Application of total quality management in education: retrospect and prospect

Paula Y.K. Kwan
Senior Lecturer, Division of Commerce, City University of Hong Kong, Hong Kong

Points out that recent discussion has centred on the application of total quality management (TQM) in education. Most writers appear inclined to suggest that TQM is a unique solution for effective school management. Nonetheless, TQM was initiated in the manufacturing sector and its successful application in the educational setting should only be justified with ample theoretical support and concrete evidence. Attempts to trace the literature that discusses the application of TQM in education. Also addresses the differences between industry and education. Aims to explore the relevance of employing TQM in education.

Development of total quality management in education

Total quality management (TQM) is a management philosophy that has transformed the products and processes of leading Japanese companies during the past 40 years[1]. Faced with increasing competition from Japanese products, companies throughout the industrialized world have begun to adopt TQM. The theoretical foundations of TQM came from several people, including W. Edwards Deming, Joseph M. Juran and Philip Crosby in the USA and Genichi Taguchi and Kaoru Ishikawa in Japan. As its name implies, TQM focuses on quality. Juran defines quality as "fitness for use"[2, p. 58] by the customer, Deming advocates that quality “should be aimed at the needs of the customer, present and future”[3, p. 5] and Crosby supports this: "conformance to requirements set by consumers”[4, p. 2]. According to Ishikawa, a quality product is one which is "most economical, most useful, and always satisfactory to the consumer”[1, p. 4]. By either of these definitions, the customer decides whether a product is of high quality, not the participants in the process that created the product. In fact, all the “gurus” emphasize the importance of customer satisfaction as well as continuous improvement.

Besides its popularity in manufacturing companies, TQM philosophy has been adopted in service industries like banks and hospitals[5-7]. The applicability of TQM theories in the educational sector has also attracted the interest of many theorists and practitioners such as DeCosmo et al.[8], Edwell[9], Sherr and Lozier[10], Bonser[11], Tribus[12], Brigham[13], Heverly[14] and Rhodes[15]. They pointed out that educational institutions have turned to TQM for many of the same reasons that businesses have instituted quality programmes.

Bonser[11] attributed the move towards TQM in higher education to the escalating number of students, the lack of consistent leadership style, the increasing accountability to the public and changing attitudes towards universities. He wrote:

These pressures will demand peak quality performance from universities in all areas of endeavor. Approaches that were considered adequate, systems that were maintained because of tradition, inertia, ignorance, or the convenience of internal politics, will no longer be tolerated. Most institutions in American society are changing to adapt to a new world environment. Universities will not be an exception[11, p. 506].

DeCosmo et al.[8] also explained that the intensifying adaptation of TQM philosophy in education was due to resources constraints and increasing public pressure. In fact, Edwell[9, p. 96] reported that: “over 61 percent of college presidents averring involvement in Total Quality - this compared with at best a dozen or so campus implementation efforts as recently as two years ago.”

Definition of TQM

Various definitions of TQM have been adopted by different writers. According to Harris[16], there are three generic approaches to TQM. The first approach has a customer focus, where the idea of service to students is fostered through staff training and development. The second has a staff focus, and is concerned to value and enhance the contribution of all members of staff to the effectiveness of a school. The third approach takes a service agreement stance, and seeks to ensure conformity to specification at certain key measurable points of the educational process. Murgatroyd and Morgan[17, p. 47] advocate that there are three dimensions for quality – quality assurance, contract conformance and customer-driven. Taylor and Hill[18] define TQM as a customer-focused process which seeks for continuous improvement and meeting customers’ perceptions. These views are echoed by many authors such as Sherr and Lozier[10], Heverly[14], Edwell[9], DeCosmo et al.[8], Coate[19] and Leffel et al.[20]. However, Green[21, p. 17] challenges this by stating that “different interest groups ... have different priorities and their focus of attention may be different”. Bolton[22, p. 14] thinks that “the measurement of performance is an inescapable feature of TQM.” This view is supported by Green[21] who points out that some
measurement methods as to ensure conformance to customers’ expectations are necessary. Williams[23, p. 374] concludes that there are two dimensions of TQM. On the one hand “it is a management tool to increase productivity, keep the customer happy, and cut down waste”; on the other hand “it is a means of making us better people, of developing our professional good manners, and providing us with a moral education”.

To sum up the various views[8-19,21-23], TQM is 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, such as the tax payers, parents and potential employers, should be satisfied with the standards of the graduates, whereas the internal customers, such as teaching and students, should be satisfied with the teaching and learning process in school. It targets the total process and output of the educational system. Second, it requires quality assurance to ensure conformity to specification of standards set out by the customers. Third, it is a management tool that emphasizes the means for measurement of performance and feedback.

**Deming’s philosophy**

Among the extensive number of articles written on TQM in educational institutions, Deming’s philosophy is the most frequently cited reference. He is widely recognized as the father of TQM and thus a closer look at his work can help to understand the situation.

Deming’s work[3, pp. 23-4] begins with the belief that all people are educable, that they want to do a good job and they deserve respect. “When there is a problem, 85 per cent of the time it is with the system; 15 per cent of the time it will be with the workers.” He also takes into account statistical variation and calls for management by fact, which implies collecting data and analysing them statistically before decisions are made. Deming’s 14 points are widely recognized as the fundamentals of TQM. A according to Deming, these 14 points can:

- apply anywhere, to small organizations as well as to large ones, to the service industry as well as to manufacturing.
- create constancy of purpose toward improvement of product and service.
- adopt the philosophy…Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
- cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
- end the practice of awarding business on the basis of price tag…Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
- improve constantly and forever the system of production and service,…and thus constantly decrease costs.
- institute training on job.
- insist on leadership…The aim of supervision should be to help people…to do a better job...
- drive out fear...
- break down barriers…people must work as a team...
- eliminate slogans and target…asking for zero defects and new levels of productivity.
- institute a vigorous program of education and self-improvement.
- put everyone in the company to work to accomplish the transformation…"

According to Winter[24], these 14 principles fall into three broad categories:

1. Philosophy and mission – this category includes principles that stress focusing on customer needs in a never-ending search for quality.
2. Organizational environment – these principles establish norms and values that dictate the treatment of each individual in the organization.
3. Process – this category stresses the need for problem prevention throughout the process rather than the identification of failures at the end of the process.

In adopting TQM, educational administrators are trying to pursue these three objectives.

**Successful cases**

Apparently, successful implementation of TQM in educational settings has been widely reported. The following cases supported with hands-on experiences of the authors are reported in the literature. DeCosmo et al.[8] reported their experience of implementing TQM in Delaware County Community College (DCCC) for a period of four-and-a-half years. The implementation constituted three
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The first was the implementation of total quality in the top management of the college, and was followed by the development of a TQM curriculum. The last phase was the implementation of TQM throughout the teaching and learning process. They found that "one of the important benefits of implementing TQM is that college staff are actively involving one another in a process of documenting and standardizing college operating procedures... staff are willing to work in teams and across departments. The college is slowly removing barriers to teamwork... The executive staff in DCCC is convinced that TQM is worth every effort we have made" [8, p. 22].

Coate[19] gave a full report of his work in implementing TQM at the Oregon State University (OSU). It comprised nine phases which were:

1. Exploring total quality management;
2. Establishing a pilot study team;
3. Defining customer needs;
4. Adopting the breakthrough planning process;
5. Performing breakthrough planning in the divisions;
6. Forming daily management teams;
7. Initiating cross-functional pilot projects;
8. Implementing cross-functional total quality management; and
9. Setting up reporting, recognition, and awards systems.

Coate also suggested that top management support and teamwork were critical factors for successful TQM implementation. In Coate's opinion, the case of OSU proved that: "it [TQM] has saved the university time, reduced costs, empowered people at all levels, and improved morale... TQM as vital not only for the realization of its vision but also for its survival in the marketplace"[19, p. 37].

Leffel et al.[20] reported their experience with Virginia Tech and recommended that: TQM must begin with the development of the leadership team working toward a shared vision, shared values, and a repertoire of leadership skills. Change will not occur immediately either in personnel or in the institutional culture. Leadership development must be a value and a process that evolves within the institution over a period of five to ten years[20, p. 70].

They also admitted that TQM leadership development was a process that evolved within the institution over a period of five to ten years at least. Therefore, TQM is a very time- and resource-consuming tool.

Other writers comment on the adaptation of TQM in the classroom. Gartner[25] reported his application of Deming's methods to two business courses. Students were given a 16-page course outline which specified the requirement to achieve grade A on the first day of class, so that students could measure their ability to meet the quantity and quality specifications for A work. Gartner found that students wanted to do well and could perform those specific outputs when they were given specific instructions about what was required. He concluded:

"the general principles and methods of quality control as outlined by Deming seem to work. Students can be treated like workers, and systems can be put in place to enable them to generate high levels of outputs with high level of quality. The workplace seems to be more enjoyable for both students and faculty. The classroom is less neurotic; students know how to act, and they know that these actions will be rewarded"[25, p. 155].

However, Gartner also reported that he was restricted by his university from giving all students A grades. Therefore, he advocated that to implement TQM, top management support was the vital factor.

Chizmar[26] recorded his strategy of involving students actively in their own learning through the creation of learning communities and increased use of collaboration. His one-minute paper proved to be successful. In the final minute of class, the students were asked to respond to two questions:

1. What was the most important thing they learned in the class? And
2. What was the muddiest point still remaining at the conclusion of that class?

In Chizmar’s words, “the first question is intended to focus on the big picture (what is being learned) and the second to assess how well it is being learned”[26, p. 186]. Chizmar found that the one-minute paper could provide better ways for continuous improvement than the end-of-term evaluations. He concluded that the conditions of a TQM teaching/learning model were teamwork, empowerment, feedback, and continuous improvement. “The real power of TQM drives form its totalness.... it provides a framework, or model, for combining disparate ideas into a unified whole for the purpose of predicting a priori what will work”[26, p. 188].

Differences between education and industry

Evidence quoted by various writers seems to prove that Deming’s philosophy can be successfully applied in educational settings. Is it really the case? There seems little doubt that TQM can produce encouraging results in the
manufacturing sector. Education, however, is very much different from industry and questions may be raised as to its applicability.

In order to examine the relevance of applying TQM in education, one should be able to answer three questions:
1. What are the differences between education and industry? Would these differences hinder the application of TQM in education?
2. What are the unique contributions of TQM towards education? Why and in what ways is it superior to other management theories?
3. Are there any concrete examples and evidence to ascertain its application? Can the experience be transferred to other similar organizations?

Education differs from the manufacturing sector in four ways: objectives, processes, inputs and outputs. For manufacturing firms, profit is the commonly used indicator for measuring effectiveness. However, the objectives for education are not so simple. According to Tribus[12], the objective of every school should be to provide for each student opportunities to develop in four categories; these are “Knowledge – which enables us to understand; know-how – which enables us to do; wisdom – which enables us to set priorities; and character – which enables us to cooperate, to persevere, and to become respected and trusted members of society”[12, p. 39]. Therefore, the mission of education is relatively long term and there is no single indicator, such as profit, which can reflect the effectiveness of achieving these objectives. Without precise and specific objectives, it is difficult, if not impossible, to measure effectiveness.

Teaching and learning processes are not the same as assembly lines. They are interactive processes between teachers and students, and therefore the procedures in the processes cannot be preset in a step-by-step format as those for an assembly line. Moreover, both of the parties are human beings whose behaviours are subject to different motives and objectives, emotional fluctuations, as well as individual styles of interpersonal skills. Therefore, there cannot be any specification as regards the standardized codes of practice in learning and teaching. More complicating, the behaviour of one party is often responding to the act of the counterpart. Thus, there cannot be a step-wise instruction for the teaching process in classrooms.

As far as inputs are concerned, those of educational settings are subject to enormous variability. Unlike factories, schools cannot control the quality of incoming materials (students), which adds to the difficulty of controlling the quality of outputs. Although some sort of entrance requirements can be imposed on the applicants, colleges are confronted with increasing difficulties in getting the desired students because of the drastic increase in the number of college places in recent years. Moreover, the quality standard of students is not as precise as those of materials. The pre-admission academic performance in public examinations and the demographic characteristics are the only information available to college admission officers when the admission decision has to be made. There are other factors, such as the attitudes of students towards learning, their learning strategies and interpersonal skills, which are not readily assessable. Although admission interviews are widely used by many colleges, their effectiveness is questionable[27-29]. Students are human beings whose performance is expected to vary under different situations, and thus the measurement of human behaviour cannot be subjected to a precise scale. This factor complicates the difficulty of measuring the quality of incoming students.

Likewise, it is difficult to define a certain quality standard for the output. For manufacturing firms, quality outputs are those which can satisfy the requirements of the customers. In education, there are many customers: the students themselves, the parents, the teachers, the school management, the potential employers and society in general. Whose interest should be the first priority if there are conflicts between their interests? Are students, being participants and "customers", in the foremost position to determine what is the best for themselves? In fact, would they know what is best in the first place? Can Deming’s “zero defect” products[3] be produced in education? Can any educator claim that his student can achieve perfect standard? These are just some of many questions that must be addressed before defining the quality of the outputs. It is very difficult to define any perfect standard in education. School curriculum is only one of the many factors that shape the personality, behaviour and academic achievement of a student even if these three dimensions are accepted as the criteria for measuring the performance of a student in general. Family education and the societal impact also play an important role. Thus, the performance of a student is the only indicator of the teaching process.

The evaluation of student performance is also a problem. What should the educators award? Should they award the relative progress in students’ learning or the absolute learning outcome only? In other words, should they award more to those sub-standard
students who manage to jump from Grade F to Grade C or those who achieve Grade A with minimal effort? Recalling Deming's words that “when there is a problem, 85% of the time it is with the system; 15% of the time it will be with the workers”[3, p. 23], if one is to believe him, then one is faced with that frightening prospect that all students should deserve Grade A. If it is not the case, then one has to admit that it is the teacher's responsibility. Given the complexity of the learning and teaching environment, this allegation is not fair to the teachers.

Review of related research

A detailed study of the literature on application of TQM in education reveals that many writers cannot justify the use of TQM as they fail to address the three questions mentioned earlier. Some authors discuss TQM without examining the feasibility and suitability of such an application. Others give reasons which are not strong enough to support TQM’s use and yet others mention only the potential benefits of TQM. Few articles are supported with practical case studies. The following is a brief report on the literature.

Differentiating education from industry
The work of Siu and Heart[30] presents one of the writers making no attempt to differentiate education from business settings. They wrote, “...education is different from industry. But managing people and resources is largely the same for any organization – whether in business or education, the private sector or the public arena”[30, p. 96]. Their opinion may be queried as management writers usually consider the management of non-profit making organizations different from that of profit-making organizations.

Similarly, Sago and Barnett[31] and Harris[16] suggest ways for TQM implementation in schools without discussing the differences between education and industry. Although both Chizmar[26] and Gartner[25] claimed that their work had been successful, neither of them discussed the appropriateness of applying TQM in educational settings. Hill and Taylor[32] only highlight the characteristics of a service, i.e. inseparability of customer from the production, heterogeneity of service offering and intangibility, but fail to address the characteristics of education.

Hertzier[33] presents a comprehensive account of the literature on implementing TQM in higher education. She reported and discussed historical development in TQM, implementation of TQM in educational settings and barriers to implementation. She suggested that the only barriers to TQM were lack of leadership in college and the reluctance of faculty members to treat students as “customers”. Again, however, she did not attempt to discuss the differences between education and industry.

Hazzard[34], in his article discussing the strengths and weaknesses of TQM in higher education, pointed out only that TQM was both time and effort consuming. Other deficiencies of TQM mentioned included the requirement of top management support and the development of staff training programmes. He did not, however, discuss the relevance of applying TQM in educational institutions. The work reported by Bolton[22], Eriksen[35] and J. araiedi and Ritz[36] are also found to have the same deficiency.

Similarly, Harris[16], Weller Jr and Hartley[37], Samuels[38], Solomen[39] and Cole[40] only reported that there are urgent needs to improve education. However, they all failed to explain the suitability of adopting TQM in education.

Brigham admitted that “service industries...generally have met with less success than manufacturing thus far... Higher education has good reason to be wary”[13, p. 48]. Although he acknowledged such a difference, he elaborated no further on the relevance of administering TQM in education, nor did he discuss the adjustment which had to be made before application. He continued:

This is not to say industry has nothing to teach us. On the contrary, it is helpful to see across the sectors the importance of building quality principles into strategic and business plans; of finding champions at every level of the organisation; particularly at the top; of focusing on results and processes; of bringing new teams on line, only as needed; of incorporating customers early on and forever.

He provided a list of potential benefits of TQM but not only the reasons to support its application to education.

Although Irwin[41] had acknowledged that education and industry are different in quality definition and target customers, he made no further attempt to explain why TQM is applicable in the educational setting.

Leslie[42] tried to establish the value of student work experience (SWE) and to propose that a TQM approach to SWE should be adopted. He stated that: “education is not about fitting people for work... [it] is about developing members of society to be able to prosper in society”[42, p. 27]. However, he did
not explain why TQM can help to achieve this objective.

Justifying the unique contributions of TQM

The article written by Sherr and Lozier[10, p. 10] advocated that TQM espoused three core values, which were the importance of people, need to use knowledge and continuous improvement. “We in higher education hold dearly such values as the importance of people, knowledge, and continuing improvement. Why don’t we practice what we preach?” They failed to point out the superiority of TQM as compared to other management theories.

In recommending TQM as the most effective management philosophy, Leddick[43, p. 60] commented that other management methods were not effective as they lacked comprehensiveness:

They have no language for defining the context in which the school exists and thus its purpose...they have no language for describing the schools as a whole organization...they lack a theory of knowledge—a way to know if changes really lead to improvement...they lack a method to make improvements to any and all parts of the school...and they lack a means for engaging all the people in the school in continually improving it...Quality management provides the comprehensive view school reform has been lacking.

Judging from these comments, Leddick did not manage to give convincing reasons to support the pitfalls of other management theories. In fact, the importance of people has been well recognized by management theorists. In the most familiar dichotomy of management, Theory X and Theory Y, McGregor[44] noted that an effective manager should respect and trust the Theory Y type employees who might take up responsibility voluntarily. Maslow[45] also recognized that self-esteem needs and self-actualization needs are the top priorities in motivating employees. These two needs are very much in line with the motivating factors suggested by Herzberg's two factor theory[46]. The systems approach to organization theory can provide a holistic and integrative view for the operations of an organization. Therefore, TQM is not the only means for effective management. In their book, Using Deming to Improve Quality in Colleges and Universities, Cornesky et al.[47] explained the application of Deming's philosophy in education. They argued that the private sector was defined largely by the relationship between customers and suppliers, and by how the latter could use and improve production, distribution and service to increase quality and keep customers satisfied. Customer patronage was the object of competition among many firms. Each firm tried to maintain or increase market share by pleasing customers, and survival depended on repeat business. According to them, higher education's concept of customers differed from the private sector's because in higher education there were no "repeat customers" in the traditional sense. Students, once enrolled, tended to remain until they graduated. Alumni, once graduated, tended not to return to the same institution for additional degrees. It could be argued, though, that if alumni and current students were well satisfied with their experience, they would recommend the institution to others. Likewise, employers who were well satisfied with the university's graduates might be disposed to hire additional graduates from the university. Thus students, alumni and employers share some characteristics of traditional customers.

Therefore, according to Cornesky et al., TQM can help the management in education by offering the customer-oriented concept and customers can be both internal and external. Nevertheless TQM is not the only philosophy which emphasizes the importance of customer satisfaction. All marketing writers acknowledge the importance of customers[48,49]. Moreover, recognizing and satisfying the needs of internal customers are topics in "relationship marketing"[50].

Work reported by Chizmar[26] and Gartner[25], which has been discussed earlier in this paper seems to be very effective. However, a closer look at their method reveals that they were in fact using management by objectives (MBO) technique rather than the high-sounding TQM. MBO is a management technique which provides subordinates with a specific goal and encourages them to accomplish them by providing them with the desired rewards. Chizmar and Gartner actually entered into a "performance contract" with the students and awarded them accordingly. Therefore, it is not TQM that does the magic.

Trumbull[51] gives a list of what he called the "visible results" of implementation of TQM in colleges: "...many business schools teach TQM...teachers are being encouraged to view students as customers...universities are also viewing students as inputs arriving from other systems...we need to work with highschools...employers say that they stop recruiting at places that aren't teaching total quality"[51, p. 25]. He also writes that "If this (TQM) movement is to transform education, however, several hurdles must be jumped. These include teachers' resistance to change and the time and effort it take to implement
Implications

The words of Schmoker quoted by Weaver[53] may best sum up the current state of TQM: “[Some] has been written about [it]; little of it has been absorbed, believed, and implemented in American schools or businesses. This might be explained by the fact that systematic change requires time, but it might also be an indication the quality movement is not achieving its vision”[53, p. 87]. Thus, TQM is more a term than an action in school management.

House[62, p. 35] suggested that Deming shows the direction for a transformation of American management: Transformation of management practices and beliefs, in turn, results in changes in organizational structure, changes in relationships among those connected with the
<table>
<thead>
<tr>
<th>Writer</th>
<th>Differentiate education from industry</th>
<th>Justify/discuss TQM’s unique contributions</th>
<th>Supported with hands-on experiences in educational institution</th>
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<td>Yes</td>
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<td>Potential benefits</td>
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<td>Hertzier[33]</td>
<td>No</td>
<td>Detailed discussion on historical development only</td>
<td>No</td>
</tr>
<tr>
<td>Jaraiedi and Ritz[36]</td>
<td>No</td>
<td>Only described TQM as a means to solve problems</td>
<td>No</td>
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</table>

(Continued)
organization, and changes in all of the processes used in attaining the organizational purpose. The question of interest is not about the need for transformation and change, but rather the extent to which the Deming philosophy applies to management in education”.

According to Bonser [11, p. 507], there are still reservations in applying all Deming’s philosophy in education. He wrote, “Given these differences, not all of the Deming principles may be directly applicable, although he argues that it is necessary to adopt them all if they are to be useful...his approach can be a vital component in the construction of a new philosophy by which higher education leadership can guide our institutions into the next century.”

Commenting on the contribution of TQM to education, Hill[63] acknowledges that TQM is not a new concept but offers an integrative framework for improvement. He wrote, there are some things in the TQM model which I perceive to be good, but hardly new, many of its insights into such issues as product assessment, management structures, and participative quality control, can be paired with similar critiques in half a century of educational writing. But their coming together in the one coherent and persuasive argument for improvement is something we can welcome [63, p. 25].

Faced with increasing challenges in the environment, there is no argument that education institutions are obliged to cope with the change for survival. Deming’s philosophy provides an inspiration for direction of change in education. However, these are not the only means. More research work has to be done to find better ways of adopting these manufacturing sector originated methods into the educational setting. Fundamentally, the three problematic areas in applying TQM in education discussed earlier should be addressed. They are the differences between education and industry; justification for the unique contribution of TQM and the support of hands-on experience that can be transferred to other similar situations.

References
Paula Y.K. Kwan

Application of total quality management in education: retrospect and prospect


53 Weaver, T., “Total quality management”, ERIC Digest, No. 73, August 1992.