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*ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM: A CASE STUDY
COLÉGIO PM CRUZ AZUL¹*

**SISTEMA DE GESTÃO AMBIENTAL ISO 14001: UM ESTUDO DE CASO NO
COLÉGIO PM CRUZ AZUL**

Giovano Candiani²

ABSTRACT

Environmental management systems (EMS), such as the ISO 14001 standard, have been an option increasingly used by organizations to offset their environmental impacts. The objective of this work is to evaluate the management system and environmental performance of an educational organization. To this end, a single case study was carried out with Colégio PM Cruz Azul. Data were collected from a bibliographical survey, document analysis and an interview with the person responsible for the SGA. At the end of the article, suggestions for continuous improvement of the EMS are presented.

Keywords: ISO 14001, environmental management system, education.

RESUMO

Os sistemas de gestão ambiental (SGA), como a norma ISO 14001, têm sido uma opção cada vez mais utilizada pelas organizações para compensar seus impactos ambientais. O objetivo deste trabalho é avaliar o sistema de gestão e o desempenho ambiental de uma organização do segmento educacional. Para tanto, foi realizado um estudo de caso único com o Colégio PM Cruz Azul. Os dados foram coletados a partir de levantamento bibliográfico, análise documental e entrevista com o responsável pelo SGA. Ao final do artigo são apresentadas sugestões para melhoria contínua do SGA.

Palavras-chaves: ISO 14001, sistema de gestão ambiental, educação.

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² Universidade Federal de São Paulo. gcandiani@unifesp.br



INTRODUCTION

Society is transforming at an accelerated pace; scientific development and technology have been profoundly altering knowledge and, especially, the way goods and services are produced and consumed. Human “rationality” has caused economic, political, cultural, social, and environmental imbalances, that is, deep crises in contemporary society. Obviously, all these changes have affected education, teaching, and school.

There is a crisis in the school system: the pedagogy of the traditional school no longer meets the needs of today’s society. New technologies and different modes of communication, information, and teaching are no longer centered on the school and the teacher, and the Internet has become one of the many “providers” of knowledge (Aranha, 2006).

Unfortunately, what has been observed is an intense devaluation of teachers, with the deterioration of their initial and continuing training, career plans, and salaries. Changes are necessary — recognizing the importance of the teacher in the educational process, incorporating new teaching techniques, media, and the Internet as valuable and necessary tools, and promoting permanent, comprehensive, and interdisciplinary education, and above all, a critical education (Agudo; Teixeira, 2020).

Recognizing the need for an education that encompasses training for the exercise of citizenship, qualification for work, systemic thinking, and individuals who are “aware” of socio-environmental issues and actively participate in decision-making processes, the practices promoted by an Environmental Management System (EMS), especially regarding the development of Critical Environmental Education, can foster a more critical pedagogical perspective and, importantly, encourage more Sustainable Education with practices aligned with the Sustainable Development Goals (SDGs), Agenda 2030 (Dutton et al., 2022).



Solving or mitigating socio-environmental problems demands new attitudes and behaviors from everyone, and schools, as mediators of knowledge, must train ethical and environmentally responsible citizens (Moro et al., 2017).

Thus, the school, as a social organization that also generates negative socio-environmental impacts like any other enterprise, can certainly implement an EMS within its processes, aligning environmental discourse and practices in the educational context, making schools, colleges, and universities more sustainable — an aspect that justifies the present work.

In this regard, the present study was conducted with Colégio PM Cruz Azul, which has several educational units operating in the state of São Paulo. The institution has a certified management system (ISO 9001 and 14001) by Fundação Vanzolini, focused on continuous improvement, stakeholder satisfaction, and the reduction of environmental impact (Cruz Azul, 2021; 2024).

Thus, through this single case study (Yin, 2001; Gil, 2023), which allows for more detailed and in-depth analysis, the aim is to evaluate the management system and the environmental performance of the EMS implemented by this organization, considering the guidelines established by the following ISO standards: (i) ABNT ISO 14001/2015 – Environmental management systems: Requirements with guidance for use (ABNT, 2015), (ii) ABNT ISO 14031/2015 – Environmental management: Environmental performance evaluation – Guidelines (ABNT, 2015), and (iii) ABNT ISO PR 2030/2023 – Environmental, social, and governance (ESG): Concepts, guidelines, and assessment and guidance model for organizations (ABNT, 2023).

ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The EMS is “a set of interrelated administrative and operational activities aimed at addressing current environmental problems or preventing their emergence” (Barbieri, 2023, p. 97).



An EMS requires the formulation of an environmental and/or sustainability policy, the definition of objectives, the coordination of activities, and the evaluation of results with the involvement of the entire organization, including top management, in addition to integrating as many stakeholders as possible into the process. Creating and maintaining an EMS is a voluntary organizational commitment in which the organization pledges to achieve performance levels higher than those required by the environmental legislation to which it is subject. Therefore, the organization must promote socio-environmental improvements (Barbieri, 2024).

ISO – International Organization for Standardization is an institution created in 1947 with the purpose of developing standardization and related activities to facilitate the exchange of goods and services in the international market and cooperation among countries in scientific, technological, and productive spheres. Historically, there has been a global increase in the number of certifications, with organizations from different productive sectors seeking improvements in their processes and socio-environmental performance (Pombo; Magrini, 2008; Benedito, 2021).

The NBR ISO 14001 standard contains the requirements of an EMS. The current version from 2015 adopts a high-level structure with legal requirements used to manage the environmental aspects of any organization, regardless of whether it is public or private, its size, or its sector of activity (Barbieri, 2024).

This standard applies to any organization that wishes to: (i) establish, implement, maintain, and improve an EMS, (ii) ensure conformity with its defined environmental and/or sustainability policy, and (iii) demonstrate compliance with this standard (Seiffert, 2007).

The standard provides organizations with a framework of requirements for environmental protection, creating alternatives for sustainable development through the prevention or mitigation of adverse impacts, improvement of



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environmental performance, and communication of environmental information to stakeholders (Barbieri, 2023).

Knowledge of the organization and its context is the conceptual basis for creating, maintaining, and continuously improving its EMS, which encompasses internal and external issues relevant to its purposes. Meeting the needs and expectations of stakeholders — understood as persons or organizations that can affect, be affected by, or perceive themselves as affected by a decision or activity — includes employees, customers, suppliers, public agents, residents near the organization, media, socio-environmental organizations, among others (Seiffert, 2007).

The organization must establish the scope of the EMS, defining its field of application and coverage and the nature of the activities of its products and services. It must also establish leadership roles, responsibilities, and commitments, as well as the direct responsibility of top management for the effectiveness of the EMS. Additionally, it must establish, implement, and maintain an environmental policy, that is, the organization's intentions related to its environmental performance and environmental protection (Oliveira; Serra, 2010).

The organization needs to construct its matrix of aspects — “an element of an organization's activities, products, or services that interacts or may interact with the environment” (ISO 14001/2015) — and environmental impacts — “changes to the environment, whether adverse or beneficial, wholly or partially resulting from the organization's environmental aspects” (ISO 14001/2015).

Environmental aspects arise from the use of water, raw materials, energy, space, and other productive resources, as well as from using the environment as a receiver of waste from production and consumption processes. The significance of environmental aspects and impacts is assessed based on criteria with rating scores for scope, severity, and likelihood of occurrence (Oliveira; Pinheiro, 2010).



The organization must meet legal requirements, complying fully with relevant regulations for its productive nature, including laws, decrees, resolutions, normative instructions, among others, at the municipal, state, federal, and international levels (Ribeiro Neto et al., 2017).

It must also define its environmental objectives across relevant functions and levels, considering significant environmental aspects and impacts and legal requirements. These objectives must be consistent with the environmental policy and measurable, monitored, communicated, and updated. They must be maintained as documented information, typically in Sustainability Reports and/or ESG (Environmental, Social and Governance) Reports (Barbieri, 2024).

The organization must determine and provide the necessary resources to establish, implement, maintain, and continuously improve the EMS, ensuring that people receive training, develop competencies, and gain awareness that can guarantee the achievement of EMS objectives (Vilela Júnior; Demajorovic, 2006).

Environmental education must be included in all organizational training programs. This work advocates for critical environmental education as a means of offering analytical and action-oriented tools to individuals so they can reflect on their relationship with the environment and promote the socio-environmental transformations necessary to achieve improvements in environmental quality and quality of life in communities (Sato, 2002; Sato; Carvalho, 2005).

The organization must establish, implement, and maintain processes necessary for internal and external communications related to the EMS, and all this information must be documented, controlled, and maintained (Tachizawa, 2019). It must also establish, implement, control, and maintain operational controls and emergency responses. The organization must measure, analyze, and evaluate its environmental performance and the effectiveness of the EMS by defining environmental and sustainability indicators capable of measuring its performance objectives (Campos; Melo, 2008).



Evaluations of compliance with legal and other requirements, as well as internal and external audits, must be conducted to assess performance. Top management must conduct critical analyses of the EMS to ensure its continued adequacy and effectiveness. Additionally, continuous improvement actions must be implemented, including corrective actions to eliminate nonconformities or prevent their occurrence (Barbieri, 2023).

It is also important for an organization to integrate two or more management systems, including interactions with a quality management system (ISO 9001) or even an occupational health and safety system (ISO 45001), among others (Ribeiro Neto et al., 2017). Finally, the EMS should be understood as one of many tools for addressing socio-environmental problems, and when well implemented and maintained, it helps an organization continuously improve its environmental performance (Bellen, 2006; Crosara, 2009).

It is understood that critical environmental education is indispensable. It is grounded in a more critical, proactive, and sustainable pedagogical perspective and values environmental education within school curricula. It proves capable of addressing the socio-environmental crisis and environmental problems by discussing environmental issues with students and reflecting on the environment as shaped by social relations arising from the interaction between society and nature (Agudo; Teixeira, 2020).

METHOD

The methodology of this study is characterized as a single case study, which is research focused on a uniquely defined object (Yin, 2001; Gil, 2023).

The selection of Colégio PM Cruz Azul was based on the fact that it holds ISO 9001 and ISO 14001 certifications, which made it possible to analyze the organization's environmental performance and sustainability and ESG practices.



The search for the organization was carried out using the CERTIFIQ/INMETRO website – Certificate Management System: <https://certifiq.inmetro.gov.br/>.

The following methodological procedures were carried out: (i) bibliographic research, (ii) document analysis, and (iii) an interview using a questionnaire with open-ended questions. The bibliographic search was conducted using the keywords: “ISO 14001 AND School,” “ISO 14001 AND College,” “ISO 14001 AND Education,” “Sustainability Reports AND/OR ESG Educational Sector.” Searches were performed using Google Scholar.

The document analysis was based on the following documents: (i) ABNT ISO 14001/2015 – Environmental management systems: Requirements with guidance for use (ABNT, 2015); (ii) ABNT ISO 14031/2015 – Environmental management: Environmental performance evaluation – Guidelines (ABNT, 2015); and (iii) ABNT ISO PR 2030/2023 – Environmental, Social and Governance (ESG): Concepts, guidelines, and model for evaluation and guidance for organizations (ABNT, 2023). The ISO standards were obtained from the website: <https://www.abntcatalogo.com.br/default.aspx>.

Documents containing information and data concerning Colégio PM Cruz Azul were obtained from the website: <https://www.colegiopm.com.br/>. Data on the organization’s management systems, socio-environmental programs, and environmental indicators were obtained from institutional reports: “Critical Analysis Reports NBR ISO 14001:2015 – Cruz Azul Education Segment” (2021; 2024), made available by the organization for consultation and analysis.

This evaluation was based on the structure of normative requirements from the ISO standards mentioned above. The following were analyzed: the organization’s environmental management policy, environmental objectives and targets, environmental aspects and impacts, environmental, sustainability, and socio-environmental responsibility programs, environmental and sustainability indicators, internal and external audits, nonconformities, continuous



improvements, and the quality of the information and communication in the organization's sustainability reports.

The interview script was structured with the following open-ended questions: In what year did the organization obtain ISO 14001 certification?; Which certification body was responsible?; Does the organization hold other certifications? Which ones?; What is the organization's environmental and/or sustainability policy?; What are the environmental objectives and targets of the environmental management system?; What are the environmental aspects and impacts of the environmental management system?; What are the environmental/sustainability and social responsibility programs of the environmental management system?; What are the indicators of the environmental management system?; In internal and external audits, what were the main nonconformities recorded?; How does the organization communicate with stakeholders of the environmental management system?; What were the main continuous improvements implemented by the environmental management system?; What were the main challenges in implementing and obtaining the environmental management system?; and What are the main challenges in maintaining the environmental management system?

The questionnaire was sent to the organization via its institutional email. After receiving the completed questionnaire, a general analysis of the answers was conducted, and additional information was requested. These were provided by the organization along with the reports of the management systems. After analyzing these reports, further questions arose, which were clarified through phone calls, email exchanges, and a synchronous online meeting via Google Meet, lasting approximately 1.5 hours, with a staff member/manager responsible for the organization's environmental management system.



RESULTS AND ANALYSIS

Colégio PM Cruz Azul was founded in 1978 with the aim of contributing to the integral development of students. With educational units in several regions of the state of São Paulo (Campinas, São Paulo: Centro, Vila Talarico, Itaquera, Penha and Santo Amaro, Guarulhos, Santo André, Osasco, São Vicente, and Sorocaba), the organization is committed to human values and socio-environmental responsibility in providing services to police-military families and society. The organization holds ISO 9001 (quality management system) and ISO 14001 (environmental management system) certifications (Cruz Azul, 2021; 2024).

The educational units offer early childhood education, elementary education, and high school, currently serving around 1,200 enrolled students. Its mission is to promote quality education and contribute to the formation of citizens committed to human values and socio-environmental responsibility. Its vision is to establish an institution with a high level of teaching quality, committed to the values of "Knowledge, Honor, and Discipline," promoting its expansion in a sustainable and competitive way (Cruz Azul, 2021; 2024). The educational units located in Centro, Guarulhos, Santo Amaro, Campinas, São Vicente, Osasco, Santo André, Itaquera, and Penha are certified by ISO 9001 and ISO 14001 (Cruz Azul, 2021; 2024).

Its policy is to ensure the satisfaction of customers and other stakeholders through innovation and continuous improvement of its processes, seeking socio-environmental sustainability and environmental protection through the identification and management of risks, rational use of natural resources, and minimization or prevention of environmental impacts in compliance with legal requirements, with results that demonstrate excellence (Cruz Azul, 2021; 2024).

This policy also highlights institutional concerns related to the following aspects: innovation, continuous improvement, socio-environmental



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sustainability, environmental protection, risk management, rationalization of natural resources, minimization or prevention of environmental impacts, and compliance with legal requirements. These are fundamental aspects demonstrating excellence in management (Cruz Azul, 2021; 2024).

In this context, the Brazilian Standard ABNT NBR ISO 14031:2015 establishes a process known as Environmental Performance Evaluation (EPE), enabling an organization to measure, evaluate, and communicate its environmental performance through indicators (ABNT ISO 14031, 2015). Thus, an organization with an implemented Environmental Management System (EMS) can assess its environmental performance using ISO 14031 as a support for evaluation, especially for comparison with its policy, objectives, and targets. ISO 14031 also enables the organization to identify its aspects and impacts and establish criteria for performance evaluation (ABNT ISO 14031, 2015).

Colégio PM Cruz Azul has ISO 14001:2015 and ISO 9001:2015 certification since 2019, both granted by Fundação Carlos Alberto Vanzolini (FCAV). The organization presents a management policy that incorporates both quality and environmental aspects.

Customer satisfaction, development of innovation and continuous improvement, compliance with legal requirements, risk management, and pursuit of excellence are emphasized. Regarding environmental aspects, the organization shows concern for socio-environmental sustainability, environmental protection, rational use of natural resources, and the minimization or prevention of environmental impacts.

The environmental objectives and targets are defined by the management system, with two main goals highlighted: (i) rationalize the use of natural resources and (ii) minimize environmental impacts. The targets for the first goal are: reduce water consumption by 2% compared to the previous year and reduce electricity consumption by 2% in the same period. The target for the



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second goal is a 1% reduction in paper consumption compared to the previous year.

Actions implemented to achieve these environmental objectives and targets include: acting preventively by saving natural resources and other materials, ensuring continuous improvement in processes, using materials responsibly, properly disposing of waste, reporting water leaks, printing on scrap paper or double-sided, minimizing the use of air conditioning, and reusing the same disposable plastic cup throughout the day.

In the matrix of environmental aspects and impacts (spreadsheets referred to as PAIA), it was possible to verify concerns related to three main environmental aspects: water, electricity, and waste. Adequate actions and guidelines for waste management, including segregation, treatment, and proper final disposal, were documented. Regarding water, awareness and consumption reduction programs were identified; the same was observed for electricity consumption.

Environmental and sustainability programs and social responsibility programs included the following projects: the “Lacre Amigo” aluminum tab recycling project, the cooking oil collection campaign, the home recycling project, the “Green July” sustainability project, and the school environmental education project.

In terms of environmental indicators, three were identified: water consumption, electricity consumption, and waste generation, with emphasis on paper. Monitoring of indicators is conducted locally at school units through an integrated management panel. Top management regularly reviews the environmental management system based on biannual reports, and it was observed that since 2020 there have been no significant outstanding issues.

Due to the COVID-19 pandemic, school units acquired equipment to measure body temperature (infrared thermometers). Changes in suppliers were



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also noted, including those producing English teaching materials and banking service agreements. Regarding stakeholders, the institution maintains a positive public image and transparency in management results.

Environmental performance analysis is based on internal and external audits, managed through an electronic system called Docnix Blue, DocAction module.

A total of 202 accumulated nonconformities were recorded from 2019 to 2024, of which 97% were addressed and resolved. Internal and external audits indicated that environmental monitoring is being carried out. In the external environmental audit conducted by the company “Inteligência Ambiental,” 165 applicable legal requirements were identified, with 98% compliance.

There were 26 nonconformities and 6 opportunities for improvement in 2019. In 2020, 76 nonconformities were recorded (an increase of 192%), along with 5 opportunities for improvement. In 2021, nonconformities decreased to 46 (a reduction of 53%). With the rise in nonconformities, adjustments were required in the management system, resulting in a reduction of nonconformities in recent years. Currently, 16 nonconformities have been observed.

The organization applied a Pareto diagram to monitor ISO 14001 requirements identified in the nonconformities. It was observed that 85% of nonconformities were related to the following requirements: 7.5 – documented information (outdated or obsolete documents in use), 9.1 – monitoring, measurement, analysis, and evaluation (lack of technical/legal documentation), 8.1 – operational planning and control (absence of operational controls, noncompliance with controls, incorrect waste disposal), and 6.2 – environmental objectives and targets (indicators not monitored and unknown targets). The organization created an audit plan (corrective action plan) to address these nonconformities, and this plan is currently being implemented.



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Communications with stakeholders occur through a customer service system (SAC), meetings with the Community Advisory Council (CCE), and an employee communication channel. The organization's website includes management system information, financial statements, and a digital magazine; however, the organization does not publish a Social Report or a Sustainability and/or ESG Report.

Regarding environmental indicators, the organization did not provide data and information on water and electricity consumption or waste generation. Therefore, it was not possible to assess environmental performance related to the environmental objectives and targets. The organization also did not provide information on opportunities and continuous improvements.

The critical analysis report showed that school units developed several environmental and social programs and actions, including: school psychology social action (student support), the aluminum tab campaign, the values program (World Environment Day activities), healthy eating initiatives, "zero waste school" project, composting programs, "Green June" campaign, responsible disposal of batteries and cooking oil, paper collection, and responsible disposal of medications.

From the corrective action plan, the following items stand out: raising awareness among employees and partners regarding the organization's environmental aspects and impacts and its environmental objectives and targets; intensifying and standardizing monitoring of legal requirements and environmental indicators (water and electricity); and reviewing environmental aspect and impact spreadsheets.

It is noteworthy that ISO 14001 and ISO 14031 contribute to environmental performance evaluation, especially ISO 14031 with its application of environmental indicators, analysis of management policy, environmental objectives and targets, and audit results.



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Specifically, Colégio PM Cruz Azul has two environmental indicators: water consumption and electricity consumption, and some initial controls regarding solid waste. However, it was not possible to verify historical data for these consumption and generation patterns or whether the organization has achieved its environmental objectives and targets. Regarding environmental awareness, the organization has carried out numerous environmental education programs, a positive aspect within its environmental management actions.

The organization has also worked to resolve nonconformities. However, it could more explicitly address its environmental risks and incorporate a Life Cycle Assessment (LCA) approach into its processes. It could also expand its socio-environmental indicators, including implementing a broader socio-environmental communication program with more information on its website and by publishing a Sustainability and/or ESG Report.

Regarding environmental indicators, it is suggested that, in addition to expanding them, the organization disclose them in an Annual Report. New indicators could also be implemented in the environmental management system, such as quantities of organic waste, recyclable waste, hazardous waste, and carbon emissions. It is also recommended that the organization incorporate the Sustainable Development Goals (SDGs) from the 2030 Agenda into its management systems. Regarding the SDGs, the application of the ABNT ISO PR 2030/2023 standard – “Environmental, social, and governance (ESG): Concepts, guidelines, and evaluation and guidance model for organizations” – would represent a significant continuous improvement opportunity for its management system and could greatly enhance its management processes.

FINAL CONSIDERATIONS

ISO 14001 certification is beneficial for an organization, contributing to a positive public image and to the development of environmental actions. The



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organization can control its negative socio-environmental impacts and continuously improve its operations and business activities. One of the challenges of ISO certification relates to the costs of implementing and maintaining the system.

In the specific context of ISO within the educational sector, it is evident that a school or college is a possible and viable setting for an Environmental Management System (EMS), making these organizations more sustainable, improving their environmental performance, and reducing their negative socio-environmental impacts. Although viable, ISO in this sector is still incipient and requires broader dissemination.

Colégio PM Cruz Azul has promoted a set of environmental actions and practices through the development of socio-environmental and environmental education programs. It is possible to observe its environmental policy, the presence of environmental objectives and targets, the mapping of environmental aspects and impacts, and the initial development of three environmental indicators: water, energy, and waste.

The organization conducts environmental audits and addresses the reported non-conformities, and a set of information is managed internally through the management system.

Considering the three environmental indicators included in the management system and their still incipient monitoring, it was not possible to adequately assess the environmental performance of this organization. It was found that its EMS, certified in 2019, is still under development and requires adjustments, particularly regarding the improvement and monitoring of environmental and sustainability indicators.

Several suggestions may be mentioned as part of continuous improvement efforts, including: the incorporation of new environmental and sustainability indicators, adjustments to the matrix of environmental aspects and



impacts, improvements and especially compliance with environmental objectives and targets, incorporation of the UN 2030 Agenda Sustainable Development Goals (SDGs) into the management system, and finally, the annual publication of a Sustainability and/or ESG Report.

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