

## Accreditation and Deming Cycle in a public university in Peru

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### Abstract

*This article examines the relationship between Accreditation and the Deming Cycle based on a study conducted at a public university in Peru. The study design was cross-sectional and non-experimental, and descriptive analyses were carried out on the data collected from a sample of 150 professors, using frequencies and percentages. In addition, inferential analysis was applied using Pearson's correlation test, with a significance level of 0.05. The results reveal that there is a direct, strong and significant correlation between the Accreditation variables and the Deming Cycle.*

**Keywords:** Accreditation, Deming Cycle, transformation, innovation.

### Introduction

The relationship between Accreditation and the Deming Cycle is raised as a possibility in the future. Therefore, the implementation of a continuous improvement process is considered appropriate, since it allows aligning goals and actions to promote the development of a public university in Peru. In this context, it is recognized that the Deming Cycle, which also incorporates the 14 points of organizational development, represents the most appropriate system to introduce a continuous improvement plan. This system, also known as the PHVA Cycle (Plan, Do, Check and Act), leads to a new proposal of policies, programs and strategies to raise the quality of university education. This is in line with the provisions of article 2 of the Political Constitution of Peru, which underlines the importance of ensuring that all young people in the country have access to a high-quality university education, focused on comprehensive training and constant improvement, in addition to promoting civic values that encourage academic reflection and research for the benefit of the country (Minedu, 2015).

Because of this, the Deming Cycle approach along with the 14 points of organizational development is presented as an effective means to boost the growth of a university educational institution, as noted in the study in question. Consequently, the following research question was raised: What is the relationship between the Accreditation and Deming Cycle in Peruvian public universities in 2022? The inquiry led to the conclusion,

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based on the findings of the study, that there is a direct, strong and significant relationship between both variables.

The previous reports and studies that have contributed to the review of the current state of the situation in this specific case enrich the conceptual understanding of the two variables mentioned. In this sense, evidence has been compiled based on the contributions of authors such as Salas (2018), who points out that the application of the Deming Cycle and the development of skills, as well as the acquisition of knowledge, can promote innovative educational practices in the quantitative field. On the other hand, León et al. (2018) conclude that an evaluation and accreditation system for university educational institutions dedicated to medical activity plays a fundamental role in promoting quality, where it is demonstrated that the implementation of a quality system leads to optimal results in the training of health professionals.

López (2018) argues that when the quality of education in a public institution is low, this affects efficiency, effectiveness and, ultimately, effectiveness, in terms of resource utilization and goal achievement. In addition, it highlights that the lack of adequate communication and the absence of clear policies and objectives can hinder the implementation of a quality system, resulting in academic and administrative disorder.

Ayala (2018) argues that the PDCA model and its 14 points of organizational development are essential to maintain quality in the educational process of a Higher Educational Institution, serving as a central control strategy to achieve objectives, maintain the continuity of the educational service and allow institutional accreditation through self-evaluation supported by adequate data analysis.

In a similar vein, Zhao (2009) points out that the PDCA model and its 14 principles represent a powerful tool and philosophy that can be beneficial for Higher Education Institutions in their continuous improvement efforts, but highlights the importance of making organizational changes and adjustments to configure a progressive, continuous and sustainable accreditation model that promotes self-regulation. In a more specific approach, Llamó (2018) concludes, through his research, that there is a moderate relationship between Organization and Quality. However, Cano (2019) reaches a different conclusion by stating that there is a very high, positive and significant relationship, supported by the statistician Rho Spearman. Campano and Flores (2019) identify a significant relationship between educational management and educational service, using Pearson's R statistic with a value of  $r=0.680$ . Finally, Javier (2019) concludes that 77% of the standards are at level 1, which corresponds to the "not achieved" criterion. Therefore, when analyzing research related to quality systems and continuous improvement in higher education, the relevance and applicability of the Deming Cycle or PDCA Cycle model is verified, along with the 14 principles of organizational development.

#### The Deming Model or PDCA and the 14 Principles of Organizational Development

The PDCA (Plan-Do-Check-Act) cycle contributes to the constant process of improving an entity's procedures. This approach is evidenced in the specific context of a national public university that has managed to obtain its licensure, conduct self-evaluations, and gradually obtain accreditation from its various faculties.

Table 1 Deming Cycle

<i>Etapa</i>	<i>Especificaciones</i>	<i>Herramientas</i>
<b>Planear</b>	Determinar causas potenciales. Planificar soluciones.	<ul style="list-style-type: none"> <li>• Registros</li> <li>• Analizar datos recopilados.</li> <li>• Observar la experiencia personal.</li> </ul>
<b>Hacer</b>	Implementar soluciones.	<ul style="list-style-type: none"> <li>• Efectuar los cambios planificados.</li> <li>• Brainstorming</li> <li>• Gráficos de barras</li> <li>• Gráficos circulares</li> <li>• Gráficos de línea</li> <li>• Histogramas</li> <li>• Pareto</li> </ul>
<b>Verificar</b>	Medir los resultados. Estandarizar el mejoramiento	<ul style="list-style-type: none"> <li>• Recopilar datos de control.</li> <li>• Capacitar y entrenar al personal.</li> <li>• Definir nuevas responsabilidades.</li> <li>• Definir nuevas operaciones y especificaciones.</li> <li>• Gráficos de línea</li> <li>• Histogramas</li> <li>• Gráficos de control</li> </ul>
<b>Actuar</b>	Documentar la solución	<ul style="list-style-type: none"> <li>• Resumir el procedimiento aprendido</li> <li>• Procedimientos generales</li> <li>• Procedimientos específicos</li> <li>• Registro e instructivos de trabajo</li> </ul>

Note. Source: Carro and Gonzales (2016).

Both explicitly and implicitly, the implementation of the 14 Deming Points has been considered an integral part of this process, leading to organizational restructuring and institutional renewal. To achieve this goal, universal or deep knowledge was leveraged, which was assimilated by the educational community of a national public university, guided by empathic leadership that promoted a receptive mindset towards change and continuous learning, as noted by Mulder (2017). This knowledge, which covers aspects such as systemic appreciation, variability of perception, organizational psychology and theory of knowledge, offers a fresh perspective to analyze reality from another angle. It is worth remembering that the 14 points of organizational development encourage greater efficiency and effectiveness, which contributes to a continuous transformation in the organization.

Table 2 The 14 points of organizational development

<b>14 puntos de Deming</b>	<b>Acciones</b>
1. Crear constancia de propósito	Esfuerzo por el mejoramiento permanente para lograr la competitividad universitaria.
2. La nueva filosofía	Apertura a los cambios desde el rectorado, decanos, directores como líderes responsables del fomento hacia la calidad, productividad e innovación.
3. Dejar de depender de la inspección	Hacer bien las cosas desde el inicio del proceso académico y administrativo y poner fin a las inspecciones y controles al final del mismo para garantizar la calidad.
4. Finalizar el contrato de "oferta más baja"	Lograr una relación a largo plazo con los proveedores, que fomente la confianza y aumente la lealtad y calidad.
5. Mejora continua	El mejoramiento continuo del proceso académico y administrativo universitario para obtener calidad, productividad e innovación.
6. Establecer capacitación en el trabajo	Plan y ejecución de capacitación y desarrollo del talento docente, estudiantil, administrativo y de servicio de manera permanente
7. Liderazgo	Optar por el estilo de liderazgo transformacional que implica un cambio planeado inspirado en la filosofía de la calidad para el fortalecimiento de una cultura organizacional educativa universitaria.
8. Fomentar la cultura de la confianza	Eliminar el miedo y construir una actitud de seguridad para identificar y afrontar los problemas existentes en un contexto universitario
9. Practicar la Minka (cooperación)	Desarrollar trabajos colaborativos y en equipo para eliminar barreras entre áreas o departamentos
10. Eliminar slogans de exhortación	Eliminar el individualismo y la rivalidad e internalizar que la calidad es voluntaria
11. No solo cantidad sino calidad	Las metas que se logren se debe basar en hacer bien las cosas desde la primera vez y durante el proceso académico administrativo y no solo por cumplir metas numéricas.
12. Logros personales	Valoración y autovaloración por la labor realizada por los docentes, estudiantes, administrativo y de servicio en un contexto universitario
13. Capacitación y educación para la calidad	Formar y educar el talento para el proceso de mejora continua (docentes, estudiantil, docente, administrativo y de servicio)
14. Transformación	El cambio planeado y la práctica de la filosofía de la calidad de equipos estudiantil, docente, administrativo y de servicio lleva a una transformación sistémica académica-administrativa en contextos universitarios.

Note. Own adaptation of the study.

## History of the accreditation process in Peru

The accreditation of universities in Peru is a novelty, and the acquisition of experiences in this area becomes essential for the preparation of professionals in various disciplines. This implies validating the competences according to the profile that is expected of the graduates for their insertion in the labor market. Consequently, accreditation becomes a process of constant improvement that the university needs and that is based on the analysis of its results.

Table 3 Timeline of events

<b>Año</b>	<b>Acontecimientos</b>
<b>1993</b>	Los decanos de las facultades de Educación fomentaron discusiones sobre los estándares mínimos de calidad.
<b>1996</b>	Se congregaron, la Pontificia Universidad Católica del Perú, la Universidad de Lima, la Universidad Peruana Cayetano Heredia y la Universidad del Pacífico entidades formando un Consorcio cuyo propósito era la acreditación de sus carreras.
<b>1998</b>	El Ministerio de Salud convocó a las Universidades de San Marcos y Cayetano Heredia, para ver una propuesta de ley de acreditación. Se establece la ley 27154 que garantiza la calidad y la idoneidad de la formación de los médicos, así como la atención sanitaria de la comunidad. En es entonces también se crea la Comisión para la Acreditación de Facultades o Escuelas de Medicina Humana.
<b>1999</b>	Se promulga la ley 27154, que institucionaliza la acreditación de las facultades y las escuelas de medicina. Este logro tuvo un proceso iniciado años antes.
<b>2000</b>	se aprueba el decreto supremo 005-2000-sa el Reglamento de la ley 27154. En él se establecen los requisitos y las condiciones generales a los que tienen que sujetarse al funcionamiento de las facultades y las escuelas de Medicina para <b>garantizar la idoneidad y la calidad</b> en la formación de los médicos.
<b>2002</b>	La Comisión Nacional de Rectores para la Acreditación Universitaria (CNRAU). propuso estándares de acreditación y de evaluación de las universidades, donde se formó una comisión para difundir la necesidad de evaluación y de autoevaluación educativa universitaria.
<b>2003</b>	28 universidades públicas y 29 privadas coordinación con la ANR en materia de acreditación, autoevaluación, y acreditación.
<b>2016</b>	Se proyectaba contar con más de 70 procesos de acreditación concluidos entre las carreras de pregrado y programas posgrados e instituciones universitarias.

Note. Own adaptation of the study, based on Soria (2004), Coneau (2008) and Sineace (2023).

As stated by Sineace (2016), accreditation is defined as a public recognition that requires compliance with quality standards. This involves making adjustments, modifications and even an organizational restructuring in accordance with the evaluation matrix, which seeks to guarantee adherence to the new quality standards both nationally and internationally. In addition, according to UNESCO (2016), to establish an effective quality system, it is essential to consider essential aspects such as the configuration of organizational structures, the implementation of an adequate management model, the formulation of appropriate policies, the existence of a regulatory framework and the measurement of results. Law 28740, which regulates the "National System of Evaluation, Accreditation and Certification of Educational Quality", defines a methodological approach that is used to obtain the desired institutional recognition. This process is based on self-assessment and improvement, external evaluation and quality accreditation.

Table 4 Self-Assessment and Improvement, External Evaluation and Quality Accreditation

<b>Proceso</b>	<b>Acciones</b>
Autoevaluación y mejora	Realizada por la institución educativa, carrera o programa de estudio basándose en la Matriz de evaluación y a la Guía de autoevaluación.
Evaluación Externa	Solicitada voluntariamente por la institución educativa, carrera o programa de estudio y efectuada por una entidad evaluadora externa autorizada por el Sineace.
Acreditación de la calidad	Reconocimiento otorgado por el Sineace a partir del informe de evaluación externa

Note. Source: Sineace (2023)

## Method

The research approach employed in this study has been rigorous and in line with the standards of scientific research. It was a quantitative approach with a descriptive level, which involved the use of frequencies and percentages in data analysis. In addition, at the inferential level, parametric statistics were applied using Pearson's correlation coefficient with a significance level of 0.05, since the data exhibited a normal distribution.

In terms of research design, a correlational descriptive approach was carried out, which allowed analyzing the relationship between two variables at a specific moment of the current situation, following the classification proposed by Hernández et al. (2015). The sample used was probabilistic and consisted of 150 teachers, who served as informants and participated in data collection through surveys and questionnaires as instruments. Therefore, this research work is based on a quantitative approach and a non-experimental design, according to Hernández et al. (2014), and is classified as descriptive-correlational, following the categorization of Sánchez and Reyes (1998). It is considered that this study has the necessary validity to address the social and cultural demands of today's society.

### The sample

A probability sampling method was used, and the sample size was determined considering a margin of error of 0.05 and a confidence level of 95%. This was calculated using the following formula, in which the estimator refers to the percentage of choice of each element.

Table 5 Distribution of the sample of teachers from different faculties

<b>N°</b>	<b>Facultades</b>	<b>Docentes</b>	<b>%</b>
1	Agropecuaria y Nutrición	17	11%
2	Ciencias	24	16%
3	Ciencias empresariales	24	16%
4	Ciencias Sociales y Humanidades	50	33%
5	Educación Inicial	9	6%
6	Pedagogía y Cultura física	15	10%
7	Tecnología	11	8%
	<b>Total</b>	<b>150</b>	<b>100%</b>

Questionnaires were used as tools to collect data for decision-making in this study. Techniques used to collect information included participatory observation, in which researchers identified and collected data based on this interaction. The instrument used

was the questionnaire, which was applied as a survey technique.

## Discussion

The main purpose of this study was to investigate the relationship between the Variables: Accreditation and Deming Cycle in the faculties of the National University of Education. The results obtained through the analysis using Pearson's  $r$  test revealed a significant and positive correlation between the Accreditation variable and the Deming Cycle ( $r = 0.62$ ), with a significance value of 0.000 ( $p < 0.005$ ). This indicates that there is a strong and direct relationship between the variables Accreditation and the Deming Cycle.

The results of the present study coincide with the research conducted by López (2018). In his thesis, the objective was to propose the implementation of a Quality Management System (QMS) in the Professional Career of Production Mechanics of the Institute, in order to improve the quality of its processes and procedures, and validate standard 06 of the SINEACE accreditation process. This research adopted a qualitative approach of exploratory nature and explanatory level, with an observational component. To carry out this purpose, the observation technique was used and surveys were applied as a diagnostic instrument to a population composed of 126 students and 10 teachers.

The findings of the research of López (2018) indicate that the quality of the professional career is low, that the population studied has limited knowledge about the structure and use of standard 06 of the accreditation process. In addition, they indicate that communication is deficient, that there are no quality policies or objectives, and that a quality system has not been implemented. This translates into the lack of documentation related to manuals and the absence of dissemination of the new accreditation model, as well as its relevance for a public institution.

The first specific objective is to determine the relationship between strategic management and planning in the context of teachers of the faculties of the National University of Education. The results obtained through the analysis using the Pearson correlation test show that there is a positive and significant correlation between strategic management and planning ( $r = 0.58$ ), with a significance value of 0.000 ( $p < 0.005$ ). These results indicate that there is a direct and moderate relationship between the variables examined.

These results are consistent with previous research, such as the one carried out by Lozano (2017), entitled "Educational management and its influence on teaching quality in the Army War College", carried out at the Enrique Guzmán y Valle National University of Education. This study adopted a quantitative approach, had a descriptive-correlational character and was based on a descriptive cross-sectional correlational design. The research focused on a sample of 42 teachers and used surveys as a data collection technique, using questionnaires as an instrument. The high reliability of the instrument was highlighted, with a value of 0.889. Data analysis was carried out using the Chi-square statistic. The results of this study concluded that educational management is significantly related to teacher quality by 88.1%.

Another example is the research carried out by Germán (2017), entitled "Quality management and pedagogical management in teachers of Educational Institution No. 88229 in Chimbote". This study, carried out at San Pedro University, had a basic approach and used a correlational descriptive design. The sample was composed of 23 teachers from the educational institution in question. To collect data, surveys and questionnaires were used as instruments. The conclusions indicated that quality management is at a regular level, and a relationship was established between the level of quality management and the level of pedagogical management in the teachers of the Educational Institution.

The second specific objective of the research sought to establish the relationship between comprehensive training and the actions undertaken by teachers of the faculties of the National University of Education. The results obtained through the analysis using the Pearson correlation test revealed that there is a positive and significant correlation between comprehensive training and the actions undertaken by teachers ( $r = 0.52$ ), with a significance value of 0.000 ( $p < 0.005$ ). These findings indicate that there is a direct and moderate relationship between the variables studied.

The results obtained are in line with previous research, such as that carried out by Llamó (2018), who identified a moderate relationship between Institutional Management and the Educational Quality of institutions. In addition, these findings coincide with the research conducted by Cano (2019), entitled "Educational management and educational quality in the Ricardo Bentín Emblematic Educational Institution, UGEL 02, Lima, 2016", which was carried out at the Universidad Nacional Mayor de San Marcos. This study adopted a basic approach, used a non-experimental design and was framed in a descriptive-correlational methodology with a hypothetical-deductive and quantitative approach.

The sample of this research was composed of 103 teachers of the primary and secondary levels, and surveys were used as a data collection technique, using questionnaires as an instrument. The results of this study concluded that there is a very high, positive and significant relationship between educational management and educational quality, with a value of 0.925 obtained through the Rho Spearman statistician. In addition, it was observed that 68.0% of educational management is at a moderate level and 25.2% at a high level, while educational quality is distributed with 32.0% at a moderate level and 61.2% at a high level.

With regard to the third specific objective, it was possible to establish the relationship between the results and the actions undertaken by the teachers of the faculties of the National University of Education. The results obtained through the analysis using the Pearson correlation test showed that there is a positive and significant correlation between institutional support and teacher verification actions ( $r = 0.46$ ), with a significance value of 0.000 ( $p < 0.005$ ). These results indicate that there is a direct and moderate relationship between the variables under study.

These findings coincide with the research conducted by Campano and Flores (2019), entitled "Educational management and its impact on school service in the educational institution 'Daniel Becerra Ocampo de Moquegua' in 2018". This study was conducted at the National University of San Agustín de Arequipa and had a basic approach with a correlational descriptive design. The sample of this research was composed of 50 teachers, and the survey technique was used in both variables, using questionnaires as an instrument. The conclusions of this study indicated that there is a significant relationship between educational management and educational service in the educational institution, which was determined through Pearson's R statistic, with a value of 0.68.

## Conclusions

- According to the general purpose of the research, the results obtained through the analysis using the Pearson correlation test indicate that there is a significant and positive correlation between the Accreditation variable and the Deming Cycle ( $r = 0.62$ ), with a significance value of 0.000 ( $p < 0.005$ ). This shows that there is a direct, strong and significant relationship between the variables Accreditation and the Deming Cycle.
- According to the first specific objective, the results obtained through the analysis using the Pearson correlation test revealed that there is a positive and significant correlation between strategic management and planning ( $r = 0.58$ ), with a significance value of 0.000 ( $p < 0.005$ ). These findings indicate that there is a direct and moderate intensity relationship between the variables examined.

- According to the second specific objective, the results obtained through the analysis using the Pearson correlation test showed that there is a positive and significant correlation between comprehensive training and the actions undertaken by teachers ( $r = 0.52$ ), with a significance value of 0.000 ( $p < 0.005$ ). These results indicate that there is a direct and moderate intensity relationship between the variables under study.
- In relation to the third specific objective, the results derived from the analysis using the Pearson correlation test indicate that there is a positive and significant correlation between institutional support and the verification actions undertaken by teachers ( $r = 0.46$ ). In addition, the significance value is equal to 0.000 ( $p < 0.005$ ). These findings indicate that there is a direct and moderate intensity relationship between the variables examined.

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