The Construction and Validation of a School Quality Management Scale for Quality Improvement in School Management

Zulkifli A. Manaf
Lee See Seng

ABSTRACT

This paper describes the construction and validation of a School Quality Management Scale (SQMS) which was designed to assess the Quality Management practices in the Malaysian secondary schools. The development of the SQMS consisted of two steps. In the first study, groups of items were constructed based on Malcolm Baldrige National Quality Award Education Criteria for Performance Excellence Framework and were validated using content validity, construct validity, criterion-related validity and reliability analysis. The second study was the initial application study on the excellence award winning schools using the revised SQMS. The SQMS was characterized mainly by seven constructs of the quality management practices, namely Top Management Support, Strategic Quality Planning, Customer Focus and Satisfaction, Quality Operational Result, Information and Analysis, Continuous Improvement and Staff Total Participation. Pearson correlation and test-retest reliability conducted on the SQMS also revealed significant positive relationship and stability over a period of five months. Findings from the initial application study also indicated that teachers' rating on the mean score of quality management practices was positively related to all the mean scores of the seven constructs of quality management. Several different tests showed the existence of a high degree of reliability and construct validity, which justified its suitability of SQMS, as a measurement of quality management practices in schools. The results of the analysis provided initial evidence for the scale as a potentially useful instrument to evaluate the quality management initiatives in schools.

Keywords: Instrument Development; School Management
Introduction

Malaysia has moved into the new era of the 21st century based on the aspirations of Vision 2020 that aimed to become an industrialized and developed country. Education plays a vital role in ensuring the attainment of the above goal. Thus, quality has been the main focus in the Malaysian Education System since the government has the intention of making the country the centre of educational excellence in the South East Asian region.

Education in Malaysia is under the jurisdiction of the Ministry of Education. The Ministry manages a comprehensive public school system, ranging from primary schools to universities. Malaysia provides education for all, regardless of where they live, their gender, social background, ethnic group or aptitudes and abilities. The mission of Ministry of Education is to develop a world class quality education system which will realize to the full potential of the individual and fulfill the aspiration of the Malaysian nation (MOE).

Educational professionals at all levels are constantly asked to develop new ways to improve the quality of education. Efforts to improve the quality of the school systems are not new, but have received increasing attention lately especially for primary and secondary education. Malaysian society always relates educational improvement and quality with student academic achievement. The long term goal of the education system is to produce successful school learners and prepare students to become effective contributing members of society. The idea of TQM in education is probably influenced by its successful application in industry (Ooi et al. 2007).

Changes are taking place in all parts of the globe among both developed and third world nations. These changing external environments have resulted in the educational institution to emphasize on systems and process, cross-functional activities and collaboration and teamwork within the organization in order to remain competitive. Because of these changes, members of the educational institution especially the school teachers need to equip themselves with positive mindset in accordance to the principles and practices associated with quality improvement (Lewis & Smith, 1994). Educational organizations are open systems that must respond to environmental changes in order to survive. Hence, improving the entire educational system should be the ultimate goal because once the system is improved, the outcomes will automatically improve. The quest for quality assessment in schools has lead other researchers to devise various tools to assess education quality and school improvement. For the European countries Pecar et al. (2009) has developed a simple self-evaluation model and tool that would be based on the preferences of improvement areas of all the stakeholder groups. Even the higher education sector has taken the initiative to promote quality in tertiary education (Chen et al. 2009; Manivannan...
& Premila, 2009). The Malaysian education sector has undergone substantial growth and changes as a result of efforts made by the Ministry of Education to expand the education industry. The government allocates large sums of money through Malaysian Plans to develop the education sector. It is the government's long-term goal to make Malaysia a regional centre of excellence in education.

**Background of the Problem**

Since the launching of the Excellent Work Culture Movement in 1989, the Malaysian Government has instituted various activities for further improving quality in the public sector, among which was the launching of the Manual On Quality Management and Improvement In the Public Service in 1990 and implementation of 20 Development Administrative Circulars to upgrade the civil service since 1991.

Quality is an important area in the Malaysian public services and efforts in implementing quality management have intensified with the issuance of the Development Administration Circular No. 4/1991 entitled "Guidelines on Strategies for Quality Improvement in the Public Service". In the effort to upgrade the Civil Service, the Malaysian Government has initiated quality movement for the public sector by the introduction of TQM in the public service in 1992 through the Development Administration Circular No. 1/1992 entitled ‘Guide on Total Quality Management (TQM) in the Public Service’. Total Quality Management carries the expectations of ‘doing the right thing the right time, on time, all the time,’ always striving for improvement and always satisfying the customer’s requirements. Adopting ISO 9000 series of standard in 1996 through the Development Administration Circular No. 2/1996 entitled ‘Guidelines on the Implementation of MS ISO 9000 in the Public Service’ helps government agencies to develop more uniform and internationally recognized quality management systems and further enhances the implementation of TQM. The introduction of TQM by the Ministry of Education was formalized by the launching of a customer charter on 1 April 1996. The ministry formed a policy and quality section to monitor the implementation of the country's education policy at all levels, based on TQM principles, and envisions that all schools and universities will eventually adopt TQM principles.

Apparently, TQM offers an effective way to improve quality management in education but not much has been documented on quality management development in public schools. Empirical literature and findings on quality improvement and TQM in the Malaysian context has been scarce compared to researches done in western countries. The need for the research in quality improvement and TQM can be proved also by the lack of previous studies
especially in Malaysian education setting and consequently, the lack of structured knowledge of how to facilitate quality improvement in schools. The concept of quality management has been adopted in many industrial organization (Mason & Ellenwood, 2010; Mastrangelo, 2010) and it is something feasible for adoption in the education sector in Malaysia if we are aspiring for continuous improvement and sustainability.

**Statement of the Problem**

Empirical studies on Total Quality Management in Malaysia are limited and are initiated by researches conducted by Syed Kadir (2000), Lau & Idris (2001) and Lian (2002). Owing to the limited empirical studies in the field of TQM, it is difficult for Malaysian education service to obtain sufficient information to support their TQM practices. In order to bridge the gap and provide Malaysian education service with practical assistance in the area of TQM practice, this study aims at identifying TQM constructs, developing an instrument for measuring these constructs, and empirically validating the instrument using data from Malaysian school system.

This study outlines the development of the School Quality Management Scale (SQMS) and confirms its reliability and construct validity for use in measuring quality improvement within the school management system. The SQMS is constructed and validated based on rigorous review of literature from several overseas researches on the implementation of Total Quality Management as key determinants of quality improvement strategies both in private and public sectors. In this study, the SQMS is also used to evaluate the perceived quality of the school system to gain insights into the Quality Management Practices of the school management.

**Total Quality Management in Education**

Ross (1994) defines TQM as the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services. Total Quality Management is a strategic approach to produce the best products or services through a process of continuous improvement of every aspect of the organization's operation. Ashcroft and Palacio (1996) considered Total Quality Management as an approach to change the culture of an organization so as to create a constant search for improvement in practices and systems, particularly inputs, processes and outputs.

According to Deming (1986), the principle of Total Quality Management is that quality must focus on linkages among functions across entire organizations. TQM is a management concept that focuses the collective efforts of all managers and employees on satisfying customer expectations by continually improving
operations, management processes, and products (Berry, 1991). According to Harris (1994), there are three generic approaches to TQM in education. The first approach is on customer focus, where the idea of service to students is fostered through staff training and development. The second approach is on staff focus that values and enhances the contribution of all members of staff to the Management Practice of a school. The third approach relies on service agreement where it seeks to ensure conformity to specification at certain key measurable points of the educational process.

In summing up the definitions of TQM in educational setting, TQM is considered as a management tool that aims for "total", and "quality assurance". First, TQM implies meeting the expectations of all the customers in the educational system. The external customers which include education officers, the tax payers, parents and potential employers, should be satisfied with the standards of the school leavers, whereas the internal customers consist of teachers, students and supporting staffs, should be satisfied with the teaching and learning process in school. It targets the total process and output of the education system. Second, it emphasizes quality assurance to ensure conformity to specification of standards and requirement set out by the customers. Third, it is a management tool that highlights the means for measurement of academic performance and feedback.

**Theoretical Framework of the Study**

According to Mayer et al. (2001), the Baldrige's Education Criteria incorporate the core values and concepts of Malcolm Baldrige Quality Award and are built upon the seven-part framework used in the Business Criteria. Adaptation is being made to the requirements of education organizations to improve their performance. The Education Criteria are the basis for the school self-assessments, for giving feedback to help improve school performance practices, capabilities, and results. The Criteria are also designed to serve as a working tool for understanding and managing performance and for guiding school planning and opportunities for learning.

Tenner and Detoro (1992) cited strategic Customers' focus, continuous process improvement, total involvement and empowerment of school staffs are the critical elements of total quality management in school. According to Bradley (1993), the concepts and practices of total quality management in schools are believed to be a powerful tool to enhance education quality and upgrade school effectiveness. Total Quality Management model provides a more comprehensive perspective in understanding and managing quality improvement efforts in school system. This study uses the Deming Theory of Profound Knowledge and
concept of TQM that focuses on customer needs and expectations to develop a
conceptual foundation for quality improvement strategies.

In this study, The Malcolm Baldrige Award was chosen as the theoretical
basis for the identification of TQM constructs because it incorporates a number
of different perspectives on quality, rather than focusing on one specific
view. The key dimensions of the total quality management are categorized as
Top Management Support, Strategic Quality Planning, Customer Focus and
Satisfaction, Staff Total Participation, Continuous Improvement, Information
and Analysis, and Quality and Operational Results.

Top Management Support examines how top management guides the
school, sets school values, performance expectations and how the school
addresses its responsibilities to the student, parents and other stakeholders.
Strategic Quality Planning examines how the school sets strategic directions
and how it determines key action plans. It addresses deployment of plans, and
how accomplishments are measured and sustained.

Customer Focus and Satisfaction examines how the school determines
requirements and expectations of customers. It also seeks to understand the
needs of current and future students and stakeholders and to focus on satisfying
and meeting students’ and stakeholders’ expectations.
Staff Total Participation examines how the school enables its workforce of
academic and non-academic staffs to develop its full potential and how the
workforce is aligned with the school’s objectives in order to maintain a high-
performance workplace.

Continuous Improvement examines aspects of how key and support
processes are designed, managed, and continuously being improved and
maintained.

Information and Analysis examines the management, effective use, and
analysis of data and information to support key processes and the school's
performance management system. It refers to all key information about
effectively measuring and analyzing performance to drive improvement in
student and operational performance.

Quality and Operational Results examines the school's performance
improvement in the following key areas: 1) customer satisfaction; 2) human
resources; 3) operational performance. This category also examines how the
school performs relative to its competitors.

The Baldrige Education Criteria for Performance Excellence focus on the
key areas of school performance such as student learning results, stakeholder-
focused results, school effectiveness and performance results, governance and
social responsibility results. The core values and concepts of Malcolm Baldrige
Quality Award are embodied in seven Categories of the Education Criteria for
Performance Excellence, namely, Top Management Support, Strategic Quality Planning, Customer Focus and Satisfaction, Staff Total Participation, Continuous Improvement, Information and Analysis, and Quality and Operational Results. The theoretical framework of this research is based on the latest Baldrige Education Criteria for Performance Excellence Framework (Hertz, 2003) which is underlying key concepts from Deming Theory of Profound Knowledge. The theoretical framework as depicted in the figure 1, is modified to suit the local school context and the purpose of this study.

Figure 1: Theoretical Framework of the Research modified and based on Baldrige Education Criteria for Performance Excellence Framework

As depicted in the framework, the school profile sets the context for the way the school operates. The system operations are made up of six categories that define the operations and the results the school can achieve. Top Management Support, Strategic Quality Planning and Customer Focus and Satisfaction represent the top management triad. These categories are put together to emphasize the importance of top management focus on strategy and customers. The results triad is represented by Staff Total Participation, Continuous Improvement and Quality and Operational Results. The school
operational results depend on the accomplishment of staff involvement and key processes in the system. The Information and Analysis serve as a foundation for the performance and quality management system. The two-headed arrow indicates the importance of feedback in an effective management system while the bold arrow links the top management triad to the results triad. The linkage of the six categories to the Information and Analysis category reflects the integration of individual components of the management system that operates in a fully interconnected manner.

**Research Methodology**

Both the qualitative and quantitative methods are used in this study to enhance the understanding of social phenomena (Creswell, 1994). Structured interviews with the top management of four selected excellence award-winning schools were carried out to obtain more in-depth information to provide an understanding of contextual background on quality improvement practices in the local school system.

Pilot study was conducted on the items of the School Quality Management Scale (SQMS) which were constructed based on rigorous review of the related literature, expert review and information gathered from the interviews with four selected top management of secondary schools. This was followed by the administration of the actual survey instrument i.e. School Quality Management Scale (SQMS) on perceived quality assessment in the selected secondary schools. The SQMS is an instrument that is developed based on Malcolm Baldrige Quality Award Criteria for Education where it is used as a performance indicator of quality management. It is designed in the context of Deming Theory of Profound Knowledge which recognizes the impact of system in the behavior of people. Statistical procedures were employed to ascertain the reliability of SQMS. Additional statistical procedures were conducted to refine the items of the instrument. The refined version of SQMS was then used in the initial application study.

The perception of teachers is obtained in understanding the level of quality Management Practices in the school system. The need to understand perception of quality improvement characteristics is emphasized in this study because the success of any change effort depends heavily on the commitment and aspiration of the top management and employees (Gunasekaran, 1999). Several researches done in the western countries have shown that employee perceptions are correlated with desired organizational outcomes (Coyle-Shapiro, 1999). In this study, a total 398 teachers from 20 secondary schools in Ipoh City and suburbs of the city within Kinta District were involved in responding to the SQMS.
Instrument Development

According to Hillman (1994), self-assessment is a comprehensive, systematic and regular review of an organization's activities and results referenced against a model of business excellence. The review of literature shows that there is increasing recognition of the importance of research based on quality award models such as Deming Prize and Malcolm Baldrige National Quality Award. The quality award models do not focus solely on product, service perfection or traditional quality management methods, but consider a wide range of management activities, behavior and processes that influence the quality of the organizational performance.

Several studies dealing with empirically validated scales for integrated quality management have already been conducted abroad (Saraph et al., 1989; Flynn et al., 1994; Ahire et al., 1996; Poston, 1995; Black & Porter, 1996). The first three studies are broadly similar in that they are not based on any quality award framework for the identification of the TQM constructs. The fourth and fifth studies depend solely on the Baldrige Award quality award model for the identification of the TQM constructs. Each of these instruments has its own strengths and weaknesses in terms of constructs and measurement items.

School Quality Management Scale (SQMS) is developed in this study as a basis for the self-assessment work for measuring quality management for Malaysian school system. Formulations of the items or statements in the SQMS are modified, created and adapted to the local school setting. The SQMS consists of seven constructs of the TQM practices with modification and were categorized as top management support, strategic quality planning, customer focus and satisfaction, staff total participation, continuous improvement, quality and operational results, and information and analysis. These seven constructs of TQM are collectively labeled as Quality Management Practices in this study. The SQMS is built on the core values of ‘Perceived Quality Assessment Instrument’ originally formulated and devised by Poston (1995) for measuring quality with community colleges of school districts at Iowa State University. The instrument is built based on Malcolm Baldrige National Quality Award criteria framework and related previous studies on quality management.

Psychometric Properties of the Instrument

Extensive review of the related literature on the constructs and domain of Quality Management Practices was performed to verify the content validity. Content validity was also demonstrated throughout this study with every effort made in the interview, construction of items, pilot-testing and analysis of the instrument.
In the Kaiser-Meyer-Olkin Measure of Sampling Adequacy, the test statistic of this study yielded a value of .96 which is above the 0.5. According to Kaiser as cited by George & Mallery (2003) this clearly indicated that the survey data was adequate for conducting factor analysis. Factor analysis was conducted on the constructs of the Quality Management Practices to verify the construct validity.

Principal components analysis with varimax rotation was performed on the School Quality Management Scale survey data obtained from the 398 respondents. After performing 2 rounds of principal component analysis on the original 50-item SQMS, a seven-factor model consisting of the remaining 42 items was retained. This is because the seven factors were conceptually meaningful and had greatest conceptual clarity in describing quality improvement strategies in school management and the total variance accounted by these seven factors was 61.26 percent. Each of the factor had at least five items with significant structure coefficients as compared to three items in the normal practice (Creswell, 2002). All the remaining 42 items in the scales had Eigen values greater than one and loading of individual item of greater than 0.40 on the respective construct. Item content was examined for each factor to see if an underlying theme was identifiable. This analysis verified the scales measure seven single, independent construct and were correlated with independent measure of related construct of the Quality Management Practices. These constructs were identified as Top Management Support, Strategic Quality Planning, Customer Focus and Satisfaction, Staff Total Participation, Continuous Improvement, Quality and Operational Results, and Information and Analysis.

A detailed item analysis on the item-score to scale-score correlation of each of the seven constructs in the SQMS was obtained by computing the arithmetic average or mean of the scores of the items that comprise that scale. Generally, a correlation of item values greater than 0.5 indicates the items has been assigned appropriately to the relative scale (Creswell, 2002). All the retained 42 items in SQMS were found to record a correlation value of above 0.5, thus, indicating all the items were assigned appropriately the respective scales.

Criterion-related validity is a measure of how well scales representing the various quality management practices are related to measures of product quality performance (Flynn et al., 1994). Criterion-related validity was demonstrated when high positive correlation was found between the seven constructs of the Quality Management Practices and the quality performance. Criterion-related validity basically examines the relationship of the constructs of the Quality Management Practices to the quality performance. The Pearson correlation coefficient was used for examining the criterion-related validity. The mean score
of quality management practices was correlated with the mean scores of the quality performance achieved. A significant correlation coefficient of 0.687 was obtained between the two mean scores. Generally, a correlation coefficient of more than 0.6 was accepted and thus, the correlation between TQM constructs (predictor set) and the school quality performance (the criterion set) was strong and significant at the 0.01 level. It is therefore concluded that the SQMS has good criterion-related validity.

**Evidence of Reliability**

Reliability of the survey instrument was established by calculating Cronbach’s alpha coefficient which was one of the most commonly used indicators to measure the internal consistency of the survey scale. Cronbach’s alpha was computed for the entire School Quality Management Scale, as well as each factor generated from the principle components analysis. Results showed that the reliability coefficient for the entire SQMS instrument was 0.96, indicating a high degree of internal consistency for group analyses. The Cronbach’s alpha for the individual seven factors or subscales ranged from 0.79 to 0.90. According to Nunnally (1967), an ideal reliability coefficient is 0.80 or 0.90, but correlations in education tend to be smaller, so 0.70 is deemed acceptable. All reliability coefficients in this study were higher than 0.70. The item/total correlations for all the seven subscales in the SQMS ranged from .36 to .75 with majority of the item/total correlations fell between .50 and .60. As a result, the instrument was judged to be internally consistent and therefore reliable.

For the test-retest reliability, the original SQMS was administered to a sub-sample of 50 respondents from the original sample of 398 in this study after five months from the first field study. A significant correlation of 0.895 was established between mean scores of the quality management and this indicated a strong positive correlation. The individual mean scores of the seven component of the quality management were also examined for the test-retest reliability and they were all found to be significantly correlated at a range from 0.57 to 0.86. This result indicated stability of the SQMS and the subscales over a period of five months.

The Pearson correlation coefficient was also conducted between all the seven subscales of the SQMS. Positive and significant correlation was found between the seven subscales of quality management constructs. The strongest positive correlation of 0.755 was found between the Continuous Improvement subscale and the Information and Analysis subscale. Positive and significant correlations were also found between the seven subscales and the composite quality management practices. The two strongest correlations were the
Continuous Improvement subscale \((r = 0.889)\) and the Information and Analysis subscale \((r = 0.887)\) respectively. This result indicated that the Continuous Improvement subscale and the Information and Analysis subscale were found to have the greatest impact on the school quality management practices.

**Initial Application Study**
An initial application study using the final version of the SQMS that contained 42 items in the seven quality management constructs were then administered to three excellence award winning schools and three non award winning schools. The main objective of this initial application study is to gain some sense of the incidence of quality management practices and strategies as perceived by the secondary school teachers. Of the 91 teachers who participated in this application study, only 18 percent respondents from the non award winning school had mean score above 4 in the quality management practices as compared to 41.5 percent respondents from the award winning school that had mean score above 4.

Within the context of the above interpretation, it is clear from the present data that the result indicated higher mean score of quality rating was observed in the award winning schools as compared to the non award winning school. The result of t-tests on gender indicated that there was no significant difference in the levels of quality management rating among the male and female teachers \((t\text{-value} = -0.928, p = .354)\). But significant difference was found in the levels of quality management rating among teachers from excellence award winning schools and the non award winning schools \((t\text{-value} = 9.556, p = .000)\). While it was found that there was no significant difference in the quality management rating between urban and rural school teachers \((t\text{-value} = 1.143, p = .254)\). The finding tentatively suggests that the SQMS is a valid and reliable instrument in measuring quality improvement, and quality management practices. The above comprehensive scales refinement and validation procedure were executed to seek for justification that the SQMS is a potentially reliable and useful instrument in measuring quality management practices in schools.

**Conclusion**
This study emphasizes the feasibility of applying the quality management practices to the evaluation of the overall school quality performance. The process and methodology used for the construction and validation of the measurement instrument, SMQS and the psychometric properties of the SQMS as a measurement instrument were also thoroughly studied and analyzed. The definition of SQMS as an attitudinal concept allows the researcher to develop a
valid measurement instruments and expand its scope of application to determine the perception of teachers on the quality management practices in schools. This is in accordance with the conceptualization of service quality being adopted by a few foreign researchers (Parasuraman et al. 1985; Carman 1990).

The results of this study indicated that the SQMS was characterized mainly by seven constructs of the quality management practices, namely Top Management Support, Strategic Quality Planning, Customer Focus and Satisfaction, Quality Operational Result, Information and Analysis, Continuous Improvement and Staff Total Participation. The positive significant correlation between the seven constructs of quality management practices and the perceived quality performance provided strong evidence of criterion-related validity. This study successfully developed an instrument that can be used to evaluate quality management and quality improvement efforts in Malaysian schools. The results of the analysis provided initial evidence for the scale as a potentially useful instrument. It was important to note that the scale consisted of 42 items that measure seven different dimensions of quality management practices; however, there were two factors that only had five items load on them (Top Management Support, Operational Result), compared to other factors that had eight and six items. After reviewing the literature, it was apparent that these factors, especially Top Management Support, were important, yet five items probably did not fully capture the essence of the factors. Finally, the results obtained in the initial application of the SQMS measurement instrument showed the existence of a high reliability and construct validity. The estimated parameters showed high reliability coefficients, and the different tests applied confirmed the existence of high criterion-related and construct validity. As a whole, these results showed that the SQMS measurement instrument met the main requirements for measurement instruments in social sciences, and therefore, is suitable for application to the evaluation of quality management in public schools.

The finding of this study also provides a direction to the development of an empirical understanding of total quality management implementation in schools. The results obtained in this study suggest the need to take an in-depth look at the influence of SQMS on school ability to increase higher quality management and performance. The instrument developed in this study can be used as a valid measurement to identify the existence of such quality management practices in schools. The process of constructing a psychometrically sound scale for quality management is lengthy, thus, more scale development work in the educational setting is needed. Several of the subscales in the SQMS need to have additional items to more fully capture the underlying dimensions of quality management. The reliability of the subscales will be increased by addition of related items.
References


