Total quality management in education: problems and issues for the classroom teacher

Lachlan E.D. Crawford
Senior Lecturer, Nanyang Technological University, National Institute of Education, Singapore

Paul Shutler
Lecturer, Division of Mathematics, Nanyang Technological University, National Institute of Education, Singapore

Abstract
Total quality management (TQM), a management philosophy developed for industrial purposes, is now attracting increasing attention in the field of education. Different interpretations of TQM in industry, however, may result in contrasting outcomes when TQM is applied in schools. Briefly reviews how TQM operates in the industrial context and clarifies how the philosophy of TQM may be translated into the context of education. Examines one interpretation of TQM which aims at improving the quality of the production system in order to produce a quality product with “zero defects”. This may lead to a teaching and learning process which focuses exclusively on achieving good examination results. This is contrasted with a second interpretation of TQM as a never-ending cycle of improvement in the system of production. In the context of education, this may lead to continually improving the quality of instruction in order to encourage students to become critical and creative thinkers in a fast-changing technological world.

Introduction
Total quality management (TQM) is a management philosophy developed by Deming based on his experiences in US industry before and during the Second World War. The subsequent adoption of TQM by Japanese industry, but not by the USA, is widely credited for the former’s miraculous post-war economic reconstruction and the current massive trade imbalance between the two countries. Deming (1986) published a book entitled Out of the Crisis, in which he summarised his ideas and exhorted US industry to adopt them as the Japanese had done so successfully. The TQM philosophy has also been promoted by a number of prominent writers, principally Crosby (1979, 1984), Ishikawa (1983, 1985) and Juran (1988, 1989).

Although TQM was originally intended for the industrial sector, Deming (1986, p. xi) pointed out in the preface to his book Out of the Crisis that his management principles could be applied equally well in service sectors. The service sectors, he emphasised, “include government service ... education and the mail”. In fact, whenever an organisation has a sequence of activities directed towards a defined end result, it has business processes which can be analysed and improved by TQM techniques.

A number of researchers in the field of education including Byrnes (1992), Bonstingl (1992), Murgatroyd and Morgan (1993), and Fields (1994) report that TQM is attracting increasing attention among school personnel. This is particularly the case in the UK, Canada and the USA, where educational authorities are attempting to impose quality standards through the development of strict accountability systems, competency-based education and testing, and mandated national curricular content and goals. School managers are now faced with mounting pressure to provide “results” in a climate of efficiency, accountability and competition.

It should be noted, however, that the promoters of the TQM philosophy mentioned in the first paragraph of this article differ significantly in their interpretations of TQM in industry. These differences may result in contrasting outcomes when TQM is applied in education. This article focuses, in particular, on the interpretations of TQM advocated by Crosby and Deming.

While both Crosby and Deming agree on the basic policy of eliminating defects in a product by prevention rather than by cure, they differ in one very important aspect. Crosby (1984, pp. 74-84) focuses on improving the production system so as to achieve “zero defects” with respect to some static quality standard. Deming (1986, pp. 141-2) rejects the notion of “zero defects” as inadequate. He emphasises instead (pp. 49-52) that a never-ending cycle of improvement to the production system should translate into achieving ever higher quality and performance standards for the product. Put another way, while Crosby aims to ensure that next year’s product breaks down less often than last year’s, Deming demands that it should be an altogether better product.

This dichotomy has significant implications for the application of TQM in education. Teachers seeking to implement the Crosby model would attempt to prevent examination failure by modifying the teaching and learning process with the focus firmly on achieving better examination results. They achieve “zero defects” when every student in the class passes the examination at the first attempt. The danger in this approach is that the content of the syllabus and its delivery become entirely subordinate to the goal of achieving the desired examination results. In contrast, teachers seeking to implement the Deming model would regard examinations as a means to an end rather than an end in itself. They would focus on continually improving the methods of instruction so that better curriculum goals may be achieved. In other words, supporters of the Crosby model
focus on achieving better grades, while advocates of the Deming model focus on improving the curriculum.

The remainder of this article is structured in four parts. The first is a brief review of how TQM operates in the industrial context. A comparison is made between the Crosby and Deming models, illustrated with reference to an idealisation of a factory. The second part clarifies how the philosophy of TQM may be translated into the context of education. The key issues raised by Crosby and Deming are highlighted using a simplified model of a secondary school. The third is a more detailed analysis of how Crosby’s model can be implemented in education, together with an indication of the drawbacks inherent in this approach. The fourth is a parallel analysis of how Deming’s model may be implemented in education, together with a discussion of the major obstacles faced.

Total quality management in industry

Consider the diagram shown in Figure 1 which is an idealisation of a factory. Raw materials enter a process operated by workers to produce a product which then passes through a quality control before despatch to the consumer. Items which fail the quality control are either discarded or reworked. Everything seems to be in order but, according to Crosby (1984), the quality control system has the following significant drawback. Discarding defective items wastes the time and resources already invested in them, but reworking them consumes yet more time and resources.

As a result, overall costs may rise. These, in turn, are passed on to the customer as higher prices, making the product less competitive in the consumer market. Sales may fall and jobs may be at risk.

In such a situation, Crosby (1984) suggests that manufacturers explore the following strategy:

Focus not on the quality of the product, but on the quality of the production system you use to produce it. Consider every component of the system, hence the name “total”. Find the root causes of the failures and cure them at source. The system will then produce a quality product (with “zero defects”) automatically.

By following this strategy, there will be a reduction in the number of defective items, an elimination of waste or items to be reworked, and a subsequent saving on costs making the product more competitive with a consequent increase in the share of the consumer market.

According to Deming (1986), however, this is by no means the end of the matter. Even when the root causes of failure have been eliminated, over emphasis on the quality control still has a number of drawbacks:

- Mass inspection of every item may take a long time and may be inherently unreliable since there is not time to inspect each item very closely.
- Quality control inspectors must be employed and paid even though they do not add value to the product.

In fact, Deming (1986, pp. 23-4) emphasises that mass examination of every item is not necessary to assure quality. Provided sufficient attention is paid to the quality of the system as a whole, the quality control step may be down-scaled to a careful examination of a representative sample of the product. This takes less time but turns out in practice to be more accurate. Thus, the quality control becomes a diagnostic tool which assures the quality of the production system and not of the individual items. When the quality control is streamlined in this way some of the quality control inspectors may be redeployed in tasks directly associated with producing the product. As a result of these changes, overall costs will go down still further, making the product even more competitive with a consequent increase in the share of the consumer market.

Moreover, as Deming (1986, pp. 141-2) points out, the concept of “zero defects” is a misguided one where competition in manufacturing is concerned. Quality standards against which “zero defects” may be judged are set by the manufacturer and are not absolute. For example, suppose one manufacturer consistently produces a product with “zero defects” with respect to a given set of quality standards, and if a competitor

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**Figure 1**

A simplified model of a factory
manufacturing an equivalent product has higher quality standards and therefore produces an altogether better product, then the former manufacturer will lose business. So for Deming the emphasis must be on continually improving the process of production to achieve ever higher quality standards. Quality for Deming is, therefore, a positive concept meaning how useful or valuable a product is to the person who purchases it, rather than a negative concept, being simply the absence of defects.

**Total quality management in education**

Consider the diagram shown in Figure 2 which is an idealisation of a secondary school. Primary school leavers enter a secondary school where they pass through a teaching process conducted by teachers. The students then sit for an examination (quality control) before entering further education and training, or the workforce. Students who fail the examination either enter the workforce as unskilled workers, with a lack of academic credentials, or they re-sit the subjects they have failed. This widely-used examination system is inefficient for the following reason. Allowing students who fail their examinations to enter the workforce is a waste of time and money already invested in their education, but to compel students to re-sit their examinations takes even more time and money. As a result of this wastage, overall costs of studying at an institution will rise, making it less competitive in the education market.

In such a situation, supporters of TQM in education, following the Crosby (1984) model suggest the following strategy: focus not on the students’ examination results but on the quality of the teaching system you use to educate them. Consider every component of the system, hence the name “total”. Find the causes for examination failure and cure them at source. The teaching system will then produce students who pass their examinations automatically.

As a result of this strategy, there will be fewer examination failures, which means less time and money wasted going back over the syllabus, making schools better able to compete in the education market.

But, as advocates of the Deming model would point out, over-emphasis on final examinations has additional drawbacks:

- Examining every student on everything they have learned takes up considerable time, thus reducing the number of class periods available for teaching. In addition, the examination process may be unreliable since there is not time to examine each student too closely.
- Teachers may spend considerable amounts of time setting and marking examination scripts, even though this exercise does not contribute directly to student learning.

According to Deming then, schools no longer need to rely on examinations to assure quality. Provided sufficient attention is paid to the quality of the teaching system, examining every student on everything they have learned will, therefore, be unnecessary. The examinations may then be streamlined to examine a representative sample of students in depth, saving time and effort, but producing more accurate results. Thus examinations become a diagnostic tool assuring the quality of the teaching system, not of the individual students. Finally, teachers are able to spend more of the time previously devoted to the examination process to actually teaching the students, who will, therefore, learn more in a shorter time at lower tuition fees, making schools even better able to compete in the education market.

Moreover, as Deming would point out, there is nothing absolute about educational standards. Thus, for schools to compete successfully in the education market it is not sufficient merely to achieve “zero defects”, i.e. no examination failures. There must be continual improvements in the curriculum itself in order better to satisfy the educational needs of the students. These improvements to the curriculum need not be confined to updating the technical content, but may reflect complete changes in focus away from content-mastery towards creativity, thinking skills and independent learning.
Applying TQM in education: the Crosby model

The first step in applying TQM in education using the Crosby model is to identify the root causes for students’ examination failure. A representative, but by no means exhaustive list might include the following:

- Weak students who are cognitively passive and seek certainty in their learning, especially in the forms of answers and direction.
- A lack of focus in presenting material which is to be examined, coupled with ill-defined and confusing objectives.
- A lack of attention paid to performance standards.
- Unmotivated teachers who are not given due reward for their efforts.
- Neglect of students’ examination skills.

The second step is to take action in the teaching system in order to prevent these problems from arising in the first place. This may be accomplished for each of the root causes listed above by taking the following corresponding steps:

- Give extra remedial and tutorial help for the weaker students; establish clear goals and objectives.
- Organise the instructional programme into a sequence of learning units, each with a set of specific instructional objectives and associated criteria.
- Encourage teachers and students to recognise the performance standards and insist that all students leave the classroom with complete mastery of subject material.
- Reward teachers and students on the basis of how well the students perform in the examination.
- Give coaching in examination techniques and drill students in model answers.

These strategies are likely to be acceptable in countries where schools are ranked on the basis of the percentage of students who sit for, and are successful in, public examinations. They are also likely to be supported by those members of the community who view education purely in terms of examination results. Moreover, they are even more likely to be acceptable if teenagers sue their schools over poor results, as proposed recently in the UK (see *Times Educational Supplement* 1996). If the teenagers’ test case is brought to court, it would set a precedent and enable children to do? Complacency may arise and stagnation may set in. Moreover, the schools with “zero defects” are arguably continually producing the same type of regimented student product when society’s needs are changing. What is needed is a new generation of students who are better than their predecessors – not in terms of more “O” or “A” level passes or higher grades, but in terms of the intellectual capacity to be creative and innovative.

Drawbacks and dangers of the Crosby model

The strategies cited are familiar, of course, to generations of teachers who have been responsible for examination classes. However, they do have a number of significant drawbacks. The first drawback as Bonstingl (1992) points out, is that schools become specifically product oriented, focusing solely on examination results without acknowledging the broader aspects of education. Grades and school ranking become important in themselves, and the whole process of instruction is geared towards producing correct responses to examination questions. This may, indeed, ensure examination success, but teachers who use these strategies tend to produce students who are passive, inflexible, lacking in creativity and imagination, good at taking orders, but poor at working independently or generating new ideas (Joyce and Weil, 1986).

The second drawback is that many students are often alienated from their subject material by the strong emphasis on examination techniques and model answers. The insistence on a correct response stifles imagination, discussion and the development of alternative viewpoints.

The third drawback is that once teachers and students have achieved the performance standard of “zero defects” what is there left to do? Complacency may arise and stagnation may set in. Moreover, the schools with “zero defects” are arguably continually producing the same type of regimented student product when society’s needs are changing. What is needed is a new generation of students who are better than their predecessors – not in terms of more “O” or “A” level passes or higher grades, but in terms of the intellectual capacity to be creative and innovative.

Applying TQM in education: the Deming model

Since the promotion of critical and creative thinking is demanded by the requirements of a fast-changing technological world, it is important to create an educational environment in which these skills are allowed to flourish. This may be achieved by adopting the strategies suggested by Deming (1986) and considering TQM in education as a never-ending upward cycle of continuous improvement in the teaching and learning process to produce a different “quality” of school leaver. The most significant of these strategies are discussed in the following paragraphs.
Root causes for student failure

The first step in applying the Deming model is to identify the root causes for student failure. These are the same as in the previous section, i.e.:

1. weak students;
2. a lack of focus in teaching;
3. a lack of attention paid to performance standards;
4. unmotivated teachers; and
5. neglect of student’s examination skills.

With the emphasis on improving the quality of the teaching system, however, the preventative steps to be taken may be radically different. The following measures, for example, are a direct adaptation in the context of education of what Deming advocates in the industrial context:

- “Drive out fear.” Students become passive when they fear failure, when giving the wrong answer is punished. To make students active learners one should reward activity directly, irrespective of whether the students offer the correct answer at the first attempt.
- Build quality into the system by moving away from the traditional mastery learning approach, with heavy emphasis on rote learning, to more student-centred situations where students learn to set their own goals of achievement, learn how to be more effective and learn how to assess the quality of their own work. This can be implemented by:
  - active inquiry projects designed to encourage students to state hypotheses, search for and weigh conflicting evidence and draw salient conclusions;
  - problem-solving exercises which force students to search for alternatives to a range of problems;
  - group and co-operative work designed to promote collaboration, team work and respect for alternative points of view;
  - application of knowledge exercises which focus on real-life challenges; and
  - more egalitarian relationships between teachers and students where teachers are viewed by students as team-mates and helpers in removing obstacles to academic success.
- Eliminate work standards, quotas, numerical goals and “zero defects”. These merely serve to intimidate and discourage those who fail to achieve without acknowledging conscientious effort, correct method, enthusiasm, and perseverance.
- Remove barriers to pride in workmanship. Reward quality teaching and not examination results. This can be done by rewarding teachers directly through monitoring how they conduct their classes rather than judging them on their students’ examination grades.
- Cease dependence on final examinations to ensure quality. Tests and other indicators of student learning should be given as diagnostic and prescriptive instruments throughout the learning process on representative samples of student work. These may be records of achievement, process portfolios, or exhibitions which express student achievement over an extended period of time. By tailoring the instruments more specifically to the qualities being measured, there is no need to spend time drilling the mass of students in specific examination skills which are of little use in themselves.

Major obstacles to implementing the Deming model

The teaching profession tends to be highly conservative and change and innovation are difficult to implement. In particular, it is very difficult to cease dependence on final examinations as a measure of quality. Many teachers, educational administrators, parents and employers demand them as obvious visual criteria of academic achievement. Moreover, many students have difficulty with new student-centred approaches to learning, particularly those who are overly dependent on teachers for instruction and guidance. Often they are unsure of the strategies that are designed to encourage them to learn for themselves and they want to be told exactly what to do and how to do it. Finally, many teachers are reluctant to accept new methods of teaching. They may have taught successfully for 30 years using mastery learning and they see no need to change.

Conclusion

The concept of TQM, a management philosophy developed by Deming and familiar to manufacturers and captains of industry, is now attracting increasing attention among educational theorists and practitioners. Different interpretations of TQM, however, may lead to radically different educational processes and outcomes. Teachers seeking to implement the Crosby “zero defects” model may concentrate simply on achieving better examination results without regard to the content taught, while supporters of the Deming model may focus on a never-ending cycle of improvement in the teaching and
learning process and downplay the significance of final examinations. The Crosby model can lead to a situation in which students pass examinations at the first attempt, but they may become passive, inflexible, lacking in creativity and imagination, alienated from their subject material by the strong emphasis on examination techniques, and complacent. The Deming model, however, can lead to a scenario in which students are actively involved in inquiry projects, problem-solving exercises, group and co-operative work, application of knowledge exercises, and egalitarian relationships with teachers, and as a result become critical and creative thinkers equipped to meet the challenges of a fast-changing technological world.

Major obstacles to implementing the Deming model are:

- the tendency of teachers to depend on final examinations as a measure of quality;
- the difficulty of encouraging students to adopt student-centred approaches to learning; and
- the reluctance of many teachers to accept new methods of teaching.

The successful implementation of the Deming model of TQM in schools, therefore, is likely to depend on programmes of training for teachers and, indeed, students. As Bonstingl (1992) suggests, effective training programmes would show teachers how to set goals, how to teach effectively and how to assess the quality of their work with students. Students would then, in turn, be shown how to set learning goals, how to be more effective in their school work, and how to assess the quality of their own work.

References

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