively (PE).

Parents can come and visit us whenever they feel like it and […] discuss what they are unhappy about […] It's not necessary to make formal appointments. […] Teachers and myself, we are open to discussion and students can come to us, formally or informally […] to share their concerns (PA).

Parents can come to school at any time and request to talk to me about their concerns but I prefer that they make prior arrangements with me. They are happy about such arrangements (PB).

I follow an open-door policy towards students, staff members and parents but, for practical reasons, it's important to make appointments (PD).

The most common formal methods of data collection cited in the sampled schools were through meetings of the school leadership team, staff, departmental and parent meetings. The leadership team and staff also held meetings and planning sessions amongst themselves and with parents, where school improvement issues were discussed. Indicative comments included the following:

Planning sessions involving all (teaching) staff are held annually to review the school's overall performance, identify weaknesses and then look forward to improving on past performance. As a result, corrective actions are taken to ensure future improvement (PD).

Staff meetings are held regularly where we compile lists of aspects that can still be improved, discuss matters, seek solutions for problems and give ideas (PC).

However, it may be argued that these data collection exercises were not systematic, and therefore do not contribute, in terms of TQM, to a “data culture” which facilitates participative and rational decision making. Instead, the comments revealed that principals were reactive rather than proactive in seeking the views and ideas of stakeholders. Their comments also suggest a traditional, hierarchical self-image inherent amongst principals which excludes a sense of teachers being peers and parents being important stakeholders. The changes for improvement appear to be first order (minor and sometimes inconsequential) in nature and were not indicative of second order (major) change (see also Starr, 2011).

**Lack of a distributed leadership approach and participatory culture**

It was also reported that data were gathered from students during meetings of grade groups through the use of suggestion boxes at some schools but there was minimal evidence on the use of formal methods to gather data systematically for decision-making purposes. One principal explained:
We make use of suggestion boxes […] No, it is not customary for us to use questionnaire surveys or other statistical methods to collect data formally (PD).

However, the measures schools took in gaining feedback from stakeholders still appeared to have shortcomings. For example, a disturbing finding was the selective way in which one particular principal dealt with data gathering. S/he stated:

Sometimes, my approach is to obtain the views of certain role players only [so as] to prevent unfair requests and too many conflicting demands (PC).

At another school, student journalists of the school’s newspaper were not allowed to conduct interviews with their peers or to make use of questionnaires to obtain their opinions. The principal argued that:

Surveys are not being conducted because the students will make a joke of it. […] They know well that we cannot satisfy all of their personal expectations and deal with all of their complaints because there are other more important “educational” issues to be attended to (PD).

Comments such as this suggested that surveys could only provide “bad news”, and hence there was a pervasive reluctance to use them formally. From a TQM perspective, surveys and opinion-gathering meetings could also provide “good news”, as indications of the extent to which school processes are working satisfactorily, although the emphasis should be to improve constantly and forever the system (Deming, 2000), hence “problems” or “bad news” provide guiding information for improvement.

These comments and the ones earlier about “open doors” to hear complaints suggest that principals were not creating or maintaining “open” school cultures within a participatory decision-making environment as espoused by the TQM philosophy. Parents, students and teachers appear to be positioned out of the realms of second-order decision making. This disconcerting situation could be ascribed to a substantive amount of intolerance and bias exercised by the principal and by the lack of a distributed leadership approach within the schools, which reflects autocratic styles of leadership. It could also be linked to the critical stance of the TQM research literature when it comes to the use of statistical techniques in schools. It is suggested that statistical techniques in schools may be inappropriate or culturally removed from the accepted intuitive and professional judgement of teachers (Berry, 1997). It is also suggested that statistical techniques in schools should be used sparingly, in a focused way and with the intention that they enable understanding and facilitate the systematic examination of the consequences of change (Murgatroyd, 1993) or as constructive pointers as to what needs to improve internally. In the strict TQM scenario, measurement should therefore serve the task of quality improvement.
Principals’ and teachers’ lack of time, confidence and expertise in data usage

All principals interviewed generally spoke of the difficulty in using quality tools and techniques to collect data formally, referring to time constraints and their inadequate knowledge of statistics and skills in analysing data. They expressed their concerns as follows:

I think there is nothing wrong with using questionnaire surveys and other formal means to gather information about people's needs or complaints. The problem is that it takes time and we have no time for that. […] We are also not trained to collect data systematically, let alone to analyse them statistically (PE).

My staff will have to be trained to construct questionnaires to collect data and they will need to have some knowledge of statistics to be able to analyse the information. […] But not everyone is statistically minded and I guess that it will be hard for all people to think in statistical terms. The [other] problem is that it will take so much time to carry out systematic data collection (PC).

The responding principals are assuming that data has to be statistical/quantitative, yet they do not have to be; qualitative data provides commentary, ideas and explanations and should be systematic – planned, analysed and used to inform change for improvement. Principals’ comments are in accordance with research findings that there is simply not enough time for principals and teachers to sort through data collected by external agencies about their schools (Schildkamp and Kuiper, 2010; Shen and Cooley, 2008), or that they are unprepared for data analysis believing that it adds extra constraints to their already demanding professional life. Moreover, there is an implicit avowal by the principals interviewed that they (and their staff) were not competent in processing data and turning them into meaningful information in the first place, and they therefore seemed to lack the confidence to analyse and use data for decision-making purposes. In this research there was no evidence of any systematic and transparent use of data to aid decision making for improvement in any of the schools.

However, five of the six principals interviewed suggested that they were receptive to the importance of data use for improvement and did not eschew the suggestion of data-gathering methods out of hand. For example, the following quotations capture their beliefs:

Information from surveys could be used to anticipate the future needs of students. Factors that would have to be taken into account are the changing requirements of graduates in the workplace or other education institutions, changing local, national and global requirements, and education alternatives for prospective students (PB).

It would be a great idea to use questionnaires or other data collection methods to find out the key factors that affect [students’] needs and expectations in order to support the school's longer term planning and curriculum development (PC).

It can be deduced that Mauritian principals were using a host of informal data collection methods, including listening strategies, to ascertain stakeholders’ needs and expectations, but the use of planned, data-gathering tools and techniques was not a common practice. They took into account
information regarding student needs not only from the students directly, but also from parents, employers and other education organisations, although these were not on a regular or systematic basis. They appeared to be unplanned, impromptu and unrecorded instances. Evident were contradictory comments from principals about how data were collected and used and subsequently they described no significant change initiatives that had come about through planned, systematic data use.

Nevertheless, four of the six principals thought that rational decision making based on data collected in a systematic fashion would be the right approach for major decisions, but not for decisions relating to the day-to-day quotidian of the school, as the following comment reveals:

The chances are that systematic data collection using statistical techniques will work if we are carrying out a particular feasibility study, for example, if there is need for a second school canteen, construction of a new library, etc. It is not sensible or practical in terms of time and energy to use them always and for every decision to be taken (PE).

Contrary to expectations, principals’ comments appeared to suggest that data are appropriate for non-academic purposes rather than for improving teaching and learning. However, this finding of the Mauritian study has parallels with other research conclusions. For example, Shen and Cooley (2008) found that principals rarely used data for decision making due to their heavy workload and the lack of confidence in handling data, however, when principals did make use of data, it was generally for marketing and promotional purposes to enhance enrolments and attract greater funding. Similarly, Schildkamp and Kuiper (2010) concluded that school leaders mainly used data for making school policy development decisions, and that it was teachers who were more disposed to using data for making instructional decisions. As Shen and Cooley (2008, p. 322) concluded, “[i]t is a serious issue to just focus on data ‘of’ learning to the extent of neglecting data ‘for’ learning”. One of the challenges of schools in Mauritius, as suggested by the TQM paradigm, would therefore be to strive towards a more evidenced-informed position by examining the use of data and how understandings of the leadership-learning links they foster might be deepened.

**Meaningfulness of data within a socialising context**

Furthermore, in the present study, collaborative decision making was perceived by all the principals as being important in the process in enhancing the meaningfulness of the data. Some indicative comments were:

I think people would be more willing to use [quality] tools to collect data when a particular process is to be studied and when they are in a group empowered to make a decision […] based on the subsequent analysis of the data (PB).
Having multiple members of staff involved in analysing data collected by statistical methods and putting small teams, instead of individuals, responsible for making decisions will help to increase transparency in the decision-making process and give more meaning to the data in a more meaningful context (PC).

Here again, principals’ comments reveal their conviction that data in their original form have no meaning on their own (Earl and Fullan, 2003), but that they become valuable when they are shared, debated and applied in a social context (Brown and Duguid, 2000). Yet the study reveals this may only occur in actual fact for those in schools who hold formal leadership titles.

Ideally, transforming data and information into knowledge is a human process that involves taking on a “social life”, requiring “the collective capacity of teachers and leaders in schools to examine data, make critical sense of [them], develop action plans based on the data, take action and monitor progress along the way” (Earl and Fullan, 2003, p. 392). A key task of the school leader is to create and sustain an ethos with all stakeholders in the school and the community to have the knowledge they need in the quest for continual quality improvement. Moreover, there are research studies specific to educational data use (e.g. Huffman and Kalnin, 2003; Lachat and Smith, 2005; Vanhoof et al., 2011) suggesting that support initiatives that offer participants opportunities for discussion and to exchange experiences both inside and outside their schools are indeed desirable. The key point is that it is the discussions on the use of data and the associated socialising process, rather than the data themselves, that can guide meaningful strategies for and help develop ownership of action to improve teaching and learning (Zupanc et al., 2009).

**The need for a balance between quantitative and qualitative data usage**

Importantly, five of the six principals in the present study were adamant that staff members’ professional intuition, anecdotes and experience could not be ignored. Their beliefs are reflected in the following comments:

> Surveys could be conducted using questionnaires to gather data. […] Even if we were to use questionnaires to determine students’ and parents’ views, I would still have to rely on “hear-say” to understand how people see things, feel and think (PA).

> Teachers here are always talking about their best practices and exemplary methods they have used that have made a difference. They can always learn from each other based on their professional intuition and experience (PF).

Hence, in parallel with the TQM tenet of “data-driven decision-making”, leadership practices amongst some interviewees were informed by a qualitative view based on professional discourses, intuition, judgement, perceptions and lived experiences of educators that were perceived to enable informed decisions to be made. This is a noteworthy finding because it is suggesting how TQM needs to be nuanced so as to be relevant to schools. “People” are the “product”, and so the “qualitative” evidence is equally important. After all, education is a moral enterprise (Duignan, 2005, 2007; Fullan, 2003; Sergiovanni, 2006), and so there is an ethical imperative to know what people think, experience and perceive, not simply to rely on quantifications of performance. This is important in the quest for quality education, in deciding what is significant, right and worthwhile. While data may provide a
sound foundation that influences effective decision making in the process of continuous improvement, they are not the transformative process itself, and should not be considered the soul and heart of the process (Bonstingl, 2001). In summary, as Knapp et al. (2006) claim, data should “inform” rather than “drive” quality decisions. As it stands, data is aspirational, not actual – a point we shall return to later in this paper.

**Implications**

The use of data, including benchmarking, to measure work quality and refinement was not an area of strength amongst participant principals. Their responses are in agreement with the observations made by Evans (2007) that measurement, analysis and knowledge management efforts are often the least advanced of the quality dimensions within organisations, often because “the discipline required to establish and maintain an effective performance measurement system is viewed as an arduous task (Evans, 2007, p. 519). Principals’ lack of time and lack of confidence due to their inadequate knowledge of statistical tools and techniques were additional barriers for systematic data collection and analysis, again corroborating with other research findings (e.g. Earl and Fullan, 2003; Schildkamp and Kuiper, 2010; Shen and Cooley, 2008). On the other hand, Levin and Datnow (2012) have shown that where schools are successful in using data-driven decision making for improvement of teaching, learning and learning outcomes, principals and teachers were strong in these skills. Decision making based on facts and evidence, as a requirement of TQM, was not substantiated in the Mauritian study.

This situation is exacerbated by the fact that these principals and their staff did not have any professional learning opportunities in the area of carrying out research, data collection or data interpretation. This too is not an uncommon phenomenon, as evidenced by the findings of research conducted world-wide (Earl and Fullan, 2003; Herman and Gribbons, 2001; Schildkamp and Kuiper, 2010; Shen and Cooley, 2008; Vanhoof et al., 2011). “Rarely does teaching rhetoric include program planning, performance-based decision making, or the intricacy of data collection, analysis, and interpretation. These are new principles in the culture of most schools” (Herman and Gribbons, 2001, p. 2). Yet, the principals interviewed quite rightly pointed out, as Earl and Fullan (2003) do, that a distinction should be made between “data” in their crude, original form and processed data resulting in valuable and usable “information” and ultimately “knowledge” that may enable informed decisions to be made for school improvement.

There was strong agreement among all the principals as to the potential advantages that would accrue from data usage for decision-making purposes. Hence, there is an urgency to determine the current level of “leaders’ [and teachers’] expertise in accessing, generating, managing, interpreting, and acting on data” (Knapp et al., 2006, p. 39). It goes without saying that principals and teachers should also be allotted time to engage in professional learning opportunities to improve their knowledge and skills in handling data (Smith, 1996). However, care will have to be taken so that unintended or undesirable effects do not occur as a result of an overemphasis on data-driven decision making – for example, reduced motivation among teachers due to extra workload or a narrowing of curriculum focus (Schildkamp and Teddlie, 2008).

Concurrently, most principals felt strongly that qualitative data based on professional discourses and lived experiences should not be overlooked as unimportant in making informed decisions for improvement. This has clear parallels with research by Seashore Louis et al. (2005) who found that
teachers deemed to have a strong teacher culture supporting school effectiveness relied heavily on anecdotal data, intuition and experience rather than systematically collected data when making decisions about teaching. The evidence in this study therefore suggests that data “represent a tool for decision making, but the human element and human judgement cannot be divorced from the process” (Shen and Cooley, 2008, p. 326). Hence school leaders’ and teachers’ quality decisions should not be totally “driven” by or “based” on data as in strict TQM parlance, but, as Knapp et al. (2006) argue, they should rather be “informed” by data, otherwise leadership decisions based on data could be misleading.

Moreover, it has been argued by some that education is currently too regulated and controlled by “facts” or “supposed truths” (quantitative data) (Hargreaves and Fink, 2006). Others are in agreement with the “scientific method” in education change processes but believe that scientific laws can not hold true in all cases where human behaviour is concerned, and that while group behaviour may be predicted in terms of probability, it is much harder to explain the behaviour of each individual or the outcome of events (De Jager and Nieuwenhuis, 2005). This research therefore expands the knowledge of the work of principals as quantitative data users and further informs the field by eliciting the qualitative so as to gain a better understanding of social reality. To be more ethical, qualitative information based on professional discourses, human judgements and lived experiences should be valorised in an updated ethical TQM model for making educational decisions. Incidentally, we caution against the bias that quantitative data analysis is less human since, for example, participative decision making could still result from the use of questionnaires.

The “data-informed decision-making” tenet within such an ethical TQM model consists of two complementary opposites: the quantitative view based on numerical data and evidence, and the qualitative view based on professional discourses, human judgements, perceptions and lived experiences. A more participatory decision-making model for effective change for improvement should rightfully engage all stakeholders through various quantitative and qualitative processes. Change should not be alienating or it will fail (Evans, 2007), hence we argue that purposive use of both methods of data gathering is more likely to engage the whole school community towards collectively decided goals.

Conclusion

There are important lessons that can be learned from this study and that can inform educational leaders in the context of leading change for learning improvement even if they do not adhere (completely) to a TQM approach. First, there is a general lack of confidence and expertise by principals and teachers alike in the use of data-driven improvement of teaching, learning and student outcomes. Second, there is a need to generate participatory skills in a teamwork approach in data collection, statistical analysis and data usage. Next, this study emphasises the connection between making meaningful data in TQM and the social life of school leaders and teachers through participation and conversation. Another significant finding generated in this study is the need for a balance between a quantitative data culture in schools and the complementary importance of a qualitative view based on professional discourses, intuition, judgement and the perceptions and lived experiences of educators. Finally, we recommend that alongside the core systemic qualities of TQM, there are ethical, moral and cultural dimensions of leadership which could enhance the teaching and learning improvement.
To the best of our knowledge, this is the first ever study assessing the notion of “quality” in primary and secondary schools in Mauritius at the national level. With no Mauritian studies with which to compare the findings of the present study, there is much scope for further research. However, principals’ responses indicate that information (data analysed to produce contextual information) (Earl and Fullan, 2003) could be used more rigorously and systematically to inform school communities about teaching and learning improvement, while providing ideas as to how change could be best effected and supported. We argue that schools are making little use of readily available data and see little value in it for improving school practices. Evidence for decision making is elided such that the status quo is likely to be maintained rather than challenged. While this practice is perpetuated, the attainment of educational equity and “quality” for a productive citizenry and the nation's global competitiveness could be hampered.
Figure I

Source: Adapted from De Jager and Nieuwenhuis (2005, p. 254)

Figure II

<table>
<thead>
<tr>
<th>Plan</th>
<th>Do</th>
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</thead>
<tbody>
<tr>
<td>1. State the objective of the research collectively.</td>
<td></td>
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<tr>
<td>2. Make predictions about what will happen and why.</td>
<td></td>
</tr>
<tr>
<td>3. Develop a plan to test the change: what, when, where data must be collected?</td>
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<table>
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<tr>
<th>Act</th>
<th>Study</th>
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<tbody>
<tr>
<td>4. Carry out the research</td>
<td></td>
</tr>
<tr>
<td>5. Document problems and unexpected observations.</td>
<td></td>
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<tr>
<td>6. Begin analysis of the data.</td>
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</tbody>
</table>

| 12. Implement improvements on wider scale, if appropriate. |
| 11. Prepare a plan for the next research. |
| 10. Determine what modifications should be made. |
| 9. Summarise and reflect on what was learned. |
| 8. Compare the data to predictions made. |
| 7. Complete analysis of the data. |
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