



Design of a quality management system based on the ISO 9001-2015 standard at the La Inmaculada Bilingual Educational Unit in the city of Guayaquil.

Diseño de un sistema de gestión de la calidad basado en la norma ISO 9001-2015 en la Unidad Educativa Bilingüe La Inmaculada de la Ciudad de Guayaquil

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Abstract

The objective of this research is the design of an ISO 9001:2015 quality management system for Bilingual Educational Unit of the Immaculate, in order for the institution to continuously improve its academic proposal and achieve long-term sustained success. For this purpose, the diagnosis, prognosis and control to the prognosis of the different causes that lead to the lack of good quality management in the institution were carried out. The sample and the type of methodological tools used for data collection are described. The analysis of the data by sections, compliance and non-compliance and the general level of compliance of the organization is specified. The solution to the problem is presented with a SWOT analysis followed by the mission and vision, which underwent a reformulation to meet current needs, the quality objectives and the quality policy, principles and values are described.

key words

Leadership, planning, performance evaluation, continuous improvement, quality, ISO 9001 - 2015.

Resumen

La presente investigación tiene como objetivo el diseño de un sistema de gestión de la calidad ISO 9001:2015 para la Unidad Educativa Bilingüe de La Inmaculada, con el fin de que la institución mejore continuamente su propuesta académica y consiga el éxito sostenido a largo plazo. Para ello se realizó el diagnóstico, pronóstico y control al pronóstico de las diferentes causas que llevan a que no se dé una buena gestión de la calidad en la institución. Se describe la muestra y el tipo de herramientas metodológicas que sirvieron para la recolección de datos. Se especifica el análisis de los datos por apartados, del cumplimiento e incumplimiento y el nivel general de cumplimiento de la organización. Se presenta la solución al problema con un análisis FODA seguido de la misión y la visión, las cuales pasaron por una reformulación para que puedan cumplir con las necesidades actuales, se describen los objetivos de calidad y la política de calidad, principios y valores.

Palabras clave

Liderazgo, planificación, evaluación de desempeño, mejora continua, calidad, ISO 9001 - 2015.

1. Introduction

The ISO 9001:2015 standard, which has been in effect since September 2015, comes with substantial changes that will be analyzed to improve the quality management system of the Bilingual Educational Unit of the Immaculate in Guayaquil. This will allow the standard to be used as a tool to assess the level of organization and structuring of the system and determine its performance across the entire organization. [1]

One of the main objectives of any organization is to comply with the prevailing local regulations, which are increasingly stringent, while always aiming for customer satisfaction. The concern of the community and both

internal and external stakeholders regarding issues and measures related to quality is growing. [2]

Therefore, this work aims to design the quality management system of Bilingual Educational Unit of the Immaculate based on a self-diagnosis that allows for the development and consolidation of an improvement proposal. This proposal will be based on the evaluation of the impact that the management system has on the organization, on quality costs and non-quality costs, and on the management of the information generated by the system itself [3].

The research aims to determine whether the guidelines of the ISO 9001-2015 standard are applicable to all

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processes within the organization. Additionally, it seeks to establish whether the standard provides a better understanding of roles, responsibilities, and goals, enhances participation at all levels within the organization, and offers a greater comprehension of the relationship between costs and benefits.

Bilingual Educational Unit of the Immaculate has been working for 115 years following the educational guidelines of the Ecuadorian Constitution. However, it has weaknesses in its quality management system, which is why there is a need to reactivate the system based on the ISO 9001-2015 standard.

Bilingual Educational Unit of the Immaculate, hereafter referred to as Uebli, as a source of knowledge, presents inconsistencies in its management processes that affect the organizational structure, compromising the customer satisfaction level indicator. [4]

In 2012, the institution underwent a review where it decided to forego the audits from the certification body, opting instead to comply with the regulations, statutes, and standards of the Ministry of Education. Currently, the organization continues to operate with the management system that was once implemented and certified.

The Ministry of Education maintains that society's problems should be identified and resolved through education with relevance and quality.

1.2 History of the Unidad Educativa Bilingüe de la Inmaculada

The arrival of the Sisters of Providence in the port of Guayaquil took place on October 5, 1896. The city had just experienced the greatest fire of the century, which lasted 48 hours and destroyed 80 blocks and 1,500 houses, more than half the city. At that time, General Eloy Alfaro was named President of the Republic.

The school opened with the first three elementary grades, with teachers M. Leonie, skilled in Pedagogy; Eufrosina, excellent in Spanish Language Calligraphy; and Clemencia, outstanding in Arithmetic and Geometry, all of whom were paid directly by President Alfaro. On September 8, 1900, it opened with 20 scholarship students and some boarders. One of the oldest students (who was 88 years old in 1972), Mrs. Porfiria Aroca de Feraud, recalled the school at 9 de Octubre and Mascote streets, where the institution's first location was, then known as National Girls' School, donated by President General Eloy Alfaro Delgado at that time.

The institution was later renamed Colegio de la Inmaculada because, as people passed by the romantic-

style portal, typical of old Guayaquil, they saw from outside the hustle and bustle of the girls under the image of the Immaculate Conception. Soon the neighborhood began to popularize it, calling it School of the Immaculate Conception, a name given by the people of Guayaquil, who could have well preserved the name of Providencia, as it was designated on the day of its inauguration [5].

With the challenges that come when seeking the common good, the dynamic sisters began looking for land in the southern neighborhood called El Astillero, between Eloy Alfaro and 5 de Junio streets, facing the river. On this land, there were some huts (houses made of bamboo called "guadúa," a type of bamboo split and tied with ropes, commonly used as the poor's dwelling) that housed entire families.

In this area, there was a large wooden house commonly called the Caamaño house, which belonged to a family named Flores. The owner of the property was the widow Mrs. Josefina Flores, with whom the business and purchase were made; the land where the huts stood was also gradually bought, and they disappeared at once. [6]

1.3 Overview of a Quality Management System.

Organizations go through various transformations during their life cycle to meet their customers' needs. Today, we frequently hear about learning organizations, which are those that can adapt to the real world, are highly investigative, and whose main strength lies in the human factor. [7].

Adopting a quality management system is a strategy that organizations should take advantage of. However, how the quality management system is managed is the differentiator for increasing organizational efficiency and effectiveness. [8]

The applicability of a quality management system is present in all organizations, regardless of their purpose. Any organization wishing to implement a management system must clearly understand the following stages:

Diagnose: This is the stage where we define the problem we are going to solve, identifying the most critical issues so that solving them will be relevant to the organization.

Plan: Every problem needs to be analyzed, and the scope and responsible parties must be defined. Planning allows for an organized approach to how things will be done.

Design: This involves creating the system using various tools that facilitate understanding for its subsequent applicability.

Implementation: This is putting into practice everything that has been learned previously, where things come to life.

Implementation is the most critical point of the quality management system's applicability, as any errors could affect customer satisfaction.

Validation: This is the continuous verification of the results obtained, which must be carried out regularly to improve the system.

1.4 Stages of the Organization

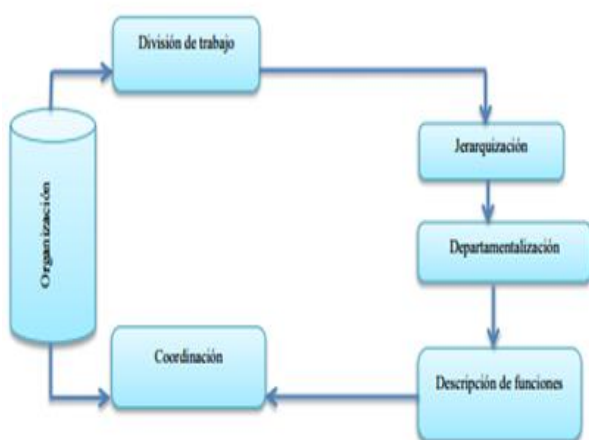


Fig. 1. Stages of the Organization

- **Division:** This is the proper and balanced distribution of all organizational activities to achieve greater precision and efficiency with minimal effort.
 - **Coordination:** The organization must work symmetrically without losing the threads that bind it to its mission and vision. This is the alignment of all organizational processes.
1. **Hierarchy:** These are the levels within an organization, where a responsible person is assigned to each level to fulfill and ensure the company's objectives are met.
 2. **Department:** This can be by processes or teams, functional, by product, by territory, by customer, and by sequence.
 3. **Job Descriptions:** This involves the creation of a job manual where the activities of each position are specified. This facilitates the understanding of responsibilities for any new hire. [9]

1.5 ISO 9001:2015

“The ISO 9001:2015 edition was born out of the need and difficulty organizations face when analyzing potential risks that may affect them. Therefore, it was planned to focus on risk management and be more applicable to service companies. The quality manual and

the management representative are eliminated, making this standard more advanced than the one published in 2008”. [10]

This standard's principle is to prevent future risks by describing internal and external factors, which are specified in the organization's context. [11]

The standard is much more generic, making it easier to apply to service companies than the previous version, which was more focused on industrial production companies.

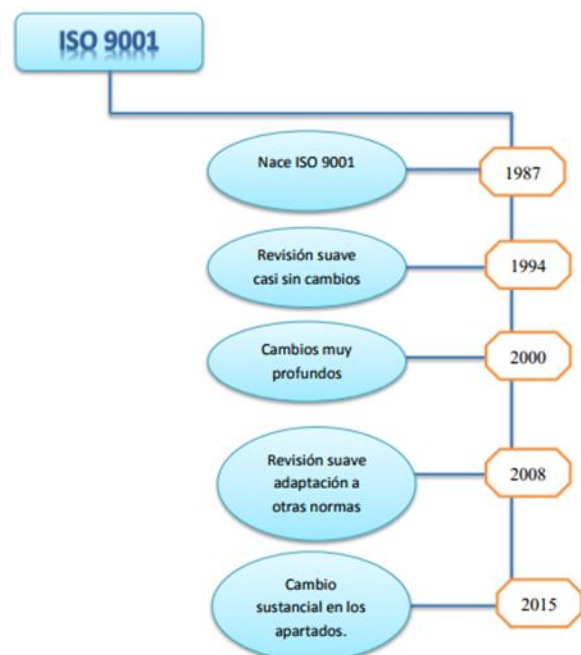


Fig. 2. Evolution of ISO 9001 Standard

The various stages through which the ISO 9001 standard has passed demonstrate its concern for organizations to better understand each other and communicate in a unified management language. This is why each revision includes changes aimed at meeting the needs of both the organization and its customers. [12]

The ISO 9001:2015 standard is the latest version in this family and has introduced substantial changes since its inception. It offers better applicability to service companies and emphasizes risk management within the organization. With this latest version, it is expected that organizations will learn to anticipate future challenges, create simulated scenarios to assess potential impacts, and develop strategies and improvement plans to mitigate them. [13]

The design of this system leads to a review of all the organization's processes, allowing for an assessment of performance levels, internal and external factors, and the

organization's knowledge level to prioritize decision-making that drives sustainable development. [14]

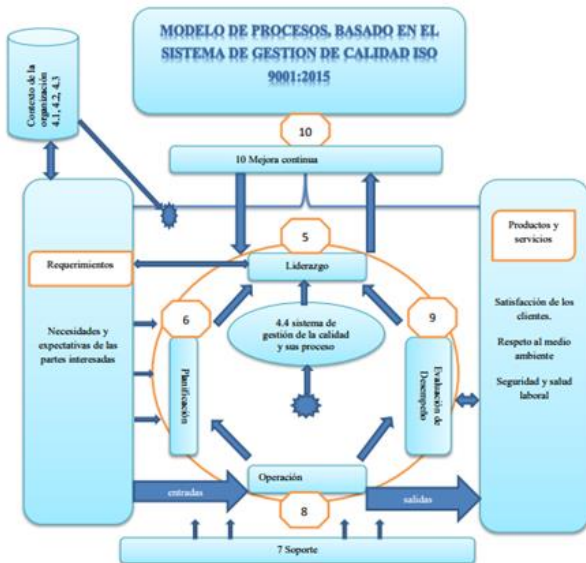


Fig. 3. Process Model Based on the ISO 9001:2015 Quality Management System

2. Materials and Methods

The development of the work related to the design of a quality management system based on the ISO 9001:2015 standard for the Inmaculada Bilingual Educational Unit involved reviewing various types of research and selecting those most relevant to the project's development.

2.1 Population and Sample

Following the institution's structure, information was obtained as follows:

- **Authorities:** This group consists of the Mother Superior, the Rector Mother, the Vice-Rector, the Director of Primary Education, and the General Inspector.

The age range is between 38-80 years. The educational level of the Mother Superior and the General Inspector is undergraduate, while the Rector Mother, the Vice-Rector, and the Director of Primary Education have postgraduate studies. All have a comfortable socioeconomic level, possess knowledge and experience in teaching, and the academic management of high school is handled 80% by the Vice-Rectorate and 20% by the Rectorate. In primary education, the Director manages 80% of academic management, with the remaining 20% managed by the Rectorate. As a religious institution, it is concerned with instilling values in its students

- **Teaching Staff:** This group includes all individuals who teach at the institution. The age range is 20-70 years, with a medium-high socioeconomic level. Academic qualifications are divided among undergraduate, graduate, and postgraduate degrees.
- **Administrative Staff:** This group manages the institution's documentation, including accounting, human resources, secretarial work, and academic management. The age range is between 24-50 years, with academic qualifications divided between undergraduate and postgraduate degrees.
- **Support Staff:** This group includes those responsible for maintaining the institution, including security and the institution's driver, who report directly to the maintenance administrator. The age range is 25-70 years, with academic qualifications ranging from primary education to high school diplomas.
- **Students:** They are the primary focus of the organization, with principles based on strengthening their attitudes and aptitudes. The age range is between 4-17 years, with a medium-high socioeconomic level. For obtaining relevant data, only students in the final grades were considered.

2.2 Population Delimitation

The population is finite, as the institution maintains a list of all its collaborators and students

Table 1. Determination of Population Size

Interest Group	Population
Students	839
Teaching Staff	87
Support Staff	12
Administrative Staff	8
Authorities	5

2.3 Sampling Method

The sampling method used was probabilistic because it includes the entire population in the sample. It is characterized by extracting a small group that provides significant information, facilitating the research development process.

2.3.1 Sample Size

After identifying the population, a representative sample was extracted for the research. The following formula was used:

$$n = \frac{N}{[(N - 1) * (E^2)] + 1} \quad (1)$$

Where:

- n: sample size
- N: population size



- E: permissible error in the study, set at 5%
- It should be noted that this formula was not necessary for the administrative, authorities, and support groups due to their small population size. The following table presents the sample size:

Table 2. Determination of Sample Size

Interest Group	Population	Sample
Students	839	271
Teaching Staff	87	72
Support Staff	12	12
Administrative Staff	8	8
Authorities	5	5

2.4 Techniques and Instruments

- **Interviews:** Dialogues were established with all interested parties to ensure that no loose ends were left in the research analysis and to collect valuable information.
- **Sampling:** This technique was necessary to select the sample size for the interviews, aiming to reduce costs and time in the research.
- **Document Review:** The ISO 9001:2015 standard checklist was used to evaluate the institution, allowing for the collection of data regarding the institution's direction.

The checklist served as a starting point, verifying each process in the institution and concluding whether the variable met the standard or not.

3. Results

The ISO 9001:2015 checklist was necessary to propose improvements that help the institution identify its most significant problems.

To facilitate understanding, the analysis interpretation is presented below:

Table 3. Organizational Context

Clause	Complies	Does Not Comply
4.1 Understanding the organization and its context	50%	50%
4.2 Understanding the needs and expectations of interested parties	87,50%	12,50%
4.3 Determining the scope of the QMS	60%	40%
4.4 Quality management system	15%	85%
Section	Complies	Does Not Comply

4 Organizational Context	53,13%	46,87%
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The Inmaculada Bilingual Educational Unit currently offers educational services, which is its primary mission. Regarding the evaluation conducted using the checklist, it was observed that senior management meets every Tuesday and Thursday to discuss institutional decisions. In these meetings, 70% of the topics discussed are internal, while only 30% are external, neglecting the importance of technological, cultural, market, social, and economic issues that could present many opportunities. The context of the organization is to identify all internal and external factors that may affect the institution's quality management system. The institution fulfilled this section by 53%, with 47% non-compliance.

Table 4. Leadership.

Clause	Complies	Does Not Comply
5.1 Leadership and commitment	42,50%	57,50%
5.2 Quality Policy	0%	100%
5.3 Organizational roles, responsibilities, and authorities	0%	100%
Section	Complies	Does Not Comply
5 Leadership	14,16%	85,83%

In section 5.1, which discusses leadership and commitment, it was evident that senior management demonstrates a high level of leadership but a low level of commitment to the quality management system, complying with 42.5% and not complying with 57.5%. Regarding the quality policy (5.2) and the records and documents related to payment processing (5.3), they are not defined in a way that supports the institution's continuous improvement, resulting in 0% compliance and 100% non-compliance.

In conclusion, section 5 on leadership complies with 14.16% and does not comply with 85.83%.

Table 5. Planning

Clause	Complies	No cuple
6.1 Actions to address risks and opportunities	0%	100%
6.2 Quality objectives and planning to achieve them	36%	64%
6.3 Planning of changes	0%	100%
Section	Complies	Does Not Comply
6 Planning	12%	88%



Holding meetings does not equate to planning, as it was evident that senior management does not analyze the institution's risks and opportunities. There is no culture of risk-based thinking, which concerns section 6.1, where the organization must address risks and opportunities. Regarding quality objectives and planning to achieve them (section 6.2), while quality objectives exist, strategic management is often disconnected from achieving them, with 36% compliance and 64% non-compliance. Section 6.3, which mentions the planning of changes, reveals that changes are not always planned with the participation of all collaborators, nor are they effectively communicated to ensure understanding. Compliance is 0%, with 100% non-compliance. Overall, section 6, which refers to the planning of the quality management system, complies with 12% and does not comply with 88%.

Table 6. Support

Clause	Complies	No cumple
7.1 Resources	35%	65%
7.2 Competence	0%	100%
7.3 Awareness	0%	100%
7.4 Communication	0%	100%
7.5 Documented information	53,33%	46,70%
Section	Complies	Does Not Comply
7. Support	17,70%	82,30%

This section covers the management of the institution's resources, where many shortcomings were found. It was evident that the organization neither determines nor provides the necessary resources for its areas, lacks inventory evaluations to estimate capacity and limitations, with section 7.1 complying with 35% and not complying with 65%. Section 7.2, which mentions determining the necessary competence to achieve objectives, revealed a lack of competent staff and no periodic performance evaluations, with 0% compliance and 100% non-compliance. Regarding awareness (section 7.3), the staff is unaware of the institution's quality policy and objectives, and there is no effective communication channel to ensure these are understood in their entirety, resulting in 0% compliance and 100% non-compliance. Regarding how communication is managed to ensure understanding and avoid diversification, as mentioned in section 7.3, there is no well-structured communication from senior management to subordinates, with 100% non-compliance. However, in section 7.5, which pertains to documented information, the lack of documentation related to the standard was evident. While the creation and updating follow the practice of including the date, name, or reference number, and an approval system is in place, the primary

issue lies in document control. Planning occurs without documentation, and essential documents are lost due to the lack of a document control system. In conclusion, the support section complies with 18% and does not comply with 82%.

Table 7. Operations

Clause	Complies	Does Not Comply
8.1 Operational planning and control	40%	60%
8.2 Determination of market needs and customer interactions	50,42%	49,57%
8.3 Operational planning process	12,50%	87,50%
8.4 Control of externally provided goods and services	0%	100%
8.5 Development of products and services	59.51%	40,49%
8.6 Production of goods and service delivery	37,50%	62,50%
8.7 Release of goods and services	0%	100%
8.8 Non-conforming goods and services	66,70%	33,30%
Section	Complies	Does Not Comply
8 Operation	33,32%	66,67%

Operations encompass everything related to product realization. Bilingual Educational Unit of the Immaculate delivers an intangible product (educational service). This standard has a significant potential for guiding service companies; therefore, the institution was evaluated, yielding the following compliance and non-compliance percentages. Deficiencies in planning and lack of operational control were evident, with a 40% compliance rate. In Section 8.2, where market needs and customer interaction are determined, compliance was at 50.42%. As mentioned earlier, the operational planning process needs improvement, which is why Section 8.3 only complies with 12.50%, showing a high non-compliance rate of 87.50%. There is no supplier control system, and external processes are not identified, leading to a compliance rate of 33% and non-compliance of 67%.

Table 8. Performance Evaluation

Clause	Complies	No cumple
9.1 Monitoring, measurement, analysis, and evaluation	60%	40%
9.2 Internal audit	0%	100%
9.3 Management review	13%	86,7%
Section	Complies	Does Not



		Comply
9 Performance evaluation	24,44%	75,56%

In this section, everything related to monitoring, measurement, and internal auditing was analyzed. The lack of competent personnel was immediately evident as no periodic performance evaluations, follow-ups, or measurements are carried out, except for students. There is a lack of satisfaction surveys necessary for effective decision-making, non-existent measurement schedules, and no internal audits, leading to the conclusion that the organization only complies with 24% and does not comply with 76%, showing a significant deficiency due to a poor documentation system.

Table 9. Improvement

Clause	Complies	No cumple
10.1 Nonconformity and corrective actions	28,57%	71,41%
10.2 Improvement	40%	60%
Section	Complies	Does Not Comply
10 Improvement	34,30%	65,70%

Improvement is the fundamental principle for organizations to remain sustainable over time. The main areas of improvement include processes, products or services, and the quality management system. The evaluation conducted with the verification checklist showed that the management system has not undergone improvements that significantly impact the institution's results, complying with this section at 34% and not complying at 66%.

4. Conclusions

The quality management system of Bilingual Educational Unit of the Immaculate is currently misaligned.

The lack of commitment from its staff, insufficient updates in communication and information technologies, and the absence of a career development plan are several of the deficiencies identified in the management of education. These issues need to be analyzed for subsequent improvement. Any educational institution must have committed personnel, and this will be evident when management includes everyone in decision-making.

The ISO 9001:2015 checklist was used to audit all processes within the institution, revealing issues such as lack of documentation, absence of records, problems with infrastructure, untrained teachers, and poor distribution of resources, among others. These findings expose the organization's framework, which, if not addressed with efficient and effective measures, could

lead to increased non-quality costs, reduced productivity, and an unappealing educational offer.

Bilingual Educational Unit of the Immaculate aims to be a benchmark for educational quality. Therefore, this research was designed to identify the deficiencies affecting its quality management system, service issues, poor staff integration, and other concerns previously mentioned. Although the institution has been providing capable high school graduates and collaborating with the Ecuadorian community for over 100 years, it must adhere to the continuous improvement cycle to consistently deliver exemplary young people and services that satisfy the entire community.

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