Principals' perceptions of "quality" in Mauritian schools using the Baldrige framework

Jean Claude Ah-Teck

(School of Education, Faculty of Arts and Education, Deakin University, Melbourne, Australia)

Karen Starr

(School of Education, Faculty of Arts and Education, Deakin University, Melbourne, Australia)

Abstract:

Purpose

– This article aims to report the findings of a research project exploring Mauritian principals' receptivity to the main tenets inherent in Total Quality Management (TQM). The Malcolm Baldrige National Quality Award (MBNQA) framework (aligned with, and an outcome of, the TQM movement) provides a set of criteria for organizational quality assessment and improvement in the business, healthcare and education sectors. Given the imperative to improve the quality of schools in Mauritius, this study was designed to investigate the usefulness of the widely accepted MBNQA framework in the Mauritian context.

Design/methodology/approach

– A nationwide questionnaire survey of school principals explored the nature and strength of the Baldrige theory of relationships between leadership, systems and processes of primary and secondary schools and the ensuing outcomes. Correlation and regression analyses were conducted.

Findings

– The findings indicate that Mauritian school leaders play a critical role in influencing school outcomes directly and indirectly through the inner workings of the schooling system.

Research limitations/implications

– The research relied on principals' views as the unique source of data about school leadership. The perspectives of the other stakeholders within schools, including teachers, students and parents, should also count and would offer a richer description of leadership reality in Mauritian schools.

Originality/value

– This is the first ever study assessing empirically the notion of "quality" in primary and secondary schools in Mauritius at the national level. It contributes new perspectives about leadership for school improvement.

Introduction

It is generally agreed that providing a high-quality education system is crucial for a country's economic development and international competitiveness (Miller, 2001; Romer, 2008). In view of repositioning Mauritius to meet the needs of an increasingly competitive, knowledge-based and globalized economy, the government is attempting to develop the country into a "cyber island" that would be a "knowledge hub" in the Indian Ocean, conveniently located between Africa and Asia (Castells, 2001; Chan-Meetoo, 2007; Ministry of Education and Human Resources (MEHR), 2006a). However, concerns that the education system has not been adequately preparing students for work and life and unsatisfactory academic achievement in schools have fuelled the government's drive to explore ways to redesign the education system and improve the quality of schools. To this end, the "Government is committed to carrying out fundamental reforms in education with a view to providing World Class Quality Education to enable young Mauritians to be employable in new sectors of the economy, to have more fulfilling jobs and also to be competitive at the international level" (Ministry of Education, Culture and Human Resources (MECHR), 2009, p. 10). The ongoing reform policies undertaken since 2001 are to be seen in this context.

A fundamental aim of the various educational reforms is to further democratize education and provide "quality" education for all Mauritian children, in the spirit of the goals and objectives set by the World Education Forum on Education for All (EFA) in Dakar in 2000 (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2000). The Dakar Declaration seeks to achieve EFA by 2015 and requires all nations to expand participation in education while "improving all aspects of the quality of education and ensuring excellence […] so that recognised and measurable learning outcomes are achieved by all, especially in literacy, numeracy, and essential life skills" (Saito and van Cappelle, 2009, p. 2). This is also aligned with the strategic objectives defined by the United Nations Millennium Development Goals (United Nations, 2006).

Ironically, as acknowledged in the Mauritian "Rat Race" policy (Ministry of Education and Scientific Research (MESR), 2001, p. 1), "the major dysfunction of the Mauritian educational system is to be found in the bottleneck situation" created by the highly selective Certificate of Primary Education (CPE) examination, "constraining access from primary to secondary education" for many of the nation's children. To illustrate this, the document mentions that, for the 18,000 children passing the CPE examination, only 1,000 places are available in the small number of so-called "star" schools, perceived as providing "quality" education at the secondary level. The majority of the other schools, considered as low-achieving or sub-standard, do not attract enrolments and are resented by parents (Ah-Teck and Starr, 2012). Consequently, education structures systematically segregate students into "star" schools and other less desirable schools that curtail the education experience of a huge percentage of Mauritian children. Although every Mauritian child is guaranteed a seat in a state or private secondary school, there is severe competition, evocatively referred to as the "Rat Race" among the children, to have a chance to enrol in the "star" schools. The competition for acceptance into "star" schools emphasizes the "end" rather than the "process" of learning and exerts immense psychological pressure on both the children and their parents, let alone life-long consequences in terms of employment and further education opportunity.

A further paradox is that although all children have access to primary education, a significant proportion of them cannot successfully remain in the system. The average failure rate on the CPE

examination over the years 2001-2005 stands at over one third (Ministry of Education and Scientific Research (MESR), 2005), indicating that the primary school system is not delivering basic learning outcomes after six years of schooling for a significant proportion of pupils. This situation is at odds with the view that "[a] quality education system must manage to provide all children and young people with a comprehensive education and with an appropriate preparation for working life, life in society and private life" (Fredriksson, 2004, p. 2), while putting in jeopardy the long-term economic competitiveness of Mauritius as a global player. Mauritius, as a small island country that relies largely on its people as its key resource, cannot afford to lose a significant proportion of its human capital if it wants to compete in the global economic market.

Reflecting the Mauritian government's "quality" agenda and its focus on the work of school leaders, this paper reports the findings of research exploring principals' receptivity to the main ideas inherent in total quality management (TQM), their views about how quality improvement issues are being or may be addressed, and whether these bear resemblance with the tenets of TQM which has been widely used to transform organizations outside of education (Deming, 1986, 2000). TQM embraces principles that are consistent with much current literature about school improvement (e.g. Hargreaves and Fink, 2004; Harris, 2011; Leithwood et al., 2004, 2006). TQM has also been used to create major changes for improvement in educational institutions and has already been found to be successful (Blankstein, 2004; Bonstingl, 2001; Sallis, 2002; Mukhopadhyay, 2005) although this literature is not prevalent, and hence our inquiry into TQM as an idea for the Mauritian schooling system.

However, one of the major hurdles to empirical investigations of quality in schools is the difficulty of arriving at clear definitions of "quality" in the field of education. One defining framework providing a set of criteria for organizational quality assessment and improvement that has been used extensively by business, healthcare and higher education organizations for more than a decade is the Malcolm Baldrige National Quality Award (MBNQA) framework. The framework's criteria are generally regarded as forming a comprehensive tool for design and self-evaluation of educational systems. Indeed, the MBNQA framework is both aligned with, and is an outcome of, the TQM movement (Karathanos, 1999).

Given the wide acceptance and use of the MBNQA framework (Badri et al., 2006; Winn and Cameron, 1998), coupled with the imperative to improve the quality of schools in Mauritius (Ministry of Education and Human Resources (MEHR), 2006b) and the absence of empirical investigations of the quality of Mauritian schools (Ah-Teck and Starr, 2011, 2012), it is appropriate that a study be designed to explore whether the MBNQA Education Criteria for Performance Excellence could be usefully deployed in the Mauritian context. Moreover, empirical research across contexts testing the assumed relationships among the quality dimensions within the MBNQA framework has tended to be limited to higher education but its usage is rare in schools. Addressing this gap in scholarship is also a key objective of this paper.

The paper reports the quantitative findings of the study, while the qualitative findings have been described in detail elsewhere (Ah-Teck and Starr, 2011, 2012). Specifically, the paper investigates empirically the assumed causal relationships in the MBNQA Education Criteria for Performance Excellence framework in the Mauritian context in the course of assessing the current quality status of primary and secondary schools. By providing empirical evidence of the nature and strength of the Baldrige theory of relationships between leaders, systems and processes of primary and secondary

schools and the ensuing outcomes, the findings indicate that school leaders play a critical role in influencing school outcomes directly and indirectly through the inner workings of the schooling system, and contribute new perspectives about leadership for school improvement.

Defining quality in education

Undoubtedly, there have been difficulties in defining precisely what quality is in the field of education, and yet the word has gained prominence in educational circles despite its lack of definition. The debate continues between those who identify quality in education with excellence (Peters and Waterman, 1982), value addition (Feigenbaum, 1983), conformance of educational output to goal (Crosby, 1979), defect avoidance in educational processes (Crosby, 1979) and meeting or exceeding stakeholders' expectations of education (Parasuranam et al., 1985). These debates have led to further questions related to the fitness of educational outcomes and the quality of students' educational experiences (Juran and Godfrey, 1999) and further into discussions about the relationship between quality and educational standards in general (Middlehurst and Gordon, 1995).

A popular conceptualization of quality in education is from the school effectiveness perspective, which advocates for the "black box" technique of measuring inputs and output (Teddlie and Reynolds, 2000). Hoy et al. (2000, p 13) argue that the "[m]easures that can be used as yardsticks for quality of education are pupil grades, attendance figures, staying-on rates, exclusion rates, teacher qualifications, pupil-teacher ratios". These measures can be linked to the "internal efficiency" of the school system, which, in addition to indicating what goes on in the process, controls for wastages and aids decisions on improving the provision of education (Liston, 1999). However, such indicators of quality are restricted as there are undoubtedly some qualitative, immeasurable attributes of good education that help to produce the output.

In Saitoti's (2003) view, the major determinants of quality education include curriculum content, relevant instructional materials and equipment, physical facilities, conducive learning environments, the quality of the teaching force, as well as assessment and monitoring of learning achievements. Saitoti (2003) suggests that quality education should shift from mere certification to encompass the development of analytical, cognitive, motivational and creative potential of the individual including critical imagination, spiritual and ethical values. Indeed, some authors have indicated concerns that school effectiveness fails to accommodate the moral aspect of education. As Reid (1997, cited in Holt, 2000, p. 5) argues, "the term 'effective' is devoid of moral content, and it is an inappropriate concept to apply to the moral activity of schooling."

Another way of looking at quality in education concerns its linkage with "accountability": schools that impose and fulfill the benchmarks and persistently work to achieve standards stipulated in the system's educational objectives are accountable, and hence are assumed to possess quality (Louis and Robinson, 2012; Watterson and Caldwell, 2011). Hoy et al. (2000, p. 10) state:

Quality in education is an evaluation of the process of educating which enhances the need to achieve and develop the talents of the customers of the process, and at the same time meets the accountability standards set by the clients who pay for the process or the outputs from the process of educating.

However, this benchmark-based concept of quality is also problematic. Even if the curriculum and instructional processes are poorly designed, schools may well meet standards and target grades if they teach to the test (Zhao, 2007). Besides, there is no guarantee that these standards are worth achieving in the first place. Hence, despite accountability, schools may lack quality (Winch, 1996). In a decentralized school-based management system, a school can innovate by designing a broad-based curriculum and offering a wide range of learning experiences, thereby encouraging students' engagement and enhancing quality (Holt, 2000). But having said that, there is little evidence to suggest that devolved autonomy leads to "quality" in education (Abu-Duhou, 1999).

The International Commission on Education for the twenty-first century called for holistic education that will promote each child's mental, physical, intellectual and spiritual development. Quality education must be viewed in the broader social context and supported by the four pillars of learning: learning to know, learning to do, learning to live together and learning to be (United Nations Educational, Scientific and Cultural Organization (UNESCO), 1996). However, Holt (2000, p. 4) argues that:

[…] education is concerned with the development of minds of pupils; schools produce educated persons who, by virtue of their schooling, make their way in society to their own and society's benefit. So far so good; but we encounter a difficulty immediately. How are these benefits to be construed? Is our aim to be the pursuit of happiness? The creation of wealth through capitalism? The religious life, made manifest? Our concept of quality is dependent on which we choose.

Furthermore, in many societies, social goals change with time. America's priority on human rights and personal freedom in the 1960s has changed to a focus on success in the global economy in the 1990s (Mukhopadhyay, 2005). Britain's current education policy is on schools demonstrating what students "know and can do" rather than numinous goals (Holt, 2000). A Japanese white paper on education in the 1990s shifted its focus from the application or adaptation of science and technology to pursue the objective of the "Nation Based on the Creation of Science and Technology" (Harayama, 2001, p. 9). Similarly, the social goal in Mauritius has also changed from being a literate society in the 1970s to a knowledge society in this new millennium. The emphasis is also shifting from a supposedly "value-neutral" education to a value-based one (MEHR, 2006a) so that the balance between objective "facts" and questioning these facts becomes a great challenge to the professional teacher (Fredriksson, 2004).

Perhaps the most familiar notion of quality is that it has absolute or relative connotations (Sallis, 2002). The implications of absolute quality products are high standards of production and presentation associated with expensiveness, rarity and prestige. As Pfeffer and Coote (1991, p. 4) put it, a product or service has the attribute of absolute quality when "[m]ost of us admire it, many of us want it, few of us can have it". In education, this would apply to an elitist and exclusive system, exemplified in Mauritius by the few highly demanded, so-called "star" schools. On the other hand, relative quality becomes evident when similar products or services provided by several organizations are compared at a given time and place, or when products or services of the same organization are compared over time (Sallis, 2002). In Mauritius, for example, it is not uncommon that while some parents scramble to get their children admitted in one particular school for good quality education, others withdraw their children from the very same school through dissatisfaction with the "quality" of education delivered.

Parents define the quality of education differently. In general, the public sees quality as more to do with the total effect schooling has on the individual rather than mere examination results (Hoy et al., 2000). Reference is also made to relative quality over time, for example, when people nostalgically recall the school experience they had as students.

Irrespective of definitions of quality in education, the educational literature indicates that increasing attention is being devoted to an important shift in research on leadership in schools towards forms that promote, nurture and support distributed or shared notions of leadership, including an emphasis on teacher leadership (e.g. Crowther et al., 2002; Starr and Oakley, 2008). Discussion on principals' leadership in relation to quality schools now inevitably moves beyond formally appointed leaders, personality traits, roles, and positions, and draws on the tacit knowledge, skills and merit of staff members and accounts for what the group knows and does collectively (Lee et al., 2012; Spillane et al., 2001; Spillane, 2006). From this perspective, principals should develop and communicate vision, optimism and purpose with their staff (Bonstingl, 2001; Sallis, 2002). They build leadership capacity by empowering staff and having a high level of tolerance for risk-taking, ambiguity, patience and integrity. This recognizes the importance of participation, collaborative decision making and teamwork to enable stakeholders to contribute to the processes of visioning and implementing rather than simply accepting the formal leader's personal vision (Bush and Glover, 2003). Role players are motivated and committed to realizing educational goals through shared leadership practices (Griffith, 2001).

Leadership in the distributed sense therefore avoids the limitations inherent in the traditional notion of leadership understood individually (Gronn, 2008). In particular, it is suggested that improvements in student outcomes are more likely when teachers are empowered in decisions related to teaching, learning and assessment (Silins and Mulford, 2002; Starr and Oakley, 2008). Thus, within the general field of school leadership, teacher leadership has more significant effects on student achievement than principal leadership (Leithwood and Jantzi, 2000; Leithwood et al., 2004; Silins and Mulford, 2002). In fact, school leadership appears to be second only to teaching in its impact on student outcomes (Leithwood and Jantzi, 2000; Leithwood et al., 2004).

"Quality" becomes an integral part of a school once the thinking and visioning of staff and the culture of the school as a whole organization are aligned. The principal is entrusted with the responsibility of fully adopting the total quality philosophy throughout the organization, empowering staff to continuously improve by removing barriers to their natural joy and pride of "workmanship" (Deming, 1986, 2000). Principals should be the driving force in employing strategies to achieve improvements in schools with their staff in a shared, teamwork sense. This means that quality achievement has to be managed, it just does not happen by chance and it has to be a concern for everyone at all levels of the organization. School leaders operating at all levels in concert with a formally appointed principal create an atmosphere of trust that enables commitment to a collective vision which in turn brings about deep, significant changes (Dinham, 2005).

In summary, the concept of quality in education is rapidly changing, but it also has different emphases according to context, culture and stakeholder interests. Hence, "[quality] has endless possibilities of evolution and unfolding, making it an endless journey with a deliberate purpose and design and not necessarily a destination" (Mukhopadhyay, 2005, p. 18). In this sense, defining quality is an elusive ideal. Moreover, exact definitions of quality are not particularly helpful when actual consequences

flow from different meanings attached to quality (Sallis, 2002). The diversity of dimensions, attributes and definitions is so great that systematic and reliable investigations in education are difficult to conduct, and often it is unclear which definition of quality is being considered or which dimensions are included (Winn and Cameron, 1998).

Problems in definition and evaluation of "quality" led the US Congress to mandate the development of a common framework upon which judgments of processes and outcomes could be based and, in response, the MBNQA was created in 1988. The MBNQA, or Baldrige Award, now represents America's most prestigious organizational honour for innovation and performance excellence and is presented to organizations in the manufacturing and service sectors including healthcare and education (Foster et al., 2007). As a quality assurance system, the MBNQA framework is in fact interrelated with TQM since it comprises elements that are regarded as key characteristics of TQM (Karathanos, 1999).

Overview of the MBNQA framework

Concerns about education in the USA over the past two decades have revolved around quality and the continuing escalation of costs with no demonstrable improvement in results (Karathanos, 1999). As in Mauritius, there is a growing perception that education is failing to keep pace with the standards of quality required to remain competitive in a global economy (Bah-lalya, 2006), in sharp contrast with the business sector where organizations "are getting leaner, sharpening their focus, serving their customers and trying to adjust to the dictum of doing more with less and doing it better" (Seymore cited in Karathanos, 1999, p. 232).

The competitive nature of the global economy and the growing requirements to succeed in the US market provided impetus for the passage of the Malcolm Baldrige National Quality Improvement Act into law in August 1987 (Belohlav et al., 2004). This led to the establishment of a competitive MBNQA program in 1988 aiming "to improve quality and productivity in the USA by establishing guidelines and criteria that can be used by organizations to evaluate their own quality improvement efforts" (Foster et al., 2007, p. 334). The Baldrige Award is administered by the National Institute of Standards and Technology, a non-regulatory agency of the US Department of Commerce, with the assistance of the American Society for Quality and is presented annually to US organizations by the President of the USA. The MBNQA criteria are widely recognized throughout the international business community as a comprehensive and systematic framework for assessing performance excellence and guiding quality improvement efforts.

On the basis of the success of this award system in the business sector, the MBNQA assessment framework was extended to education and healthcare (Meyer and Collier, 2001). The Baldrige Quality Award for education was implemented for the first time in 1999 (Karathanos, 1999). The MBNQA Education Criteria for Performance Excellence form a set of interrelated, results-orientated requirements relating to seven organizational categories (Bonstingl, 2001; National Institute of Standards and Technology (NIST), 2004):

A, leadership;

B, strategic planning;

C, student and stakeholder focus;

D, information and analysis;

E, faculty and staff focus;

F, educational and support process management; and

G, school performance results.

The general MBNQA theory that "leadership drives the system which creates results" suggests that the performance relationships are recursive (Meyer and Collier, 2001). The original framework, depicted in Figure 1, signifies the interdependent relationships between the different dimensions, and was therefore selected for use in this study. This version of the model was in use when the pilot criteria for the healthcare and education sectors first became available (Olson, 2009), and hence relates to most of the literature about the MBNQA in education.

It should be noted, however, that the Baldrige framework, which evolved from TQM and which is continuously being refined (see NIST, 2004, 2009-2010), is not aligned with a particular scholar or practitioner's thinking, or a particular definition of quality, but rather encompasses a comprehensive variety of viewpoints on quality (Dean and Bowen, 1994). The framework has set a national standard for quality in the USA, and many organizations, including service organizations like schools, use the criteria to pursue higher levels of quality in systems and processes (Swift et al., 1998).

In this framework, the seven Baldrige dimensions A to G are assumed to be related in a recursive causal model and that the sign of each path coefficient is positive. So, for example, leadership's direct effects in the causal model are represented in two ways: first, as the score of the "driver dimension" of leadership increases, the scores of the four "system dimensions" of strategic planning, information and analysis, faculty and staff focus, and educational and support process management also increase; and second, as the leadership score increases, the scores of the two "outcome dimensions" of student and stakeholder focus and school performance results should also increase. Leadership's indirect effects are represented by increases in the leadership score causing the scores of the outcome dimensions to increase as a result of leadership influence on the mediating system dimensions.

The development of the Baldrige education criteria is significant in the education sector because they have become an accepted framework (aided by the status of the award) for pursuing educational quality (Karathanos, 1999; Winn and Cameron, 1998). The instrument has been validated empirically by several researchers including Badri et al. (2006) and Winn and Cameron (1998) in the higher education sector. Empirical research investigating the nature and strength of the assumed causal relationships among the quality dimensions within this instrument in primary and secondary education has been rare (e.g. Olson, 2009).

Adapting a business culture to education

The credit for developing the philosophy of TQM goes to two Americans, W. Edwards Deming and Joseph Juran (Deming, 1986, 2000; Juran and Godfrey, 1999). Although TQM was originally intended for the industry sector, Deming argued that his "management principles" could equally be applied to the service sector, including education (Crawford and Shutler, 1999; Dale, 2003). Many authors including Bonstingl (2001) and Mukhopadhyay (2005) have interpreted how Deming's principles might be applied by those leading schools or education system reforms to achieve continual quality improvement and to suit the different purposes of education. Many terms used by Deming, which are seemingly "alien" in an education context, have been demonstrated to support distributed notions of leadership and democratic modus operandi, where teacher leadership, for example, is equally valorized (Mukhopadhyay, 2005; Murgatroyd and Morgan, 1993).

By and large, the argument that because TQM methodology is conventionally written in the language of manufacturing, it is only relevant in that context, and is bent to the will of service organizations with difficulty and doubtful utility, demonstrates a misunderstanding of both the origins and philosophy of quality management and confuses means with ends. It is possible that, to the extent that leadership and management tools are universal and transferable across the manufacturing/service divide, so too are quality strategies.

Whilst there are certain features of quality management that are associated with particular theorists, all of the major TQM proponents emphasize that leadership, while comprising formal arrangements, is a circumjacent phenomenon that exists throughout the organization, at all levels, with the key role of leaders (formal and informal) being to develop strategies, mobilize teams and use tools that will facilitate the realization of a collective vision and wisdom as an element of cultural change in the pursuit of quality (Crosby, 1979, 1984; Deming, 1986, 2000; Feigenbaum, 1983; Ishikawa, 1984; Juran and Godfrey, 1999). Leadership is in focus in this paper, since it is the means by which the Mauritian government hopes to raise the quality of schools.

It is perhaps unsurprising that the Baldrige framework presently enjoys much currency in educational literature (NIST, 2009-2010) and will be canvassed in this research in assessing the current quality climate in schools, with its seven quality dimensions used as a basis for the analysis of the data – especially in relation to educational leadership. This stance is supported by Mauritian policy makers who are of the view that TQM may hold the potential to draw out schools from their current quality crisis as the Ministry of Education rhetoric endorses quality management (see Ah-Teck and Starr, 2011, 2012).

The research

The construction of our questionnaire was based on the structure and contents of the MBNQA Education Criteria for Performance Excellence framework (NIST, 2004), which has been used to assess the quality climate in educational institutions (Badri et al., 2006; Olson, 2009; Poston, 1997; Winn and Cameron, 1998), as well as on a comprehensive survey of the literature of quality in education. Criteria were customized to suit the Mauritian study. The study aimed to assess the perceptions of primary and secondary school principals about the current state of quality in Mauritian schools in terms of the seven quality dimensions of the MBNQA Education Criteria for Performance Excellence. The idea was to determine to what extent principals were using and agreed with quality principles to lead schools in Mauritius from their own perspective. Based on the notion that the quality of schools is being assessed, the questionnaire was named the School Quality Assessment Questionnaire (SQAQ).

The SQAQ consisted of an initial section of demographic data followed by Sections A-G, with each section dealing with a particular dimension of the MBNQA education criteria to determine respondents' perceptions as to their relevance to a school's quality. For example, in Section A (leadership), the items aimed at determining to what extent respondents regarded organizational leadership, public responsibility and citizenship as relevant to a school's quality culture, etc. In Sections A-G of the questionnaire, respondents considered a list of statements to determine the extent they reflected their school's current situation using a five-point Likert scale. The pre-test of the SQAQ was piloted in one secondary school in Mauritius, where the questionnaire was personally administered. In addition, the draft questionnaire was reviewed by two experienced school principals and the director of the Bureau de L'Education Catholique. Based on their recommendations and on the outcome of the pilot study, the questionnaire was revised, incorporating corrections and adaptations. Hence the questionnaire can be considered to have both face validity and content validity.

In this study, the principals of all 415 schools in Mauritius, consisting of 258 (62.2 per cent) primary schools and 157 (37.8 per cent) secondary schools (state and private schools included) formed the research population. Questionnaires totalling 213 (51.3 per cent) were returned, of which 127 (59.6 per cent) and 86 (40.4 per cent) were from the primary and secondary sectors, respectively. Participating schools represented the diversity in the research population in terms of school type (primary/secondary, private/state, Catholic/non-Catholic), gender (boys/girls) and location (urban/rural).

The Microsoft Excel 2007 and IBM SPSS Statistics 19 software programs were used to analyse the collected questionnaire data. For the introductory background information section of the SQAQ, descriptive statistics was used. Statistical tests, namely one-way analysis of variance (ANOVA) and t-test procedures were also used to determine differences in the responses of principals among the different background information categories. The aim of this section was to summarize data that could possibly be used to place responses to the questions in the other sections of the SQAQ in perspective. For Sections A-G of the SQAQ, correlation and regression analyses were done to find the strengths and directions of relationships among the different dimensions on the SQAQ. As is customary in social science research, tests of significance were evaluated at the 0.05 level.

We formulated four research hypotheses to test the Baldrige model's assertion that leadership acts as a "driver" of quality management by directly influencing the four system dimensions:

H1. Leadership has a positive influence on strategic planning.

H2. Leadership has a positive influence on information and analysis.

H3. Leadership has a positive influence on faculty and staff focus.

H4. Leadership has a positive influence on educational and support process management.

Next, we formulated two hypotheses to test the Baldrige model's assertion that leadership has a direct impact on the two outcome dimensions:

H5. Leadership has a positive influence on student and stakeholder focus.

H6. Leadership has a positive influence on school performance results.

Finally, we formulated eight hypotheses to examine the directional relationship between each of the four system dimensions and each of the two outcome dimensions:

H7. Strategic planning has a positive influence on student and stakeholder focus.

H8. Strategic planning has a positive influence on school performance results.

H9. Information and analysis has a positive influence on student and stakeholder focus.

H10. Information and analysis has a positive influence on school performance results.

H11. Faculty and staff focus has a positive influence on student and stakeholder focus.

H12. Faculty and staff focus has a positive influence on school performance results.

H13. Educational and support process management has a positive influence on student and stakeholder focus.

H14. Educational and support process management has a positive influence on school performance results.

Each of these 14 hypothesized relationships was supported by the general theory that "leadership drives the system which creates results" (Meyer and Collier, 2001). The general theory guided our assumption about a recursive causal model and the direction for each of the specific hypotheses. In testing the 14 hypotheses, correlation analysis was carried out to ascertain the interrelationships between the quality dimensions on the SQAQ. Then, simple regression analysis was used to examine the assumed causal relationships between the dimensions individually. Finally, multiple regression analysis was used to determine how some dimensions collectively influenced the outcome dimensions.

We used the IBM SPSS Statistics 19 software program to conduct internal reliability analyses for the seven sections/dimensions in the questionnaire and for the whole questionnaire. Nunnally (1978) suggests that a coefficient of 0.7 or above is desirable. Around 0.8 is recommended for research by Streiner (2003). The reliability coefficients for the various sections of the SQAQ are presented in Table I.

The reliability coefficients for Sections A-F ranged from 0.862 to 0.920, indicating a high positive correlation among all items within each of these sections. The reliability coefficient for Section G was 0.754, signifying a moderate, albeit sufficient, positive correlation among all items within this section. The overall reliability coefficient for the questionnaire was 0.961, considerably exceeding guidelines for adequate reliability (Nunnally, 1978; Streiner, 2003) and demonstrating very strong internal consistency.

Findings

SQAQ: analysis of background information

More than two-thirds (68.1 per cent) of all principals had at least six years' experience in their current position. The majority (85.0 per cent) of participating primary principals held the highest possible educational qualification for the post of principalship (Advanced Certificate in Educational Management), while more than half (51.2 per cent) of their secondary counterparts held a Masters degree. An overwhelming majority (94.8 per cent) of all respondents were aged 40 years or more, while a slight majority (54.9 per cent) were at least 50 years of age. Males represented 45.5 per cent of respondents and 54.5 per cent were female.

Statistical tests were also used to determine differences, if any, in the responses of principals among the different background information categories. In particular, t-tests were used to examine differences in responses of principals by school type (i.e. between primary and secondary principals)

and by gender, while one-way ANOVA procedures were used to test for differences in responses of principals by work experience, highest qualification and age.

It was found that there were no significant statistical differences in responses of principals by school type, highest qualification in the primary sector and gender (whether between all male and all female principals, between primary male and female principals, or between secondary male and female principals). However, there were significant statistical differences, all at 5 per cent level ($p<0.05$), in responses of principals by work experience, highest qualification in the secondary sector and age.

The significant differences in responses of principals by work experience were between the "2-5" and "6-9" year groups. Upon closer analysis, it was noted that these differences were not attributed to responses of primary principals, but instead to responses of secondary principals between the "<2" and "6-9" year groups.

The significant differences in responses of secondary principals by highest qualification were between the "Bachelor's degree" and "postgraduate diploma" categories, and between the "Bachelor's degree" and "Master's degree" categories.

The significant differences in responses of principals by age were between the "40-49" and "50+" year groups. There were also significant differences in responses of primary principals between the "40-49" and "50+" year groups, but no significant differences in responses of secondary principals by age.

Correlation analysis

As part of the testing of the 14 hypotheses, H1-H14, correlation analyses were carried out in order to describe the degree, or strength, of the association that exist between the seven dimensions (Levin and Rubin, 1997) on the SQAQ, as assumed in the Baldrige Education Criteria for Performance Excellence framework (1992-1996). Figure 2 shows the resulting Pearson correlation coefficients among the seven dimensions.

Using the guidelines stated by Hinkle et al. (2002), correlation coefficients between 0.00 and 0.30 show little, if any, correlation; 0.30-0.50, a low correlation; 0.50-0.70, a moderate correlation; 0.70-0.90, a high correlation; and 0.90-1.00, a very high correlation. Accordingly, Figure 2 shows that all the correlations among the seven dimensions were positive in nature, and most of these were moderate in strength. Only one of the relationships had a correlation coefficient less than 0.50, being between strategic planning and school performance results (0.468). Four of the seven relationships were in the high positive category; these were between the following dimensions:

    (1) leadership and strategic planning (0.751);

    (2) leadership and student and stakeholder focus (0.700);

    (3) faculty and staff focus and student and stakeholder focus (0.759); and

(4) educational and support process management and student and stakeholder focus (0.803).

These relationships suggest that the assumed causal relationships in the Baldrige Education Criteria for Performance Excellence model hold in the Mauritian study, thus providing initial empirical support for each of the 14 hypotheses, H1-H14.

Regression analysis

In testing the 14 hypotheses, H1-H14, different sets of regression analyses were also conducted. In the first set, each of the four system dimensions (dependent variables) was regressed on the leadership dimension (independent variable). Table II presents the standardized regression coefficients produced by this set of analysis.

For example, leadership explains 56.5 per cent of the variation in the strategic planning dimension and 30.6 per cent of the variation in the faculty and staff focus dimension. Thus, as per Table II, the relationship between the leadership dimension and each of the system dimensions was found to be between weak to moderate. However, they were all statistically significant.

The second set regressed each of the two outcome dimensions (dependent variables) on the leadership dimension (independent variable). These regression analysis results reported in Table III again indicate that leadership had a statistically significant effect on student and stakeholder focus and school performance results, although the relationship was moderate in the former case and weak in the latter case.

Next, we examined the relationships between the system dimensions (individually) as independent variables and the outcome dimensions as dependent variables. Again, the results, given in Table IV, indicate that each of the four system dimensions had either a moderate or relatively weak, but statistically significant, effect on the two outcome dimensions.

Finally, we ran two sets of multiple regressions where the two outcome dimensions were the dependent variables and the four system dimensions were the independent variables. The results are reported in Table V.

The four system dimensions collectively suggested a relatively strong and statistically significant effect on the student and stakeholder focus dimension, accounting for 75.9 per cent of the variation in the latter dimension. On the other hand, the four system dimensions together had a moderate and statistically significant effect on the school performance results dimension, explaining 43.1 per cent of the variation in that dimension. However, within the two multiple regression models, there were relatively weak and statistically non-significant individual relationships between:

(1) the student and stakeholder focus dimension and the Information and analysis dimension;

(2) the school performance results dimension and the strategic planning dimension;

(3) the school performance results dimension and the information and analysis dimension; and

(4) the school performance results dimension and the faculty and staff focus dimension.

These non-significant results are highlighted in grey in Table V.

To summarize, the regression analyses show that leadership significantly influenced each of the four system dimensions, thus giving support to the first four hypotheses, H1-H4. Leadership also significantly impacted on each of the two outcome dimensions directly, providing support for the next two hypotheses, H5 and H6. Moreover, the system dimensions, individually and collectively, had a significant effect on the outcome dimensions, and these findings were in favour of the remaining eight hypotheses, H7-H14. These regression analysis results, together with the earlier positive correlation analysis results, are empirical evidence that both the direct effects of leadership (driver dimension) on the outcome dimensions, and the indirect effects of leadership on the outcome dimensions by mediating effects via the four system dimensions, assumed in the Baldrige Education Criteria for Performance Excellence framework, were supported in the Mauritian study.

Discussion

Background information on the participants to the SQAQ survey was described based on school type (primary or secondary), work experience, highest qualification, age and gender. It was noted that there were no significant differences in responses of principals by school type, highest qualification in the primary sector, and gender. However, significant differences were noted ($p<0.05$) in responses by work experience, highest qualification in the secondary sector, and age. Of these observations, the most remarkable one is that there were no significant differences in the responses of principals associated with the type of school they were leading. This may be surprising since primary and secondary schools in Mauritius have different organizational structures, staff profiles and pedagogical approaches, implying that different leadership styles might be expected.

A major finding of this research related to the crucial role of school leaders in driving the system that produces outcomes, as assumed in the Baldrige Education Criteria for Performance Excellence framework (1992-1996). It was found that Leadership had a statistically significant influence on the four systems dimensions (strategic planning, information and analysis, faculty and staff focus and educational and support process management), with the proportions of variation varying between 30.6 and 56.5 per cent. These gave support to the hypotheses, H1-H4, which meant that leadership was an overall driver of the inner workings of the system in Mauritian primary and secondary schools. These results are in agreement with previous research at the elementary and secondary school level (Olson, 2009; Poston, 1997) and also in higher education (Badri et al., 2006; Winn and Cameron, 1998) (see Table VI).

The research results also support an important causal relationship between leadership and strategic planning. The influence of leadership on strategic planning, with a correlation coefficient of 0.751,

was relatively stronger than leadership's influence on the other system dimensions of information and analysis, faculty and staff focus, and educational and support process management with associated correlation coefficients of 0.580, 0.553 and 0.558, respectively. The stronger influence of leadership on strategic planning was also reported in other empirical studies (Winn and Cameron, 1998). This indicates that school principals recognized their critical role in developing strategic objectives (strategy development) and converting the strategic objectives into action plans (strategy deployment).

A particularly interesting finding was that leadership had a statistically significant and direct influence on each of the two outcome dimensions of student and stakeholder focus and school performance results, with a moderate influence on the former dimension and a weak influence on the latter. These findings provided empirical support for the next two hypotheses, H5 and H6. They also corroborate with empirical research by Badri et al. (2006) and Poston (1997). However, Olson (2009) did not find any direct linkages between leadership and the two outcome dimensions, while Winn and Cameron (1998) could only find support for the direct impact of leadership on student and stakeholder focus but not on school performance results (see Table VI).

Furthermore, the regression analysis supported the claim that the four system dimensions, individually and collectively, influenced each of the two outcome dimensions. Thus, there was empirical support given to the last eight hypotheses, H7-H14. Hence this study provided evidence that leadership's role in school quality management systems was also indirect since it influenced the two outcomes dimensions through the four system dimensions. This is aligned with a burgeoning literature indicating the positive impact that school leaders have, mostly in an indirect way through the support and development of effective teaching and the implementation of effective organizational processes, on a range of academic and non-academic outcomes (e.g. Leithwood et al., 2004; Robinson, 2007). This also reinforces the claims of quality theorists who emphasize the importance of system and process improvement in achieving quality. For instance, Deming (1986, 2000) persistently asserted that a vast majority of quality problems and barriers cannot be attributed to employees' lack of motivation or skills per se, but rather to flaws in the design of systems and processes.

Strategic planning had a statistically significant causal influence on both outcome dimensions. This result corresponds with the research findings of Badri et al. (2006), Poston (1997) and Winn and Cameron (1998). However, Olson (2009) found that strategic planning did not exert such influence on either of the two outcome dimensions (see Table VI).

It was also found that information and analysis had a direct causal relationship on both outcome dimensions. Once again, this finding concurs with those of Badri et al. (2006), Poston (1997) and Winn and Cameron (1998), but Olson (2009) only found a direct causal influence of information and analysis on student and stakeholder focus and not on school performance results (see Table VI). In the Mauritian study, the relationship indicated that effective use of measurement, information and data, all addressed in the Baldrige criteria, represented key assets in the organizational performance.

The research found that faculty and staff focus had a relatively strong positive causal influence on student and stakeholder focus, with a correlation coefficient of 0.759 between them (the second highest correlation coefficient between any two dimensions). There was another relatively strong

causal relationship between educational and support process management and student and stakeholder focus; this was indeed the largest statistically significant individual relationship between any two quality dimensions with the former dimension accounting for 64.5 per cent of the total variation in the latter dimension and a correlation coefficient of 0.803 between them. These results provide evidence that the design and delivery of educational and non-educational processes in Mauritian primary and secondary schools were critical to student and stakeholder satisfaction and should be managed from these perspectives. A similar conclusion was reached by Badri et al. (2006) in their study.

Considering the results of the correlation and regression analyses, the conclusion is that all the 14 hypotheses, H1 through H14, were empirically supported in the Mauritian study, giving credence to the general MBNQA theory that "leadership drives the system which creates results" (Meyer and Collier, 2001). In other words, school leaders in Mauritius played a critical role in shaping the inner workings of the organizational operations and systems, and ultimately school outcomes.

Conclusions and implications

The findings of the Mauritian study demonstrated clearly the vital role of principals in the effective implementation of quality initiatives in primary and secondary schools. These results corroborate with those of Badri et al. (2006) and Winn and Cameron (1998), using a similar Baldrige framework methodology, where it was found that strong support by senior leaders acted as a catalyst in the implementation of quality management systems in higher education.

Recall that four research hypotheses were formulated to test the Baldrige model's assertion that leadership acts as a "driver" of quality management by directly influencing the four system dimensions, namely:

H1. Leadership has a positive influence on strategic planning.

H2. Leadership has a positive influence on information and analysis.

H3. Leadership has a positive influence on faculty and staff focus.

H4. Leadership has a positive influence on educational and support process management.

In this study the Mauritian principals were found to exert enormous influence over all these aspects of their schools, holding a pivotal position, making instrumental decisions, influencing others and the education programme. This upholds the notion that despite endorsements of distributed leadership, the formal leader is still the major power broker in Mauritian schools (Ah-Teck and Starr, 2011, 2012; Starr, 2011). These results are in agreement with other researchers who conclude that the effective implementation and sustainability of a quality-driven culture in organizations (in this case, schools) depends first and foremost on the commitment and support of leaders (in this case, principals) (Bonstingl, 2001; Deming, 1986, 2000; González and Guillén, 2002; Leithwood et al., 2006).

The important implication is that leadership is a key facilitator in achieving "quality" in primary and secondary schools in Mauritius. Principals have a significant influence on, and the ability to make changes to, the educational system. However, Winn and Cameron (1998, p. 508) point out incisively, albeit in a general organizational context, that:

[…] [w]hereas it is fashionable to highlight presidents or CEOs who have seemingly turned around organizations single‑handedly, who have been dubbed the savior or white knight in difficult times, or who have produced dramatic results in their tenure as leader, it is not sufficient to end these stories without further observation. They miss the key determinant in success.

This often forgotten but crucial link is that school leaders determine success to a large extent by guiding the system and working with colleagues – systematically collecting and using information, planning strategically, focusing on the development and well-being of staff and students, and designing and managing effectively an educational and support process to satisfy the needs and expectations of students and other stakeholders and to create the quality outcomes. Thus, the four system dimensions of strategic planning, information and analysis, faculty and staff focus and educational and support process management are enablers of quality and performance excellence in primary and secondary education. As Leithwood et al. (2004, p. 70) affirm, school leaders are the ones who can best:

[…] make sense of and productively respond to both external policy initiatives and local needs and priorities, and of how those practices seep into the fabric of the education system, improving its overall quality and substantially adding value to our student's learning.

The downside is that "quality" is closely linked to one individual, the principal, which is a risky strategy in itself and accountability is also born alone by principals, even though teachers and other school leaders are significant contributors to educational outcomes. If quality improvement is the aim of Mauritian authorities, it is conceivable that a sharing of power and wisdom could yield greater results. Furthermore, since principals in this study were found to only focus on their own schools as stand-alone systems (Ah-Teck and Starr, 2011, 2012), the whole Mauritian educational system itself remains discriminatory in its distinction between "star" and other schools.

Another implication for school principals in Mauritius stems from the correlation and regression analyses which established the positive nature and statistically significant relationships among all the seven quality dimensions. These suggest that quality improvement initiatives and efforts that focus barely on one or a few of these dimensions would not bring optimal results. School leaders should therefore develop an holistic approach based on a strong commitment and synchronized efforts to improvement with respect to all the system and outcome dimensions so as to realize the Mauritian government's often-stated goal of achieving a "world-class quality education" (MEHR, 2006a, b).

An outcome of this quantitative research was the development of the SQAQ, which proved to be a valid and reliable tool in assessing the perceptions of principals about the levels of quality of their

school systems in terms of the seven quality dimensions of the MBNQA Education Criteria for Performance Excellence. Whilst educational institutions might aspire to improve the quality of their programmes and services by focusing on sound principles embedded in the philosophy of a single quality theorist to plan the process, these philosophies almost invariably never equip them with a comprehensive system for measurement and evaluation of quality efforts at all levels in the organization (Badri et al., 2006). The MBNQA framework was developed to provide such a comprehensive framework, integrating the seemingly divergent tenets espoused by the most influential quality experts (Winn and Cameron, 1998).

Hence, whilst the SQAQ does not have the depth of a comprehensive Baldrige self-assessment, it offers considerable insight into the use of the Baldrige framework as a tool to pursue quality improvement actions at the organizational level. Greater use of this research tool in other empirical studies could lead to further development and refinement in its construct validity and quality of the perceived quality assessment process, given feedback and revision of items over time for use in schools.

Limitations of the study

Most of the literature review and the research evidence collected as a background to this study 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. Also, the dependence of this research on principals' views as the unique source of data about school leadership could be a limitation as formal 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., 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.

Implications for further research

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 studies with which to compare the findings of the present study, there is scope for further research. Future research can improve upon the findings of the present study by using larger samples of principals and raters other than principals. Not only the formal school leaders' views count, but also those of the other stakeholders within schools (González and Guillén, 2002), including teachers, students and parents. This type of research could potentially triangulate the findings of the present study, provide more comprehensive findings about successful school leadership practices and offer a richer description of leadership reality. It has to be noted, however, that this quantitative research was subsequently followed by a qualitative phase, in which a sample of principles was interviewed, which extended the data collected in the quantitative phase and the findings reported here (see Ah-Teck and Starr, 2011, 2012).

A complementary statistical technique, confirmatory structural equation modeling (SEM), such as that used by Badri et al. (2006); Olson (2009) and Winn and Cameron (1998) in their respective studies, could be used in future studies to examine the relationships among the Baldrige dimensions. Whilst

correlation and regression analyses examine the relationships among each of the dimensions, SEM tests the predicted relationships among all dimensions in the overall framework together.

In their respective studies, Badri et al. (2006) and Winn and Cameron (1998) proved empirically that information and analysis was a driver dimension of "within-system" performance with a significant causal influence on each of the other three system dimensions: strategic planning, faculty and staff focus and educational and support process management. These relationships identified information and analysis as the critical link in the Baldrige system. It remains for another study to test if such "within-system" causal relationships could be empirically validated in the Mauritian case. In effect, this would explore whether the Mauritian study supported the Baldrige theory that an effective organization needs to be built upon a framework of measurement, information, data, and analysis (NIST, 2004, 2009-2010).

The higher education sector in Mauritius faces a number of different challenges and deals with many different quality issues and priorities. Another conceivable direction for future research might assess the current quality status, from the perspective of a wide range of senior leaders, in Mauritian higher education institutions to explore the relationships among quality dimensions using the Baldrige framework, or alternative (competing) frameworks such as the more recent European Quality Award, Canadian Quality Award or Australian Quality Award models (Vokurka et al., 2000). Accordingly, findings could be shared with leaders and policy makers in higher education regarding evidence-based improvement strategies. The idea is to enable "quality" to permeate the whole education system in Mauritius, from primary to tertiary levels, as government aims suggest.

Figure 1
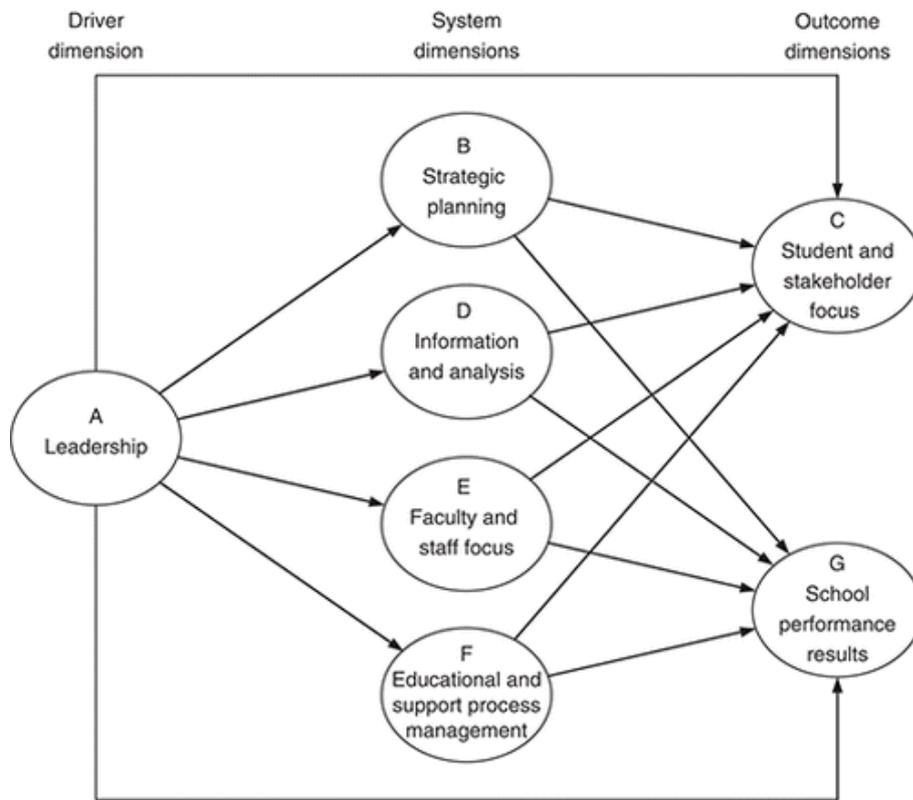
Source: Quoted in Olson (2009), adapted

Figure 2
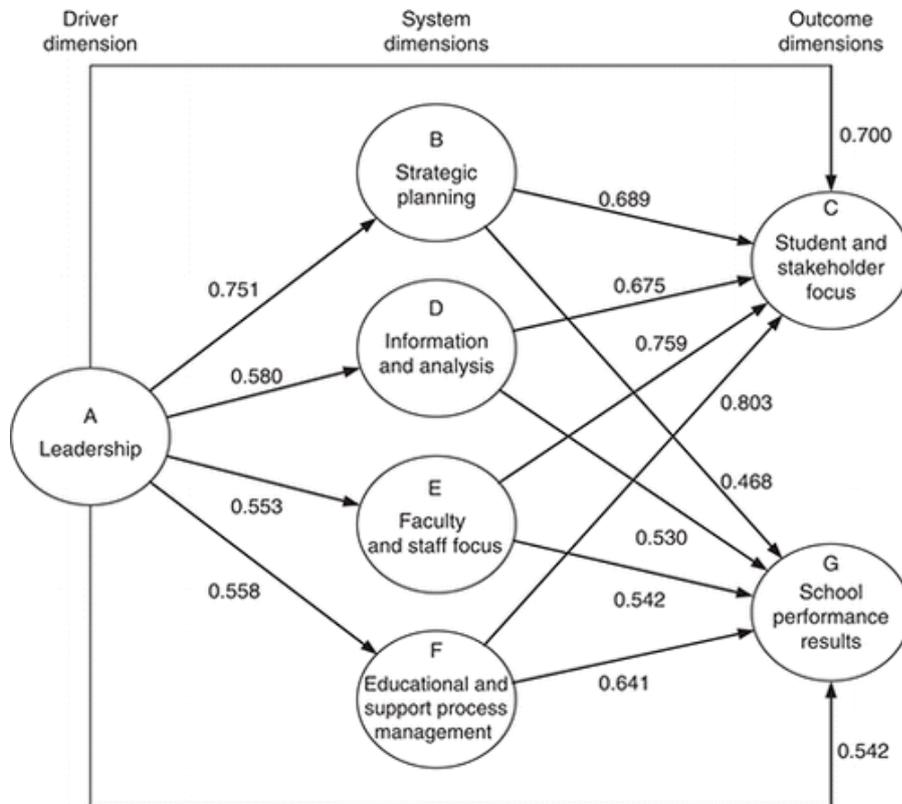
Note: All correlations are significant at the 0.01 level (two-tailed)

Figure 3

Section of the SQAQ	Number of items	Cronbach's α	n
A. Leadership	25	0.886	197
B. Strategic planning	19	0.885	203
C. Student and stakeholder focus	32	0.920	194
D. Information and analysis	12	0.862	204
E. Faculty and staff focus	20	0.911	197
F. Educational and support process management	20	0.900	200
G. School performance results	7	0.754	197
Overall	135	0.961	153

Figure 4

Driver dimension (independent variable)		System dimension (dependent variable)			
		B. Strategic planning	D. Information and analysis	E. Faculty and staff focus	F. Educational and support process management
A. Leadership	r^2	0.565	0.337	0.306	0.312
	β	0.751	0.580	0.553	0.558
	p	<0.001	<0.001	<0.001	<0.001

Figure 5

Driver dimension (independent variable)		Outcome dimension (dependent variable)	
		C. Student and stakeholder focus	G. School performance results
A. Leadership	r^2	0.490	0.294
	β	0.700	0.542
	p	<0.001	<0.001

Figure 6

System dimension (independent variable)		Outcome dimension (dependent variable)	
		C. Student and stakeholder focus	G. School performance results
B. Strategic planning	r^2	0.475	0.219
	β	0.689	0.468
	p	<0.001	<0.001
D. Information and analysis	r^2	0.456	0.281
	β	0.675	0.530
	p	<0.001	<0.001
E. Faculty and staff focus	r^2	0.576	0.294
	β	0.759	0.542
	p	<0.001	<0.001
F. Educational and support process management	r^2	0.645	0.411
	β	0.803	0.641
	p	<0.001	<0.001

Figure 7

System dimension (independent variable)	Outcome dimension (dependent variable)					
	C. Student and stakeholder focus			G. School performance results		
	β	t	p	β	t	p
B. Strategic planning	0.498	6.370	<0.001	0.048	1.480	0.140
D. Information and analysis	0.161	1.462	0.145	0.084	1.837	0.068
E. Faculty and staff focus	0.300	4.315	<0.001	0.013	0.439	0.661
F. Educational and support process management	0.570	7.248	<0.001	0.174	5.360	<0.001
Adjusted-R^2	0.759			0.431		
F-test	166.059 ($p<0.001$)			41.114 ($p<0.001$)		

Figure 8

Study	Present study	Olson (2009)	Badri et al. (2006)	Winn and Cameron (1998)	Poston (1997)
Educational setting	Primary and secondary schools	Elementary and secondary schools	Universities and colleges	One university	Public schools
Location/country	Mauritius	Minnesota, USA	UAE	USA	Iowa, USA
Is the assumed causal relationship between the pair of dimensions positive and statistically significant at the 0.05 level or less?					
Driver dimension → system dimension					
Leadership → strategic planning	✔	✔	✔	✔	✔
Leadership → information and analysis	✔	✔	✔	✔	✔
Leadership → faculty and staff focus	✔	✔	✔	✔	✔
Leadership → educational and support process management	✔	✔	✔	✔	✔
Driver dimension → outcome dimension					
Leadership → student and stakeholder focus	✔	×	✔	✔	✔
Leadership → school performance results	✔	×	✔	×	✔
System dimension → outcome dimension					
Strategic planning → student and stakeholder focus	✔	×	✔	✔	✔
Strategic planning → school performance results	✔	×	✔	✔	✔
Information and analysis → student and stakeholder focus	✔	✔	✔	✔	✔
Information and analysis → school performance results	✔	×	✔	✔	✔
Faculty and staff focus → student and stakeholder focus	✔	✔	✔	✔	✔
Faculty and staff focus → school performance results	✔	✔	✔	✔	✔
Educational and support process management → student and stakeholder focus	✔	✔	✔	✔	✔
Educational and support process management → school performance results	✔	✔	✔	✔	✔

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About the authors

Jean Claude Ah-Teck recently completed his PhD degree at Deakin University, Melbourne. Prior to this, he was educated at the University of Liverpool, University of Toronto, Homerton College of the University of Cambridge, and University of Bath. He has taught in universities and colleges in the UK, Canada and Mauritius. Jean Claude Ah-Teck is the corresponding author and can be contacted at: j.c.ahteck@email.com

Karen Starr, PhD, is the Inaugural Chair in School Leadership and Development in the Faculty of Arts and Education at Deakin University, Australia. Prior to this, she was a school principal for 15 years and was the Chief Writer of South Australia's Curriculum, Standards and Accountability Framework. In 2004 she won the Victorian and Australian Telstra Business Women's Awards for the not-for-profit sector for her services to education.