

**STRATEGIC IMPACT OF EDWARD DEMING'S TQM PRINCIPLES ON A
HEALTHY AND PRODUCTIVE ELEMENTARY SCHOOL ENVIRONMENT**

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Abstract

This study aims to analyze the strategic impact of Deming's TQM principles on creating a healthy and productive elementary school environment, in SDN Pondok Pucung 3 Tangerang Selatan. This research employed a qualitative descriptive approach, with data collected through observation, in-depth interviews with the principal, teachers, and school committee members. The results reveal that the school has successfully implemented key TQM principles such as participatory leadership, the Plan-Do-Check-Act (PDCA) cycle, stakeholder involvement, and customer-oriented service. The commitment of the principal, together with the active participation of teachers, students, and the school committee, has significantly improved environmental cleanliness, reduced student absenteeism due to health issues, and fostered a culture of healthy and responsible behavior among the school community. The findings indicate that the application of Deming's TQM principles not only enhances the efficiency of school management but also contributes to the creation of a healthy, safe, and productive learning environment. The strategic impact is continuous improvement, stakeholder collaboration, and process-focused leadership enhance student well-being and learning outcomes.

Keywords: Deming's TQM Principle, Elementary School, Environment

Abstrak

Studi ini bertujuan untuk menganalisis dampak strategis prinsip TQM Deming terhadap penciptaan lingkungan sekolah dasar yang sehat dan produktif, di SDN Pondok Pucung 3 Tangerang Selatan. Penelitian ini menggunakan pendekatan deskriptif kualitatif, dengan data dikumpulkan melalui observasi, wawancara mendalam dengan kepala sekolah, guru, dan anggota komite sekolah. Hasilnya mengungkapkan bahwa sekolah telah berhasil menerapkan prinsip-prinsip utama TQM seperti kepemimpinan partisipatif, siklus Plan-Do-Check-Act (PDCA), keterlibatan pemangku kepentingan, dan layanan berorientasi pelanggan. Komitmen kepala sekolah, bersama dengan partisipasi aktif guru, siswa, dan komite sekolah, telah secara signifikan meningkatkan kebersihan lingkungan, mengurangi ketidakhadiran siswa karena masalah kesehatan, dan menumbuhkan budaya perilaku sehat dan bertanggung jawab di kalangan komunitas sekolah. Temuan menunjukkan bahwa penerapan prinsip-prinsip TQM Deming tidak hanya meningkatkan efisiensi manajemen sekolah tetapi juga berkontribusi pada terciptanya lingkungan belajar yang sehat, aman, dan produktif. Dampak strategisnya adalah perbaikan berkelanjutan, kolaborasi pemangku kepentingan, dan kepemimpinan yang berfokus pada proses meningkatkan kesejahteraan siswa dan hasil belajar.

Kata Kunci: Prinsip TQM Deming, Sekolah Dasar, Lingkungan

INTRODUCTION

One of the main challenges faced by educational institutions in the era of globalization and Industrial Revolution 4.0 is improving the quality of education. The quality of education determines the success of the educational organization itself (Zar'an, 2024). Superior quality education is the result of school management that continuously applies quality principles (continuous improvement). Excellent quality education is inseparable from the effectiveness of school management in continuously applying quality principles, as quality will benefit educational institutions if they can provide optimal services to students. As defined by quality, which is conformity to customer requirements. (Afifa, 2024). High quality education extends beyond academic achievement; it encompasses the institution's ability to manage educational processes in a systemic, sustainable, and responsive manner, addressing the needs of students and other stakeholders.

Within this framework, effective school management with a strong orientation toward quality assurance becomes a decisive factor in shaping institutional excellence. The consistent application of quality principles enables schools to deliver optimal services and foster a culture of accountability and innovation.

In the context of education, the concept of Total Quality Management (TQM) introduced by William Edward Deming provides a new direction in school management to make it more systematic and results-oriented (output) and impact-oriented (outcome), as well as process-oriented. Edward Deming's Total Quality Management (TQM) has 14 principles in its implementation and is a strategic approach that emphasizes the importance of integrated, process-oriented, and results-focused systems. (The W. Edwards Deming Institute, 2025). Deming posited that most quality failures stem from systemic and managerial shortcomings rather than individual errors. 14 principles in Deming TQM are (1) Create Constancy of Purpose; (2) Adopt the New Philosophy; (3) Cease Dependence on Inspection; (4) End Price Tag Decisions; (5) Improve Constantly & Forever; (6) Institute Training on the Job; (7)

Institute Leadership; (8) Drive Out Fear; (9) Break Down Barriers; (10) Eliminate Slogans & Targets; (11) Eliminate Numerical Quotas; (12) Remove Barriers to Pride; (13) Encourage Education & Self-Improvement; (14) Take Action to Accomplish the Transformation.

By adopting TQM principles, schools can cultivate a culture of quality in which all organizational elements principals, teachers, staff, students, parents, and the broader community are committed to continuous improvement in both processes and learning outcomes. In practice, this includes the implementation of the PDCA (Plan-Do-Check-Act) cycle as a framework for ongoing enhancement. In Indonesia, the implementation of TQM still faces challenges such as low awareness of quality culture and limited stakeholder participation (Busahdiar et al., 2023). The quality of basic education in Indonesia still faces significant challenges, such as disparities in quality between regions, low productive work culture, and limited school facilities and infrastructure (Maryamah, 2013). Additionally, most schools are still administratively oriented and have not fully implemented the quality management paradigm.

TQM in education aims to build a collaborative work culture, continuous improvement, and customer-centricity, which in the school context includes students, parents, and the community (Zaki et al., 2024). Moreover, many schools remain administratively driven and have yet to fully adopt a quality management paradigm. TQM in education especially in primary schools aim to foster a collaborative work culture, continuous improvement, and customer-centricity where students, parents, and the community are viewed as key stakeholders. The transition from an administrative to a quality-oriented management model requires not only technical implementation but also cultural transformation, systemic change, and strategic commitment from all stakeholders.

The implementation of TQM in educational institutions has proven effective in improving service quality and learning processes. According to (Suhendri, 2024), TQM provides a holistic approach to school management, encompassing leadership aspects, staff involvement, and performance measurement. (Susanto et al., 2024) emphasize that TQM is not merely a managerial method, but a work philosophy that demands commitment from all organizational elements to quality.

In this VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) era, improving the quality of education has become a strategic priority in school management (Minciu et al., 2025). Educational institutions are now required to adapt rapidly to dynamic changes in technology, policy, and societal expectations, while ensuring that learning environments remain inclusive, innovative, and sustainable. Within this context, Total Quality Management (TQM) emerges as a relevant and effective framework for achieving organizational excellence in schools. Educational institutions are expected to adapt swiftly to dynamic changes in technology, policy, and societal expectations while maintaining inclusive, innovative, and sustainable learning environments. Within this context, Total Quality Management (TQM) serves as a relevant and effective framework for achieving organizational excellence. By applying principles such as sustainable vision, quality-oriented leadership, stakeholder engagement, human resource development, data-driven decision-making, and continuous improvement, schools can create internal conditions that support healthy and productive learning environments.

TQM emphasizes systematic improvement, stakeholder involvement, and customer orientation where students, parents, teachers, and the broader community are viewed as key beneficiaries of educational services. When these principles are integrated into daily practices,

schools can cultivate a culture of quality in which all members are committed to improving processes, outcomes, and overall satisfaction. This philosophy aligns with contemporary educational goals, which prioritize not only academic achievement but also the development of safe, inclusive, and supportive learning environments that nurture students' holistic growth.

In the context of primary education, integrating Deming's principles can help schools build systems that are responsive to students' needs as "customers" of educational services, while recognizing parents, communities, and teachers as stakeholders who influence educational quality. A collaborative school culture, learning processes designed with a quality improvement approach, and measurable learning outcomes serve as key indicators of successful TQM implementation. This approach enables schools to pursue not only academic achievement but also to foster safe, inclusive, and productive learning environments that prepare graduates to meet the challenges of the 21st century.

A healthy and productive school environment includes not only safe, clean, and comfortable physical facilities but also a positive psychological climate that supports harmonious relationships and effective communication among school members. Meanwhile, school productivity can be assessed through the efficiency of learning processes, student academic achievement, teacher innovation, and stakeholder satisfaction. Meanwhile, school productivity is measured by the efficiency of the learning process, academic achievement, and the innovative abilities of teachers and students.

Based on the explanation above, although various studies have examined the implementation of TQM in the education sector, most previous studies have focused on the context of secondary or tertiary education, with an emphasis on administrative and evaluative aspects. Research on TQM implementation at the elementary school level is relatively limited, particularly those that comprehensively examine the integration of Deming's principles in shaping a school quality culture. Furthermore, previous studies have focused more on the impact of TQM on improving academic performance, but less on how TQM contributes to the creation of a healthy, productive school environment oriented toward changing work culture. There is still little research that explores in depth the implementation process, contextual challenges, and actual practices in the field that reflect quality transformation in public elementary schools.

Therefore, implementing TQM principles in elementary schools becomes an important strategy for building a sustainable and quality-oriented education system (Arokiasamy & Krishnaswamy, 2021; Sfakianaki et al., 2021). This study examines the application of Edward Deming's TQM principles at SDN Pondok Pucung 3 as an example of good practice in basic education quality management in South Tangerang because the school has shown concrete fact that they use TQM to change, before implementing TQM, the school is underrated in society. Through a descriptive qualitative approach, this article identifies TQM implementation strategies, the challenges faced, and its impact on the school's quality culture.

METHODS

A qualitative research approach was used in this study, employing a case study design. This research approach was chosen to gain a deeper understanding of the strategic impact of applying the principles of quality figure Edward Deming on a healthy and productive elementary school environment. The case study approach provides an opportunity for researchers to systematically collect data and thoroughly study quality management within the organizational institution (Creswell & Creswell, 2018).

The research was conducted at SDN Pondok Pucung 3, located in Pondok Pucung Village, Pondok Aren District, South Tangerang City, Banten. This school was selected because it has implemented Total Quality Management (TQM) within its quality management practices to create a comfortable, healthy, and productive school environment. Data collection techniques included direct observation, in-depth interviews, and document analysis (Sugiyono, 2009). Informants were selected using purposive sampling and consisted of the Principal, Teachers, Students, and members of the School Committee.

Participatory observations were conducted to examine how school programs were implemented in daily practice. In-depth interviews were used to explore the perceptions and experiences of the Principal, Teachers, Students, and the School Committee regarding the application of Edward Deming's TQM principles and their strategic impact on school quality, particularly on developing a healthy and productive learning environment. Document analysis for covering school policy archives, program reports, and activity records was carried out to strengthen and validate the observational and interview data.

The aspects studied in this research are Deming's 14 points of TQM, yet the researchers made it more concise without reducing those points discussed into school customer focus, employee involvement, leadership, process approach, continuous improvement, decision making, communication and relationship among employee, parents and society. Furthermore, the triangulation process was carried out in this study, including aspects of sources, techniques, and time, to ensure data validity. The data analysis process followed the Miles and Huberman model, which includes the stages of data reduction, information dissemination, and drawing conclusions.

RESULTS AND DISCUSSION

SDN Pondok Pucung 3 demonstrates success in integrating Deming's TQM principles, such as visionary leadership, active teacher involvement in decision-making, and a transparent quality evaluation system. The strategies implemented include quality culture training, the formation of quality improvement teams, and strengthened communication with parents. Strategic Impact of TQM on a Healthy School Environment. Applying the principles of leadership commitment and teamwork creates a clean, safe, and comfortable environment. Teachers and students have a high awareness of clean living habits, while the principal fosters a stress-free and collaborative work environment. Deming's principle of "drive out fear" encourages open communication among school members.

From the perspective of the school committee, their involvement is an important part of the school's efforts to improve the quality of the learning environment. The school committee not only serves as a supporting party but also as an active and participatory partner in every program implemented. This collaboration is evident through the committee's participation in planning, implementing, and evaluating various school activities aimed at creating a safe, comfortable, and productive learning environment for students. The active participation of the school committee also reflects the institution's response to the needs and expectations of its primary customers, namely parents or guardians. Thus, SDN Pondok Pucung 3 has demonstrated the real implementation of the Total Quality Management (TQM) strategy based on the principle of customer satisfaction, as emphasized by Edward Deming. This approach strengthens the school's position as an educational institution that is responsive, collaborative, and focused on the sustainable quality of educational services.

SDN Pondok Pucung 3 Tangerang Selatan is a state school with an A accreditation, located in a densely populated area, with approximately 380 students and 22 teaching staff. Based on observations and interviews with the principal and teachers, this school has implemented several internal quality initiatives, such as the Healthy School program, the Clean Friday Movement, and the School Waste Bank. In addition, SDN Pondok Pucung 3 is also active in the city-level Adiwiyata School program. Although the Total Quality Management (TQM) framework hasn't been formally adopted yet, Deming's principles such as continuous improvement, involvement of all staff, and leadership commitment seem to have been internalized in various school activities. More detailed findings of the research are described in the paragraphs below:

1. Leadership Commitment and Quality Culture

The principal demonstrates a strong commitment to improving the quality of the learning environment through a participatory approach. Based on interviews, the principal emphasized that every policy is always discussed with teachers and the school committee before implementation. For example, in the Clean and Healthy Classroom program, teachers and students are given the collective responsibility of keeping the classroom clean every Friday. This aligns with Deming's principle 7, which is "Adopt and institute leadership," emphasizing the importance of the leader's role in creating working conditions that support quality (Istiqomah Rahmawati et al., 2021). Thus, the principal's leadership serves as the driving force for a culture of quality and the participation of school members. A study by (Le & Tuyen, 2025) also confirms that quality-oriented leadership is capable of building an organizational learning culture that impacts improved school performance and productivity.

2. Applying the Plan-Do-Check-Act (PDCA) Cycle in School Programs

The PDCA principle appears to be applied informally in routine school activities, namely:

- a. Plan: Monthly meetings of teachers to plan cleanliness and health activities (such as school health unit (UKS) checks, nutrition programs, and greening).
- b. Do: Implementation of activities by the cleanliness team and on-duty teachers.
- c. Check: Evaluation through direct observation by the principal and feedback from homeroom teachers.
- d. Act: Policy revisions (e.g., adding cleaning schedules or rotating classroom officers).

This practice aligns with research findings (Parveen et al., 2024) which state that the PDCA cycle effectively improves the efficiency of educational management and the quality of the work environment. It also stated explicitly that the implementation of PDCA at SDN Pondok Pucung 3 has helped the school maintain cleanliness, increase student compliance with cleanliness rules, and reduce incidents of minor health complaints (e.g., coughs, colds) as reported by the UKS teacher.

3. Participation of Teachers, Students, and Parents

The participation of school members is one of the main strengths. Teachers play an active role in initiating innovations such as "Green Class" (arranging ornamental plants in each classroom) and "Organic Waste Corner." Students are also involved in daily cleaning activities and healthy classroom competitions.

Additionally, school committees and parents play a role in supporting funding and maintaining health facilities, such as providing additional handwashing stations after the pandemic. This illustrates Deming's principle 13, Encourage education and self-

improvement for everyone, where all elements of the organization are involved in the quality improvement process. Research by (Spsychalski, 2025) also confirms that stakeholder involvement enhances the successful implementation of TQM in educational institutions because it strengthens a sense of ownership and collective responsibility for quality.

4. Data-Driven Measurement and Evaluation

The school has begun using simple data to monitor the results of quality activities. For example, student attendance lists are compared with UKS health records to see the correlation between hygiene and attendance rates. Additionally, the principal conducts an internal parent satisfaction survey at the end of each semester. Although this monitoring system is still manual, this practice reflects the application of Deming's point 11 principle: Eliminate numerical quotas and focus on quality indicators, which means assessing quality based on processes and stakeholder satisfaction, not just quantitative targets. This aligns with the findings of (Dharmawan & Romadhony, 2024; Gouge et al., 2023), which state that simple data collection related to school environmental health can help evidence-based decision-making to improve program effectiveness.

5. Impact on Health and Productivity of the School Environment

Observation results show a significant improvement in healthy physical and behavioral aspects:

- a. Classroom and yard cleanliness increased (95% of classrooms were clean and tidy based on the checklist).
- b. Availability of handwashing facilities and toilet cleanliness improved (increased since 2023).
- c. Student absenteeism due to illness decreased by approximately 18% compared to the previous year (based on UKS records from 2024).
- d. Students demonstrate a proactive attitude toward environmental protection, such as picking up trash and watering plants.

Indirectly, this improvement in environmental quality has a positive impact on students' concentration and academic performance, which is consistent with Deming's principles of continuous improvement and focus on process quality. This supports the research findings (Sallis, 2005) which confirm that TQM in an educational environment produces synergy between organizational quality and environmental health, creating schools that are not only efficient but also humane and productive.

Moreover, the findings of this study reinforce key arguments in the TQM literature while also extending them through the unique context of SDN Pondok Pucung 3. The main contributions are:

a. Theoretical Enrichment

The study expands TQM theory by showing how Deming's principles can be naturally integrated into environmental health and community involvement programs in elementary schools.

b. Contextual Novelty

The combination of low-resource PDCA practices, strong parental participation in health-focused programs, and the use of environmental initiatives as entry points for cultivating a quality culture represents a distinctive operationalization of TQM in a public elementary school context.

c. Practical Contribution

The case provides a replicable model for other schools seeking to implement TQM without formal structures, advanced technology, or large budgets.

From the research results, it can be concluded that Deming's TQM principles, when contextually adapted at SDN Pondok Pucung 3, have the following strategic impacts as follows:

Table 1. Brief Discussion Table

Aspect	Deming's Principles	Strategic Impact
Leadership & Quality Culture	Point 7 & 13 (Institute Leadership & Encourage Education & Self-Improvement)	Increasing the participation and commitment of all school members toward a healthy environment.
Process Management & PDCA	Point 5 & 6 (Improve Constantly & Forever and Institute Training on the Job)	Reducing variations in cleanliness quality and improving the operational efficiency of the school.
Stakeholder Engagement	Point 8 & 14 (Drive out fear & Take Action to Accomplish the Transformation)	Strengthening shared ownership of the quality and sustainability of the healthy school program.
Measurement & Evaluation	Point 11 (Eliminate numerical quotas and management by objectives)	Being the basis for evidence-based decision-making in school management.



Figure 1. Picture of SDN Pondok Pucung 3



Figure 2. Proof of reating a healthy, safe, and productive school environment



Figure 3. PDCA Cycle: Plan Stage



Figure 4. School Committee Involvement to Fulfill Customer Satisfaction

To sum up entire research results that the application of Edward Deming's TQM principles at SDN Pondok Pucung 3 has a strategic impact on three main dimensions: (1) improved quality of school organizational processes, and (2) enhanced physical condition and healthy behavior of school members. And (3) stakeholder synergy as a sustainability factor. Those three dimensions can be explained:

- a. Organizational Dimensions: Quality Culture and Leadership, the principal acts as an agent of change, translating TQM principles into simple policies, such as monthly reflection meetings and classroom cleanliness assessments. This strengthens the learning organization and encourages collaboration among teachers.
- b. Physical Environment and Health Dimension, the principle of process improvement is evident in the management of sanitation, ventilation, and cleanliness. Through the "Clean Friday" program, minor repairs are carried out regularly with evaluation. The impact is a healthier environment with fewer health disturbances.
- c. Stakeholder Synergy as a Sustainability Factor, Collaboration between teachers, students, and parents is a determining factor for the sustainability of the program. This participatory approach reflects Deming's philosophy of involving all members of the organization in achieving total quality.

CONCLUSION

The implementation of Edward Deming's TQM principles at SDN Pondok Pucung 3 has proven to have a strategic impact on creating a healthy, safe, and productive school environment. This success is supported by leader commitment, continuous improvement, teamwork, a participatory culture, a continuous evaluation cycle, and the integration of school cleanliness and health programs. The impact of implementing TQM principles in elementary school is evident in the increased cleanliness of the school environment, a decrease in student absenteeism due to health issues, and the growth of proactive behavior among school members in maintaining the environment. This condition not only creates a healthy learning environment but also increases students' productivity and enthusiasm for learning.

Overall, the application of Deming's TQM principles at SDN Pondok Pucung 3 demonstrates that quality education management focused on continuous improvement and customer satisfaction is capable of strengthening an innovative, adaptive, and sustainable school culture. This model practice can serve as an effective example for other elementary schools in building a quality management system aligned with the needs of the modern educational environment. However, the implementation remains challenges, such the leader encountered resistance from some teachers and a lack of management understanding to distinguish between major and minor issues, which caused the initial enthusiasm to quickly fade due to impatience, unwillingness to change behavior, and a shortage of human resources to assist in monitoring the TQM process. Practical recommendations are strengthening TQM-oriented capacity building through regular training for teachers and school committees to ensure consistent understanding and implementation of quality principles.

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