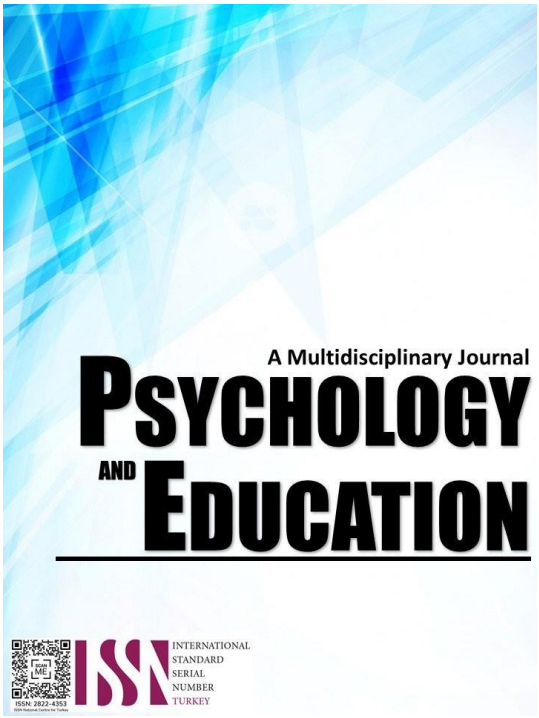
PERFORMANCE EXCELLENCE OF A SCHOOL USING SIX SIGMA IN GUMACA



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Research Article

Performance Excellence of a School using Six Sigma in Gumaca

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Abstract

This study investigates the performance excellence of a school in Gumaca, Quezon, using Six Sigma methodologies through a descriptive-evaluative research design. Data were collected from teaching and non-teaching staff via a structured questionnaire, validated by experts, and analyzed using frequency counts, mean scores, and the Kruskal-Wallis H-Test. Results indicated high performance in key areas such as top management support, customer relationships, and workforce management, with the highest-ranked indicators being the clarity of quality goals and engagement with students. However, significant areas needing improvement were identified, including the formal planning processes for quality improvement projects and the measurement of external student satisfaction. The Kruskal-Wallis H-Test revealed no significant differences between teaching and non-teaching staff perceptions, indicating a consistent view of Six Sigma's effectiveness across different roles. Based on these findings, several recommendations are proposed to further enhance the school's performance excellence. These include developing a more formalized planning process for quality improvement projects, establishing effective student feedback mechanisms, re-evaluating supplier management practices to focus on high-quality suppliers, offering more focused training in basic statistical techniques, and ensuring that quality data is readily accessible to all staff members. Implementing these recommendations can help the school leverage Six Sigma methodologies for continuous improvement and long-term success.

Keywords: *performance, six sigma,effectiveness,excellence*

Introduction

Quality management is but a common term that we usually hear whenever it pertains to quality concepts in the business world or even to any office. This is the most common concept that is used to satisfy customers and empower employees in the organization. It has long been established as an important strategy for achieving competitive advantage. The aim of the businesses may differ, but the importance of customers is a matter of common interest. The ability of organizations to adapt to new customer requirements in a globalized market is of vital importance for long-term success. Traditional quality initiatives, such as statistical quality control, zero defects, and total quality management, have been key initiatives for many years. In the last two decades, Six Sigma has evolved into a new quality management initiative, and now many organizations are working towards its implementation.

Motorola introduced the concept of Six Sigma in the 1980s to improve their products and maintain quality. The core of Six Sigma lies in the continuous improvement process using the DMAIC (Define, Measure, Analyze, Improve, and Control) method. It has since then been adopted by many other companies to achieve their respective goals both in the production of goods and in rendering services. Due to the success of this method, academic institutions attempted to adapt Six Sigma methodologies to improve the quality of education and services.

These concepts have great potential for improving process efficiency and quality of higher education. The improvements can be enhanced by integrating other similar concepts, such as lean manufacturing and SPC (statistical process control).

According to Freeman, there is an increasing need to improve the quality of higher education because education is becoming a global entity facing challenges with resource constraints. Unlike other organizations, higher education has several stakeholders, such as students, parents, future employers, and society. Zhang proposed eight important questions to ask regarding a Six Sigma research program. Of these eight, the most relevant to higher education is: "How can the effectiveness of a Six Sigma program be validated?" "How should Six Sigma be customized for different organizational contexts?", "What is the most effective organizational structure for a Six Sigma program?", and "How do leadership development and human resource practices relate to Six Sigma program?". The answers to these questions center on empirical validation of the effectiveness and customization of the program, separating the Six Sigma program from Quality Control.

In the study by Razaki & Aydin, different process improvement methods from the business world are analyzed for their usefulness in the academic world. Four different methods were analyzed, including Total Quality Management (TQM), Six Sigma, Business Process Reengineering (BPR), and Lean Manufacturing. "TQM was highly suited to improving the departmental processes to effect a transition to excellence, Lean Six Sigma provided a few but highly effective methods for departmental improvement." The use of Lean Six Sigma was revealed from their analysis of the Kukreja study. It was noticed that the data collection cycle was too long, and a great deal of time was necessary to complete the project. Since most students are only enrolled for four years, this did not work well with this required timespan. They propose mixing the appropriate parts of Six Sigma and Lean Manufacturing to make the process more appropriate for the relatively short time available to collect data on individuals. This method uses statistical tools of moderate complexity, with a short cycle time and a focus on the elimination of waste.

Research Questions

The study focused mainly on the performance excellence of a school using Six Sigma in Gumaca. Specifically, it seeks to answer the following questions:

1. What is the profile of the respondents in terms of:
    1.1. Age
    1.2. Sex
    1.3. Civil Status
    1.4. Highest Educational Attainment
    1.5. Length of Service
2. What is the level of performance excellence of a school using sig sigma in Gumaca in terms of:
    2.1. Top management support
    2.2. Student relationship
    2.3. Supplier relationship
    2.4. Workforce management
    2.5. Quality information
    2.6. Product/service design
    2.7. Process management
    2.8. Six Sigma role structure
    2.9. Six Sigma structured improvement procedure
    2.10. Six Sigma focus on metrics
3. Is there any significant difference on the performance excellence of a school in Gumaca when grouped according to profile?
4. What enhancement program can be proposed based on the results of the study?

Methodology

Research Design

The study employed a descriptive-evaluative research design to scrutinize the performance excellence of a school in Gumaca, Quezon, using Six Sigma methodologies. Descriptive research facilitated a detailed observation and documentation of current practices and performance metrics within the school. Evaluative research enabled a systematic assessment of the effectiveness of Six Sigma implementation, identifying specific areas where these practices could enhance operational efficiency and educational outcomes (Creswell, 2014).

By integrating both descriptive and evaluative approaches, the study aimed to provide a comprehensive understanding of the school's performance landscape. The dual focus ensured that not only were current processes documented, but their impact was also critically analyzed. This methodology was pivotal in uncovering both strengths and areas needing improvement, thus aligning with the principles of Six Sigma, which emphasize continuous improvement and data-driven decision-making (Pyzdek & Keller, 2014).

Respondents

The study's population comprised both teaching and non-teaching staff at the school, ensuring a holistic view of the school's performance. This inclusive approach was crucial as it recognized the diverse roles and contributions of all staff members in achieving performance excellence. By involving both groups, the study aimed to capture a comprehensive picture of the school's operational dynamics and the impact of Six Sigma practices across different job functions (Fowler, 2014). Sampling both teaching and non-teaching staff provided a balanced perspective on the implementation of Six Sigma. It highlighted the varied experiences and insights of staff members, facilitating a deeper understanding of the challenges and successes associated with Six Sigma adoption. This inclusive sampling strategy was essential for identifying systemic issues and opportunities for improvement within the school's operational framework (Patton, 2015).

Instrument

Data collection was carried out using a structured questionnaire, designed to capture detailed information regarding the implementation and impact of Six Sigma methodologies. The questionnaire included sections on key performance indicators, process improvements, and overall satisfaction with the Six Sigma approach. This structured format ensured consistency in data collection, allowing for reliable and comparable responses across participants.

To ensure the reliability and validity of the questionnaire, it underwent expert validation and reliability analysis. Expert validation involved having specialists in Six Sigma and educational performance review the instrument to ensure it accurately captured the necessary data. This process helped refine the questionnaire, making it an appropriate tool for data collection. Reliability analysis was conducted to test the consistency of the questionnaire's results. This involved statistical techniques to assess whether the instrument produced stable and consistent results over repeated administrations. The questionnaire ensuring high reliability and validity that was

critical for the credibility of the study's findings, as it confirmed that the data collected were both accurate and dependable (Tavakol & Dennick, 2011).

Data Analysis

The data collected through the questionnaire were analyzed using frequency counts, mean scores, and the Kruskal Wallis H-Test. Frequency counts provided an overview of the distribution of responses, allowing for a basic understanding of the data trends. Mean scores offered a summary measure of central tendency, giving an average rating for various indicators assessed in the study (Field, 2018). The Kruskal Wallis H-Test was employed to identify any statistically significant differences between groups, such as teaching and non-teaching staff. This non-parametric test was suitable for the ordinal data collected through the questionnaire, ensuring robust statistical analysis.

Results and Discussion

Demographic Profile of The Respondents

Table 1. *Profile Percentage according to Age*

	Teaching Staff		*Non- Teaching Staff*	
Age	*Frequency*	*Percentage %*	*Frequency*	*Percentage %*
18-28 years old	6	30	3	15
29- 39 years old	5	25	6	30
40-50 years old	6	30	10	50
51 years and above	3	15	1	5
Total	20	100 %	20	100%

The age distribution of the respondents indicates that the teaching staff is fairly evenly spread across the age groups, with 30% in the 18-28 and 40-50 years old categories. In contrast, the non-teaching staff shows a higher concentration in the 40-50 years old group, accounting for 50%. This age distribution suggests that while the teaching staff comprises a diverse age range, the non-teaching staff tends to be older, potentially indicating longer tenure or stability in these roles.

Table 2. *Profile Percentage according to Sex*

	Teaching Staff		*Non- Teaching Staff*	
Sex	*Frequency*	*Percentage %*	*Frequency*	*Percentage %*
Male	5	25	7	35
Female	15	75	13	65
Total	20	100	20	100

The gender distribution shows that the teaching staff is predominantly female, with 75% women compared to 25% men. Similarly, the non-teaching staff has a higher percentage of females (65%) than males (35%). This trend highlights a significant gender imbalance, particularly within the teaching staff.

Table 3. *Profile Percentage according to Civil Status*

	Teaching Staff		*Non- Teaching Staff*	
Sex	*Frequency*	*Percentage %*	*Frequency*	*Percentage %*
Single	8	40	9	45
Married	10	50	11	55
Separated	1	5	0	0
Widowed/er	1	5	0	0
Total	20	100 %	20	100%

Among the teaching staff, 50% are married, 40% are single, while the remaining 10% are either separated or widowed. For non-teaching staff, a similar pattern is observed with 55% married and 45% single. There are no separated or widowed respondents among the non-teaching staff.

Table 4. *Profile Percentage according to Highest Educational Attainment*

	Teaching Staff		*Non- Teaching Staff*	
HEA	*Frequency*	*Percentage %*	*Frequency*	*Percentage %*
Bachelor's	10	50	17	85
Master's	8	40	3	15
Doctorate	2	10	0	0
Total	20	100 %	20	100%

The teaching staff shows a high level of educational attainment, with 50% holding a bachelor's degree, 40% a master's degree, and 10% a doctorate. In contrast, the majority of non-teaching staff (85%) have a bachelor's degree, with 15% holding a master's degree and none with a doctorate.

Table 5. *Profile Percentage according to Length of Service*

	Teaching Staff		*Non- Teaching Staff*	
Years of Service	*Frequency*	*Percentage %*	*Frequency*	*Percentage %*
1-5 years	4	20	4	20
6-10 years	7	35	8	40
11- 15 years	6	30	7	35
16-20 years	2	10	1	5
21 years and above	1	5	0	0
Total	20	100 %	20	100%

The length of service varies among the teaching staff, with 35% having 6-10 years of service, followed by 30% with 11-15 years, and 20% with 1-5 years. Non-teaching staff also predominantly have 6-10 years of service (40%), with 35% having 11-15 years.

Performance Excellence of A School Using Six Sigma In Gumaca

Table 6. *Weighted mean of the Performance Excellence of a School using Six Sigma, under the term of Top Management Support*

Top management support	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Our school's top management (i. e. top executives and major department heads) assumes responsibility for quality performance.	3.42	P	6	3.46	P	6
Our school's top management provides personal leadership for quality products and quality improvement.	4.08	P	4	4.13	P	3
Our school's top management is evaluated for quality performance.	3.46	P	5	3.63	P	5
Major department heads within our school participate in the quality improvement process.	4.13	P	3	4.11	P	4
Quality issues are reviewed in our school's management meetings.	4.22	HP	2	4.20	HP	2
Our school's top management has objectives for quality performance.	4.25	HP	1	4.28	HP	1
Overall Mean:	3.93	P		3.97	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Top management support is perceived as performing, with an overall mean of 3.93 for teaching staff and 3.97 for non-teaching staff. The highest-ranked indicator for both groups is "Our school's top management has objectives for quality performance," with means of 4.25 (HP) and 4.28 (HP) respectively. This highlights a strong commitment to quality objectives, crucial for effective Six Sigma implementation. The second highest-ranked indicator is "Quality issues are reviewed in our school's management meetings," with means of 4.22 (HP) and 4.20 (HP), showing active management involvement in quality discussions. The lowest-ranked indicator for teaching staff is "Our school's top management is evaluated for quality performance," with a mean of 3.46, suggesting room for improvement in accountability measures. For non-teaching staff, the lowest-ranked is also the evaluation of top management for quality performance, with a mean of 3.63, indicating that establishing clear evaluation mechanisms for management could further enhance the effectiveness of Six Sigma practices in the school.

Table 7. *Weighted Mean of the Performance Excellence of a School using Six Sigma, under the term of Customer Relationship*

Customer Relationship	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
We frequently are in close contact with our students.	4.55	HP	4	3.28	P	3
Our students give us feedback on quality and delivery performance.	3.67	P	5	2.92	SP	4
Our school measures our external students' satisfaction.	3.56	P	6	2.64	SP	6
We use student requirements as the basis for quality.	4.94	HP	3	2.72	SP	5
Our employees know who our students are.	5	HP	1	4.46	HP	2
Our students visit our school.	5	HP	1	5	HP	1
Overall Mean:	4.45	HP		3.50	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Customer relationship is highly performing among teaching staff with an overall mean of 4.45, compared to 3.50 for non-teaching staff. The highest-ranked indicators for teaching staff are "Our employees know who our students are" and "Our students visit our school," both with means of 5.00 (HP). This demonstrates strong engagement with students. For non-teaching staff, the highest-ranked indicator is also "Our students visit our school" with a mean of 5.00 (HP), indicating frequent and positive student interactions. The second highest-ranked for non-teaching is "Our employees know who our students are" with a mean of 4.46 (HP). With a mean of 2.64 (SP), "Our school measures our external students' satisfaction" emerged as the lowest-ranked indicator for non-teaching staff, signifying a

substantial area for enhancement. This score underscores the necessity for the school to develop more effective feedback mechanisms to accurately gauge student satisfaction and leverage this data for quality improvements.

Table 8. *Weighted mean of the Performance excellence of a School using Six Sigma, under the term of Supplier Relationship*

Supplier Relationship	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
We strive to establish long-term relationships with suppliers.	3.31	P	3	3.28	SP	4
We rely on a small number of high-quality suppliers.	2.83	SP	7	2.91	SP	7
Our suppliers are actively involved in our educational services design/redesign process.	4.03	P	1	4.05	P	2
Our suppliers are evaluated according to quality, delivery performance, and price, in that order.	3.13	SP	6	4.10	P	1
Our school has a thorough supplier rating system.	3. 24	SP	5	3.22	SP	5
Our suppliers are involved in our quality training.	3. 28	SP	4	3.13	SP	6
We provide technical assistance to our suppliers.	3.42	P	2	3. 51	P	3
Overall Mean	3.32	SP		3.46	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Supplier relationships are somewhat performing among teaching staff with an overall mean of 3.32 and performing among non-teaching staff with a mean of 3.46. The highest-ranked indicator for teaching staff is "Our suppliers are actively involved in our educational services design/redesign process" with a mean of 4.03 (P). For non-teaching staff, the highest-ranked indicator is "Our suppliers are evaluated according to quality, delivery performance, and price" with a mean of 4.10 (P), reflecting thorough supplier evaluation practices. The second highest for teaching is "We provide technical assistance to our suppliers" with a mean of 3.42 (P). Both groups rated "We rely on a small number of high-quality suppliers" the lowest, with means of 2.83 (SP) for teaching staff and 2.91 (SP) for non-teaching staff. This indicates that the school could benefit from re-evaluating its supplier base to prioritize high-quality suppliers, potentially enhancing the quality and reliability of its educational services.

Table 9. *Weighted mean of the Performance Excellence of a school using Six Sigma, under the term of Workforce Management*

Workforce Management	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Our school forms teams to solve problems.	4.22	HP	7	4.35	HP	5
Our school gives feedback to employees on their quality performance.	4.18	P	8	4.56	HP	3
Our employees are recognized for superior quality improvement.	4.37	HP	3	4.35	HP	5
Hourly/non-supervisory employees are involved in quality decisions.	4.78	HP	1	4.93	HP	1
Supervisors encourage the persons who work for them to work as a team.	4.33	HP	5	4.51	HP	4
Quality-related training is given to hourly workers in our school.	4.37	HP	3	4.19	P	8
Quality related training is given to managers and supervisors in our school.	4.29	HP	6	4.33	HP	7
Training is given in the "total quality concept" (i.e., philosophy of company-wide responsibility for quality) in our school.	4.52	HP	2	4.61	HP	2
Training is given in the basic statistical techniques (such as histogram and control charts) in our school.	4.15	P	9	4.18	P	9
Overall Mean:	4.36	HP		4.45	HP	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Workforce management is highly performing among both teaching (4.36) and non-teaching staff (4.45). The highest-ranked indicator for teaching staff is "Hourly/non-supervisory employees are involved in quality decisions" with a mean of 4.78 (HP), while for non-teaching staff, it is 4.93 (HP). This highlights a strong involvement of all staff levels in quality management. The second highest for teaching is "Our employees are recognized for superior quality improvement" with a mean of 4.37 (HP), showing appreciation for quality efforts. The lowest-ranked indicator for teaching staff is "Training is given in the basic statistical techniques" with a mean of 4.15, and for non-teaching staff, it is "Quality-related training is given to hourly workers" with a mean of 4.18. These scores, while still performing, indicate areas where more focused training in basic statistical techniques could further enhance the workforce's capabilities.

Table 10. *Weighted mean of the Performance Excellence of a school using Six Sigma, under the term of Quality Information*

Quality Information	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Quality data (error rates, defect rates, scrap, defects, cost of quality, etc.) are available in our school.	3.40	P	5	3.49	P	5
Quality data are available to managers, supervisors, and engineers.	3.45	P	2	3.52	P	4
Quality data are available to hourly/non-supervisory workers.	3.42	P	4	3.47	P	6
Quality data are timely.	4.22	HP	6	4.18	P	1
Quality data are used as tools to manage quality.	3.57	P	1	3.54	P	3
Quality data are used to evaluate supervisory and managerial performance.	3.45	P	2	3.66	P	2
Overall Mean:	3.59	P		3.64	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Quality information is perceived as performing among both teaching (3.59) and non-teaching staff (3.64). The highest-ranked indicator for both groups is "Quality data are timely" with means of 4.22 (HP) for teaching staff and 4.18 (P) for non-teaching staff. This indicates that timely quality data is recognized and valued. The second highest for teaching is "Quality data are used as tools to manage quality" with a mean of 3.57 (P), reflecting the practical use of data in quality management.

The lowest-ranked indicator for teaching staff is "Quality data (error rates, defect rates, scrap, defects, cost of quality, etc.) are available in our school" with a mean of 3.40, while for non-teaching staff, it is "Quality data are available to hourly/non-supervisory workers" with a mean of 3.47. These scores suggest a need to improve the availability and accessibility of quality data for all staff members, ensuring that everyone can effectively utilize this information.

Table 11. *Weighted mean of the Performance Excellence of a School using Six Sigma, under the term of Product Service Design*

Product Service Design	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Our school conducts a thorough review of new product/service design before the product/service is produce.	3.44	P	6	3.42	P	6
Multiple departments (such as marketing and purchasing) coordinate in the product/service development process.	3. 56	P	3	3.50	P	4
Quality people are involved in the product/service development process.	3.47	P	5	3.43	P	5
Quality of new products/services is emphasized in relation to cost or schedule objectives.	3.63	P	2	3.61	P	3
We design for manufacturability.	3.56	P	3	3.58	P	2
We make an effort, in the design process, to list only the specifications which are clearly needed.	4.18	P	1	4.22	HP	1
Overall Mean:	3.64	P		3.63	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Product service design is performing among both teaching (3.64) and non-teaching staff (3.63). The highest-ranked indicator for both groups is "We make an effort, in the design process, to list only the specifications which are clearly needed" with means of 4.18 (P) and 4.22 (HP) respectively. This indicates a focus on clarity and necessity in product/service design specifications. The second highest for teaching is "Quality of new products/services is emphasized in relation to cost or schedule objectives" with a mean of 3.63 (P), reflecting a balanced approach to quality and cost.

The indicator "Our school conducts a thorough review of new product/service design before the product/service is produced" received the lowest scores from both groups, with means of 3.44 (P) for teaching staff and 3.42 (P) for non-teaching staff. These results highlight the need for more rigorous review processes to enhance product/service design quality, ensuring all new offerings meet high standards.

Table 12. *Weighted mean of the Performance Excellence of a school using Six Sigma, under the term of Process Management*

Process Management	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Processes in our school are designed to be “mistake-proof” to minimize the chances of errors.	4.09	P	7	4.07	P	9
We dedicate a portion of everyday solely to maintenance.	4.27	HP	5	4.29	HP	7
We usually meet the production schedule every day.	4.29	HP	4	4.20	HP	8
Production is stopped immediately for quality problems.	3.35	SP		4.45	HP	4
Our school conducts preventive equipment maintenance.	4.44	HP	3	4.52	HP	3
Clear work or process instructions are given to employees.	4.72	HP	1	4.65	HP	1
Our school shop floors are well organized and clean.	4.18	P	6	4.32	HP	5
A large number of the equipment or processes on the shop floor are currently under statistical process control.	3.40	P	8	3.54	P	2
We make extensive use of statistical techniques to reduce variance in processes.	4.46	HP	2	4.32	HP	5
Overall Mean:	4.13	P		4.26	HP	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Process management is highly performing among both teaching (4.13) and non-teaching staff (4.26). The highest-ranked indicator for teaching staff is "Clear work or process instructions are given to employees" with a mean of 4.72 (HP), and for non-teaching staff, it is 4.65 (HP). This highlights the importance of clear instructions in maintaining high-quality processes. The second highest for teaching is "We make extensive use of statistical techniques to reduce variance in processes" with a mean of 4.46 (HP), showing a commitment to statistical process control.

The lowest-ranked indicator for teaching staff is "A large number of the equipment or processes on the shop floor are currently under statistical process control" with a mean of 3.40, while for non-teaching staff, it is "Production is stopped immediately for quality problems" with a mean of 4.45 (HP). These scores indicate areas where implementing more statistical control and immediate action on quality issues could enhance process management.

Table 13. *Weighted mean of the Performance Excellence of a school using Six Sigma, under the term of Six Sigma Role Structure*

6 Sigma Role Structure	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
We employ a black/green belt role structure (or equivalent structure) for continuous improvement.	4.14	P	5	4.12	P	4
We use a black/green belt role structure (or equivalent structure) to prepare and deploy individual employees for continuous improvement programs.	3.79	P	6	3.83	P	6
In our school, members of a quality improvement team have their roles and responsibilities specifically identified.	4.26	HP	4	4.29	HP	3
The black/green belt role structure (or equivalent structure0 helps our school to recognize the depth of employees' training and experience.	4.37	HP	3	4.41	HP	2
In our school, an employee's role in the black/green structure (or equivalent structure) is considered when making compensation and promotion decisions.	3.88	P	1	3.88	P	5
Our school uses differentiated training so that employees who have different roles in the black/green belt role structure (or equivalent structure) can obtain the necessary knowledge and skills to fulfill their job responsibilities.	4.43	HP	2	4.46	HP	1
Overall Mean:	4.15	P		4.17	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

The Six Sigma role structure is performing among both teaching (4.15) and non-teaching staff (4.17). The highest-ranked indicator for both groups is "Our school uses differentiated training so that employees who have different roles in the black/green belt role structure (or equivalent structure) can obtain the necessary knowledge and skills to fulfill their job responsibilities" with means of 4.43 (HP) and 4.46 (HP). This reflects a strong emphasis on tailored training. The second highest for teaching is "In our school, an employee's role in the black/green structure (or equivalent structure) is considered when making compensation and promotion decisions" with a mean of 3.88 (P), highlighting the role structure's impact on career progression.

For teaching staff, the indicator "We use a black/green belt role structure (or equivalent structure) to prepare and deploy individual employees for continuous improvement programs" scored a mean of 3.79 (P), suggesting the need for enhancement in this area. Similarly, for non-teaching staff, this indicator scored the lowest with a mean of 3.83 (P). These scores indicate a necessity to strengthen the Six Sigma role structuring, specifically in preparing and deploying employees for continuous improvement programs.

Table 14. *Weighted mean of the performance excellence of a school using six sigma, under the term of Six Sigma role Structured Improvement Procedure*

6 Sigma Role Structured Improvement Procedure	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
In our school, continuous improvement projects are conducted by following a formalized procedure (such as DMAIC-Define, Measure, Analyze, Improve and Control).	4.27	HP	3	4.35	HP	3
We use a structured approach to manage quality improvement activities.	4.31	HP	2	4.42	HP	2
We have a formal planning process to decide the major quality improvement projects.	3.77	P	6	3.67	P	6
All improvement projects are reviewed regularly during the process.	3.79	P	5	3.76	P	5
We keep records about how each continuous improvement project is conducted.	4.53	HP	1	4.61	HP	1
In our school, the product design process follows a formalized procedure.	4.27	HP	3	4.32	HP	4
Overall Mean:	4.16	P		4.19	P	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

Six Sigma role structured improvement procedures are highly performing among both teaching (4.16) and non-teaching staff (4.19). The highest-ranked indicator for both groups is "We keep records about how each continuous improvement project is conducted," with means of 4.53 (HP) for teaching staff and 4.61 (HP) for non-teaching staff. This underscores the importance placed on maintaining comprehensive records of improvement projects, which is essential for tracking progress and learning from past initiatives. The second highest-ranked indicator is "We use a structured approach to manage quality improvement activities," with means of 4.31 (HP) for teaching staff and 4.42 (HP) for non-teaching staff, indicating a systematic methodology in quality management.

The indicator "We have a formal planning process to decide the major quality improvement projects" scored the lowest for both teaching and non-teaching staff, with means of 3.77 (P) and 3.67 (P), respectively. This suggests that although structured approaches are in place, the formal planning process for deciding major quality improvement projects requires further development. Enhancing this process could significantly improve overall performance and efficiency.

The focus on metrics is highly performing among both teaching (4.28) and non-teaching staff (4.22). The highest-ranked indicator for teaching staff is "Quality goals are clearly communicated to employees in our school," with a mean of 4.76 (HP), and for non-teaching staff, it is "We assess the performance of core processes against students' requirements," with a mean of 4.49 (HP). These high scores reflect the importance of clear communication of quality goals and the alignment of core processes with student requirements, which are critical for achieving performance excellence.

Table 15. *Weighted mean of the performance excellence of a school using six sigma, under the term of Six Sigma Focus on Metrics*

6 Sigma Focus on Metrics	*Teaching*			*Non-Teaching*		
Indicators	*WM*	*VI*	*Rank*	*WM*	*VI*	*Rank*
Our school sets strategic goals for quality improvement in order to improve firm financial performance.	3.79	P	13	3.82	P	13
Our school has a comprehensive goal-setting process for quality.	4.24	HP	7	4.27	HP	4
Quality goals are clearly communicated to employees in our school.	4.76	HP	1	4.49	HP	2
In our school, quality goals are challenging.	4.11	P	11	4.15	P	9
In our school, quality goals are clear and specific.	4.22	HP	9	4.26	HP	6
Our school translates students' needs and expectation into quality goals.	4.74	HP	2	4.15	P	9
We make an effort to determine the appropriate measures for each quality improvement project.	4.23	HP	8	4.20	HP	8
In our school, measures for quality performance are connected with the school's strategic quality goals.	4.18	P	10	4.16	P	11
The expected financial benefits of a quality improvement project are identified during the project planning phase.	4.27	HP	6	4.26	HP	6
Financial performance (e.g., cost savings, sales) is part of the criteria for evaluating the outcomes of quality improvements in our school.	4.48	HP	4	4.39	HP	3
We assess the performance of core processes against students' requirements.	4.52	HP	3	4.49	HP	1
The measures for quality performance are connected with critical-to-quality (CTQ) characteristics.	4. 31	HP	5	4.29	HP	5
Our school systematically uses a set of measures (such as defects per million opportunities, sigma level, process capability indices, defects per unit, and yield) to evaluate process improvements.	3.81	P	12	3.93	P	12
Overall Mean:	4.28	HP		4.22	HP	

Legend: 1.00- 1.79 (Least Performing-LP) 1.80-2.59 (Barely Performing- BP) 2.60- 3.39 (Somewhat Performing- SP) 3.40-4.19 (Performing-P) 4.20- 5.00 (Highly Performing-HP)

The second highest-ranked indicator for teaching staff is "Our school translates students' needs and expectations into quality goals," with a mean of 4.74 (HP), emphasizing the focus on student-centric quality improvement. For non-teaching staff, the second highest is "Quality goals are clearly communicated to employees in our school," with a mean of 4.49 (HP). The lowest-ranked indicator for both groups is "Our school sets strategic goals for quality improvement in order to improve firm financial performance," with means of 3.79 (P) for teaching staff and 3.82 (P) for non-teaching staff. This suggests that while quality goals are well-communicated, there may be a need to strengthen the connection between these goals and financial performance

Significant Difference among Responses of Teaching and Non-Teaching Staff

Table 16. *Significant difference on the performance excellence of a school in Gumaca when grouped according to profile*

Raw Sample		*Total Sample (Ordered from Smallest to Largest)*		*Ranks*	
Teaching	*Non-Teaching*	*Teaching*	*Non-Teaching*		
3.93	3.97	3.32		1	
4.45	3.5		3.46		2
3.32	3.46		3.5		3
4.36	4.45	3.59		4	
3.59	3.64		3.63		5
3.64	3.63	3.64	3.64	6.5	6.5
4.13	4.26	3.93		8	
4.15	4.17		3.97		9
4.16	4.19	4.13		10	
4.28	4.22	4.15		11	
		4.16		12	
			4.17		13
			4.19		14
			4.22		15
			4.26		16
		4.28		17	
		4.36		18	
		4.45	4.45	19.5	19.5
				H = 0.0229	

The table presents the analysis of the significant difference between the responses of teaching and non-teaching staff regarding the performance excellence of a school in Gumaca, using Six Sigma. The Kruskal-Wallis H Test was employed to determine if there were any statistically significant differences in the performance excellence ratings between the two groups. The raw data shows the overall performance ratings, ranked from smallest to largest. The analysis reveals an H statistic of 0.0229 with a p-value of 0.87983. Given that the p-value is greater than the 0.05 significance level, the result is not significant. This indicates that there is no statistically significant difference between the performance excellence ratings of teaching and non-teaching staff. Therefore, both groups perceive the implementation and effectiveness of Six Sigma in the school similarly, suggesting a consistent view across different roles within the institution.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

Both teaching and non-teaching staff perceive strong support from top management in terms of quality objectives and leadership.

Teaching staff reported higher engagement with students compared to non-teaching staff, indicating room for improvement in student feedback mechanisms for non-teaching staff.

There is a need to re-evaluate supplier management practices to focus on high-quality suppliers.

High involvement of all staff levels in quality decisions was noted, but more focused training in basic statistical techniques could enhance capabilities.

Improvement is needed in the availability and accessibility of quality data for all staff members to ensure effective utilization.

To enhance the performance excellence of the school using Six Sigma, the following recommendations are proposed:

Develop and implement a more formalized planning process for major quality improvement projects.

Establish effective feedback systems to accurately gauge student satisfaction and use the data for quality improvements.

Re-evaluate and focus on maintaining relationships with high-quality suppliers to improve educational service delivery.

Offer more focused training on basic statistical techniques to both teaching and non-teaching staff to improve quality decision-making.

Ensure that quality data is readily available and accessible to all staff members, facilitating better data-driven decisions.

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