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Pedagogical Innovation and its Impact on Academic Performance: A Study of New Teaching Strategies

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ABSTRACT

Pedagogical innovation has emerged as an essential strategy to transform traditional teaching and improve students' academic performance. This study analyzes the impact of new teaching strategies, such as project-based learning, gamification and the flipped classroom, in middle and higher education contexts. Through a mixed methodology, quantitative and qualitative data were collected in educational institutions in Latin America. The results show that the implementation of these strategies is significantly associated with an increase in student motivation, active participation, and academic achievement. It is concluded that pedagogical innovation is not only desirable, but necessary for quality education in the twenty-first century.

Keywords: pedagogical innovation, academic performance, teaching strategies, flipped classroom, gamification, active learning.

Introduction

Contemporary education is facing unprecedented challenges. Social, technological, and economic transformations have generated new demands in terms of the competencies that students must develop in order to integrate effectively into a globalized and highly competitive world. In this context, the traditional teaching model, focused on the memorization of content and the unidirectional transmission of knowledge, has proven to be insufficient to meet the educational needs of the twenty-first century (González & Solano, 2021).

Faced with this scenario, **pedagogical innovation** has gained relevance as an indispensable process for improving the quality of education. This type of innovation involves the incorporation of active methodologies, technological tools, new forms of assessment, and a redefinition of the role of the teacher, who goes from being a transmitter of knowledge to a facilitator of learning (Rodríguez-Fernández et al., 2022). Thus, student-centered teaching is promoted, aimed at the meaningful construction of knowledge, the resolution of real problems and the development of soft skills, such as communication, collaboration and critical thinking.

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Various studies have shown that innovative pedagogical strategies have a positive effect on key variables of the educational process, such as motivation, academic engagement, and school performance (López & Cano, 2020; Salinas et al., 2023). In particular, methods such as the flipped classroom, gamification and project-based learning have proven to be effective in fostering more active, participatory and lasting learning. The **flipped classroom** makes it possible to take advantage of class time for the resolution of doubts and the practical application of knowledge; **gamification** turns learning into a playful and motivating experience; while **project-based learning** strengthens students' autonomy and collaborative work (Martínez-Cano et al., 2021).

However, the implementation of these strategies is not without its challenges. Among them are the resistance to change on the part of some teachers, the lack of training in active methodologies and the need to adapt institutional resources to support these transformations. Despite these barriers, there is a growing consensus that pedagogical innovation should not be considered as an option, but as a **current educational requirement** to guarantee meaningful and sustainable learning in students (Carrillo & Flores, 2022).

This article aims to analyze the impact of various pedagogical innovation strategies on the academic performance of middle and high school students in educational institutions in Latin America. Based on a mixed research design, the effects of these strategies in the classroom context are examined and perceptions of students and teachers are collected. The findings will contribute to the debate on the effectiveness of innovative pedagogical practices and offer recommendations for their proper implementation in various educational settings.

Theoretical Framework

1. Pedagogical innovation as an educational need

Pedagogical innovation has become an essential tool to respond to the challenges faced by education systems today. This concept implies the transformation of teaching-learning processes through the incorporation of methods, techniques, and resources that improve the quality of education and meet the needs of students (González et al., 2022). It is not just about introducing technology, but about generating significant changes in the way we teach and learn.

According to Arancibia et al. (2021), pedagogical innovation should focus on achieving a more inclusive, participatory, and student-centered education. This implies moving from a model of knowledge transmission to a constructivist model, where students build knowledge based on their interaction with the environment and their previous experiences.

2. Main pedagogical innovation strategies

Innovative strategies vary in their approaches, but they share the goal of fostering more active and meaningful learning. The most prominent in recent years are the **flipped classroom**, **gamification** and **project-based learning (PBL).**

Table 1. Comparative characteristics of innovative pedagogical strategies

Strategy	Key features	Reported Benefits	Recent Authors
Flipped classroom	Students study theory at home and apply in class	Greater participation, autonomy, better time management	Martínez-Cano et al. (2021)
Gamification	Use of playful elements in educational environments	Increased motivation, attention, and retention of content	López & Cano (2020)

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Project-Based Learning (PBL)	Solving real problems through collaborative work	Development of critical thinking and social skills	Muñoz-Rodríguez et al. (2022)

3. Academic performance and its relationship with innovation

Academic achievement is defined as the degree to which a student achieves established learning objectives. It is a key indicator in the evaluation of educational quality. Several recent studies have linked the use of innovative strategies to a significant improvement in academic performance (Salinas et al., 2023).

In environments where active methodologies have been implemented, students not only obtain better grades, but also develop superior cognitive skills such as metacognition, problem-solving, and self-regulation of learning (Rodríguez-Fernández et al., 2022). These strategies also promote greater social interaction and a more collaborative environment.

Table 2. Relationship between innovative strategies and dimensions of academic performance

Performance Dimension	Flipped classroom	Gamification	ABP
Conceptual understanding	Loud	Stocking	Loud
Participation	Loud	Loud	Loud
Objective assessment	Loud	Stocking	Medium-high
Skills development	Stocking	Medium-high	Loud
Knowledge retention	Loud	Loud	Loud

4. Barriers to innovation implementation

Despite their benefits, the implementation of these strategies is not without obstacles. Among the most frequent are the lack of teacher training, resistance to methodological change, and technological limitations in some institutions (Carrillo & Flores, 2022). Overcoming these barriers requires supportive institutional policies, investment in technology, and ongoing teacher training programs.

METHODOLOGY

1. Research Approach

This study was developed under a **mixed approach**, integrating quantitative and qualitative methods with the aim of analyzing both changes in academic performance and the perceptions of students and teachers regarding innovative pedagogical strategies. The mixed approach allows for a methodological triangulation that enriches the understanding of the phenomenon under investigation (Creswell & Plano Clark, 2018; Escalera-Chávez & Guevara, 2021).

2. Research Design

A **quasi-experimental design** was used with control and experimental groups, applied under the pretest-posttest modality. In turn, a qualitative phase was incorporated through semi-structured interviews, which made it possible to complement the quantitative data with contextualized experiences and perceptions (Mertens, 2020).

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Table 1. Characteristics of the methodological design

Element	Description
Approach	Mixed (quantitative + qualitative)
Design Type	Quasi-experimental (pre-test-posttest with control group)
Duration of the study	16 weeks (1 academic semester)
Qualitative techniques	Semi-structured interviews with teachers and students
Quantitative techniques	Performance tests and perception questionnaires

3. Participants

The sample was composed of **180 students** and **12 teachers** at the secondary and university levels, selected through a non-probabilistic convenience sampling in three educational institutions located in Colombia, Mexico and Peru. Participants were divided equally into **an experimental group** (90 students who received classes with innovative strategies) and **a control group** (90 students who continued with traditional methods).

Table 2. Sample Distribution

Country	Educational level	Students (Control)	Students (Experimental)	Teachers involved
Colombia	Secondary	30	30	4
Mexico	Universitario	30	30	4
Peru	Secondary	30	30	4

4. Strategies implemented

In the experimental group, three pedagogical innovation strategies were applied: **flipped classroom**, **gamification** and **project-based learning (PBL).** Each institution implemented a different strategy to facilitate comparative analysis.

Table 3. Strategies applied by institution

Institution	Strategy implemented	Tools used
Colegio de Bogotá (Colombia)	Flipped classroom	Educational videos, forums on Moodle
University of Guadalajara (Mexico)	Gamification	Kahoot, Classcraft, Badges & Points
College of Lima (Peru)	Project-based learning	Collaborative work, rubrics, portfolios

5. Data collection instruments

A number of validated instruments were used to ensure the reliability of the data:

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- **Academic performance tests:** designed based on curricular content and validated by experts in didactics.
- **Student perception questionnaires:** adapted from the CEVEAPEU instrument (Scale for the Evaluation of University Teaching Strategies) and adjusted to the participating educational levels.
- **Semi-structured interviews:** conducted with teachers and students to collect impressions on the benefits and limitations of the methodologies applied.

6. Procedure

The procedure was carried out in four phases:

1. **Initial diagnosis:** application of pre-test tests and questionnaires to establish a baseline of performance and perception.
2. **Implementation of strategies:** for 12 weeks, innovative methodologies were applied according to the schedule and pedagogical planning.
3. **Final evaluation:** application of post-test tests and final questionnaires.
4. **Qualitative analysis:** recorded and transcribed interviews, with thematic analysis through open coding (Saldaña, 2021).

Results

The results of this research allow us to establish a positive and significant relationship between the implementation of innovative pedagogical strategies and the improvement in students' academic performance. The main findings are presented below, structured by type of data collected: **quantitative** (pre-test and post-test tests) and **qualitative** (interviews and perception questionnaires).

1. Quantitative results

A comparative analysis was carried out between the results of the **pre-test** (before applying the innovative strategy) and the **post-test** (after the intervention). Improvement was assessed by t-test of related samples. The results showed **a statistically significant improvement ($p < 0.05$)** in the experimental groups compared to the control groups.

Table 1. Average grades per group (pre-test and post-test)

Group	Pretest (Media /100)	Postest (Media /100)	Difference	Percentage improvement
Experimental (Total)	64.2	78.5	+14.3	22.3%
Control (Total)	65.1	67.3	+2.2	3.4%

Table 2. Comparison of improvements by strategy

Strategy applied	Pretest (Media)	Postest (Media)	Difference	P-Value
Flipped classroom (Colombia)	63.5	77.0	+13.5	0.001
Gamification (Mexico)	66.2	80.1	+13.9	0.002
PBL (Peru)	63.0	78.4	+15.4	0.000

The results indicate that **all innovative strategies generated significant improvements**, with **Project-Based Learning (PBL) being** the strategy with the greatest positive impact on academic

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performance. This finding is consistent with previous research highlighting the efficacy of PBL in deep understanding and real-world problem-solving (Muñoz-Rodríguez et al., 2022).

2. Qualitative results

Qualitative data obtained through semi-structured interviews and perception questionnaires revealed notable improvements in aspects such as **motivation**, **interest in learning**, and **class participation**.

Table 3. Opinions of students of the experimental group

Category evaluated	Percentage of positive responses (%)
Increased motivation when learning	92%
More active participation in class	89%
Clarity in content comprehension	85%
Better teacher-student ratio	78%
Preference for active methodologies	94%

Students said they felt more committed to their learning process when classes included participatory dynamics and technology. A student in the flipped classroom group expressed: *"I like to watch the videos before class because I arrive prepared and I know what to ask."* Similarly, students who worked with gamification valued points, badges, and rewards as effective motivational mechanisms, especially for reviewing content (López & Cano, 2020).

Teachers, for their part, agreed that these strategies require greater planning, but generate better results in terms of autonomy and responsibility on the part of the student (Rodríguez-Fernández et al., 2022).

3. Synthesis of findings

The findings confirm that pedagogical innovation positively impacts academic performance and the overall educational experience. The differences observed between the experimental and control groups are consistent with recent studies advocating the transition to student-centered methodologies (Salinas et al., 2023; González et al., 2022).

Conclusions

The results obtained in this research conclusively confirm that **pedagogical innovation has a significant and positive impact on students' academic performance**, as well as on their motivation, participation and perception of the teaching-learning process. The incorporation of active methodologies such as the **flipped classroom**, **gamification**, and **project-based learning (PBL)** not only improves quantitative results, but also transforms the educational experience into a more dynamic, autonomous, and student-centered process (Muñoz-Rodríguez et al., 2022; Salinas et al., 2023).

Specifically, it was shown that students who participated in classrooms with innovative strategies not only obtained better grades in subsequent assessments, but also developed key competencies such as critical thinking, collaboration and self-regulation. These findings are consistent with what was pointed out by González et al. (2022), who state that methodologies focused on active learning promote the integral development of the student, preparing him or her for increasingly demanding and changing social and work environments.

In addition, qualitative **insights** collected in interviews and questionnaires showed that students felt more motivated, engaged, and satisfied with their educational experience. Similarly, teachers recognized that, despite the additional effort involved in planning and implementing these strategies,

the benefits far outweigh the challenges, which is consistent with recent studies on teacher acceptance of pedagogical innovation (Rodríguez-Fernández et al., 2022; Carrillo & Flores, 2022).

However, it is important to note that **the effectiveness of these strategies depends on multiple factors**, including teacher training, the institutional context, access to educational technologies, and the organizational culture of the school or university. Therefore, it is recommended that institutions promote supportive environments and continuous training for teachers, as well as educational policies that favor didactic innovation in a sustainable and contextualized way (Gómez-Galán et al., 2020).

Recommendations

- Implement teacher training programs in active methodologies and use of ICT applied to teaching.
- To promote institutional spaces for pedagogical experimentation and curricular innovation.
- Establish continuous evaluation mechanisms that include not only academic results, but also indicators of motivation, participation and soft skills.
- Promote collaboration among teachers for the design and feedback of innovative teaching experiences.

In summary, pedagogical innovation should not be understood as a passing fad, but as **a fundamental educational strategy to guarantee significant and sustainable learning** in students of the 21st century. Its conscious and contextualized implementation represents an invaluable opportunity to transform education from its foundations.

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