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Influence of the application of project-based learning in philosophy teaching

Influencia de la aplicación del Aprendizaje Basado en Proyectos en la enseñanza de Filosofía

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Abstract

The lack of knowledge among teachers at the San José de Minas Educational Institution regarding the application of PBL in the teaching of philosophy hindered the development of students' life skills and abilities, as traditional strategies were used. Therefore, this research aimed to determine the influence of the application of Project-Based Learning in the teaching of philosophy. To achieve this goal, a mixed-methods research approach was used, and information was collected from a sample of high school students divided into two groups: experimental and control. PBL was applied to both groups, yielding favorable results in their cognitive and attitudinal processes. Teachers working at the institution were also surveyed, and an expert was interviewed. A descriptive analysis of the theoretical and statistical framework was then carried out, showing that, when applied correctly, it generates significant changes in the way of teaching. Classrooms become settings for participation, exchange, and the generation of ideas, which could not be achieved with a traditional strategy. The teacher, in his role as an educator, motivated students to develop autonomy, critical thinking, analysis, responsibility, and collaborative work, to apply them in a real environment.

Keywords: Project-based learning, teaching, concepts in philosophy

Resumen

El desconocimiento de los docentes de la I.E. San José de Minas en la aplicación del ABP en la enseñanza de Filosofía dificultó el desarrollo de habilidades y destrezas para la vida de los estudiantes, ya que se emplean estrategias tradicionales. Por ello, esta investigación tuvo como objetivo determinar la influencia de la aplicación del Aprendizaje Basado en Proyectos en la enseñanza de Filosofía. Para lograr dicha meta, se aplicó una investigación de enfoque mixto y se recopiló información mediante una muestra de estudiantes de bachillerato, divididos en dos grupos: experimental y control, a quienes se aplicó el ABP, obteniendo resultados favorables en sus procesos cognitivos y actitudinales. También se encuestó a los docentes que laboran en dicha institución y

se realizó una entrevista a un experto, para luego efectuar un análisis descriptivo del marco teórico y estadístico, lográndose evidenciar que, cuando se aplica correctamente, genera cambios significativos en la manera de enseñar. Las aulas se convierten en escenarios de participación, intercambio y generación de ideas, que no podrían lograrse con una estrategia tradicional. El docente en su rol de educador, motivó a los estudiantes a desarrollar autonomía, criticidad, análisis, responsabilidad y trabajo colaborativo, para aplicarlos en un entorno real.

Palabras clave: Aprendizaje basado en proyectos, enseñanza, conceptos en filosofía

Introduction

The persistence of the traditional teaching model, focused on mechanical memorization and the unilateral transmission of knowledge, is producing a serious crisis in educational systems across Latin America, particularly in rural contexts. This mechanism has resulted in student disengagement, poor academic performance, and a limited development of critical and reflective thinking, negatively impacting comprehension and the ability to transfer knowledge to real-life situations (Gajardo, 2022). Despite advancements in educational regulations and constitutional principles that guarantee the right to equitable, inclusive, and quality education, a methodological gap remains that hinders access to creative and contextualized education aligned with students' needs.

In light of this situation, Project-Based Learning (PBL) emerges as an active and transformative approach that challenges the traditional model. In this context, students are considered protagonists in constructing their knowledge through inquiry, real problem-solving, and collaborative production (Coronel, Álvarez & Lozano, 2021). This methodology is based on the principles of constructivism and meaningful learning as strategies to develop cognitive, social, and civic skills in learners through contextualized experiences. PBL has been deemed effective in innovative educational environments, yielding positive results in comprehensive student education and their connection to the social environment.

This study aims to analyze the implementation of PBL in the field of Philosophy among high school students at a rural educational institution in San José de Minas, Quito, Ecuador, to demonstrate its effect on the development of reflective and civic competencies. It also seeks to highlight how PBL can serve as a viable alternative to bridge methodological gaps, promote inclusion, and enhance educational quality. The study is justified by the need to review and rethink pedagogical practices to foster contextualized, critical, and transformative education that addresses current and future social challenges from an interdisciplinary perspective.

Methodology

This research adopts a mixed-methods approach aimed at improving the teaching of Philosophy at an educational institution in San José de Minas, Quito, Ecuador. To collect quantitative information (identifying the teaching process in Philosophy), surveys were administered to teachers to obtain numerical data, which were then tabulated, interpreted, and subsequently explained from a qualitative perspective (analyzing the importance and pedagogical contribution of PBL in teaching Social Sciences). This analysis was enriched by an interview with an expert and concluded with the development and application of a product (designing a teaching proposal to enhance Philosophy instruction using the active strategy of PBL and applying teaching processes that favor improvement in the learning of philosophical concepts) (Hernández et al., 2010). This mixed-methods approach was applied to analyze the data obtained through the surveys, considered reliable, thus providing a scientific contribution to a significant methodological model in Philosophy education.

The quasi-experimental design allows for "deliberately manipulating at least one independent variable to observe its effect on one or more dependent variables" (Hernández et al., 2014). However, due to external factors affecting this research, such as the virtual education stemming from the COVID-19 pandemic, the following challenges arose: poor or nonexistent connectivity for students in virtual classes, economic problems, and the educational authority's decision not to require attendance in virtual classes, opting instead for the use of pedagogical worksheets.

Additionally, using the SPSS program in the T Student test, a sample of 30 students was analyzed. Two intact groups previously formed at I.E. San José de Minas were selected: an experimental group of 15 students (first A), which received an active strategy (Project-Based Learning), and a control group of 15 students (first B), which received a traditional strategy, to observe their effects on the teaching processes in Philosophy.

The research design was explanatory, as "its interest centers on explaining why a phenomenon occurs and under what conditions it manifests or why two or more variables are related" (Hernández et al., 2014, p. 95). In this case, it aimed to explain how Project-Based Learning improved the teaching of Social Sciences. The mode of this research was applied, as the PBL strategy was implemented in a defined group, thus conceiving a solution

to the identified problem and generating a theoretical basis that will help understand the achievements obtained by correctly applying this strategy in teaching Social Sciences at the high school level. Engagement with the 23 teachers working at the Educational Institution was also conducted. Additionally, an expert in Project-Based Learning was interviewed.

Table 1
Sample

ACTORS	***SAMPLE***		
Teachers		23	
Students	**TOTAL 64**	First "A"	32
		First "B"	32

Note. Details of the actors involved in the research. Source: I.E. San José de Minas 2021).

The survey technique was used with teachers to confirm or refute the posed hypothesis, through a questionnaire as an instrument (Hernández Sampieri, 2014). Information for the surveys was collected using the technological tool Microsoft Forms. The rating scale employed for the questionnaire was the Likert scale, which measures reactions, attitudes, and behaviors of individuals. This allows for a more accurate assessment aligned with the response level required from participants when questioning them about their level of agreement or disagreement with the items.

The methodological guide for implementing Project-Based Learning (PBL) in teaching the Philosophy subject for the first year of Unified General Baccalaureate at I.E. San José de Minas is structured as follows:

Initially, it describes the general foundations of PBL, such as definition, characteristics, educational actors, and benefits applied in teaching. Then, it details the stages for implementing PBL, which are composed of:

- Planning Guidelines: Explaining how to break down skills to achieve the objectives when applying PBL.
- Didactic Guidelines: Detailing resources that can be used to conduct a didactic, participative, and collaborative class to meet the goal: a viable and collaboratively produced product.
- Class Development Guidelines: Presenting an example for the Philosophy subject, detailing the four steps of PBL.
- Evaluation Process Guidelines: Highlighting that a characteristic of PBL is continuous evaluation. Additionally, it includes explanations of co-evaluation, self-evaluation, and hetero-evaluation.

Results and discussion

Table 2
Statistics of the control and experimental groups

		EXPERIMENTAL1A	DIAGNOSTIC 1A	PARTIAL 1ª	CONTROL 1B	DIAGNOSTIC 1B	PARCIAL 1B
N	Valid	15	15	15	15	15	15
	Lost	0	0	0	0	0	0
Mean			5,5000	9,0600		5,8000	6,5867
Median			4,5000	9,1000		6,0000	6,6000
Mode			4,00[a]	8,90[a]		8,00	3,80
Std. Deviation			2,54250	,55652		3,02844	2,31327
Variance			6,464	,310		9,171	5,351
Range			8,00	1,70		8,00	6,20
Minimum			2,00	8,20		2,00	3,80
Maximum			10,00	9,90		10,00	10,00

Sum	82,50	135,90		87,00	98,80

a. There are multiple modes. The smallest value is shown.

Note. The table details the main statistics applied to the study participants. Source: Diagnostic assessments and first partial (I.E. San José de Minas, 2021).

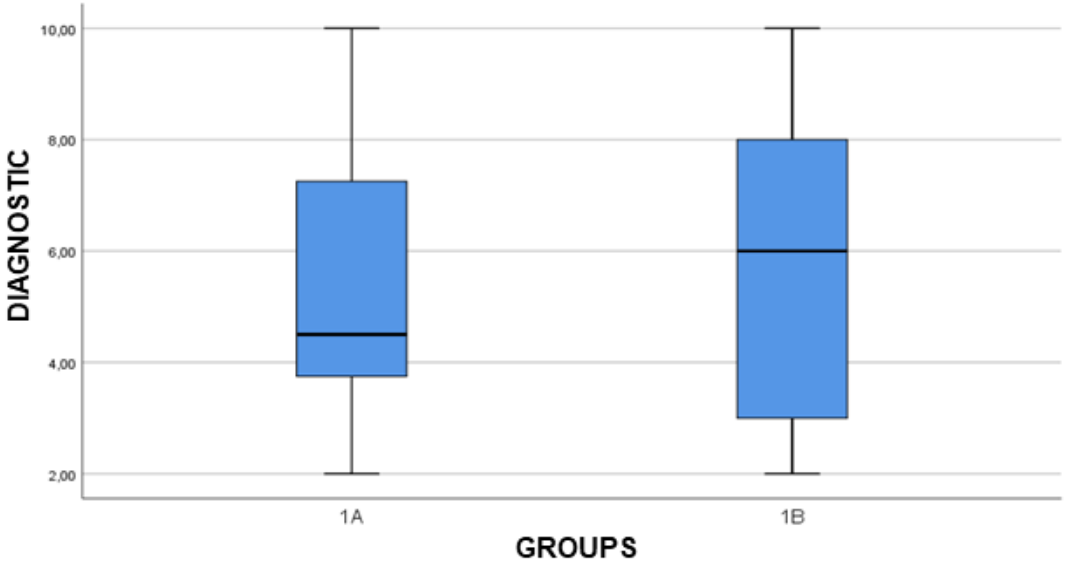
Table 2 shows that both the experimental and control groups consist of 15 students each. The table indicates that the experimental group, on average, demonstrates a significant improvement, increasing from 5.50 to 9.06 upon applying PBL as a strategy for teaching Philosophy. In contrast, the control group, which employed a traditional strategy, did not exhibit significant change, moving from 5.80 to 6.59.

It is also noteworthy that when working collaboratively on the activities for the partial assessment, the experimental group achieved a minimum score of 8.20 and a maximum of 9.90. Conversely, the control group, which worked individually, obtained a minimum of 3.80 and a maximum of 10.

Additionally, the mode for the experimental group increased from 4.00 in the diagnostic evaluation to 8.90 in the partial assessment. In contrast, the mode for the control group decreased from 8.00 in the diagnostic evaluation to 3.80 in the partial assessment.

Figure 1

Box plot for experimental and control groups, diagnostic evaluation



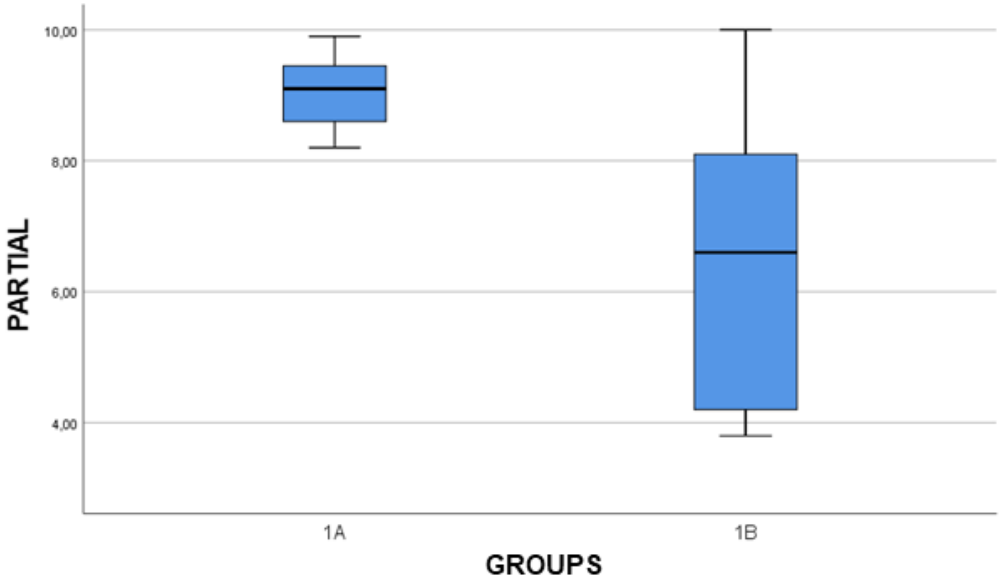
Note. Source: Diagnostic evaluation grade records (I.E. San José de Minas, 2021).

The box plot (Figure 1) summarizes the results obtained in the diagnostic evaluation for the different groups. In both First A (experimental group) and First B (control group), the intervention process commenced with scores ranging from 2 to 10 points. It is important to highlight that in the box plot corresponding to the experimental group, there is a higher concentration of students with scores between 3 and 6, with a mean of 5.50. In the control group, the box plot shows that the largest concentration of students is found within scores between 3 and 8, presenting a mean of 5.80. It is noteworthy that the control group achieved better results, with a mode of 8 points, compared to the experimental group's mode of 4 points.

The box plot (Figure 2), which summarizes the results obtained in the first partial assessment for the groups, indicates that during the intervention process, the experimental group exhibited a variation in generated scores, showing a median of 9.10 points and a concentration of students between 8.20 and 9.90 points.

Figure 2

Box plot for experimental and control groups



Note. Source: First partial grade records (I.E. San José de Minas, 2021).

In the case of the control group, students obtained a mean score of 6.58 points, which is equivalent to the qualitative scale "close to achieving the required learning outcomes."

It is significant that the experimental group demonstrated notable improvements with the support of PBL as a strategy for teaching Philosophy, achieving a mean of 9.06 points, in contrast to the 6.58 points of the control group, despite both groups participating in teaching-learning processes.

This indicates that the application of PBL generates significant changes in the teaching process, which will be detailed further.

Hypothesis testing

H_0: There are no statistically significant differences between the average grades of the experimental and control groups.

H_1: There are significant differences between the average grades of the experimental and control groups.

Significance level: $\propto = 0{,}05 \approx 95\%$

In the application of Project-Based Learning in the classroom for the Philosophy subject, the outcomes were significant and motivating for both students and the teacher. The average for the experimental group was 9.06 out of 10 points, compared to 6.58 out of 10 points for the control group; during this process, students developed skills by solving real problems, learning at their own pace, collaborating, and enhancing their vocabulary during presentations. They also improved in evaluative processes compared to traditional methods.

According to Table 3, it can be observed that the samples in relation to grades are equal, with the average grade in first year of high school A (experimental group) being 9.06 and in first B (control group) being 6.59.

Decision rule

If $\alpha < 0.05$, accept the alternative hypothesis.

If $\alpha > 0.05$, accept the null hypothesis.

$P < 0.05 \rightarrow$ Variances $\neq$

$P > 0.05 \rightarrow$ Variances $=$

Groups: Experimental Group (1 A); Control Group (1 B)

Table 3

Group statistics – T-test

	GROUPS	N	Mean	Std. Deviation	Std. Error Mean

AVERAGE Partial 1	1ª	15	9,0600	,55652	,14369
	1B	15	6,5867	2,31327	,59728

Note. Source: Diagnostic assessments and first partial (I.E. San José de Minas, 2021).

According to Table 4, Independent Samples Test, the Levene's test for equality of variances has a significance of 0.000 < 0.05, indicating that the variances are not equal and the second row will be used. Furthermore, according to the T-test for equality of means, the two-tailed significance is 0.000 < 0.05; thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (Ha) is accepted.

Table 4

Independent samples test

		Levene's test for equality of variances		**T-test for equality of means**						
		F	Sig.	t	df	Sig. (two-tailed)	Mean Difference	Standard Error Difference	95% de Standard Error Difference 95% Lower	Upper
AVERAGE Partial 1	Assumed Equal Variances // Not Assumed Equal Variances	25,568	,000	4,026	28	,000	2,47333	,61433	1,21494	3,73172
				4,026	15,615	,001	2,47333	,61433	1,16841	3,77826

Note. Details of the independent samples test values. Source: Diagnostic assessments and first partial (I.E. San José de Minas, 2021).

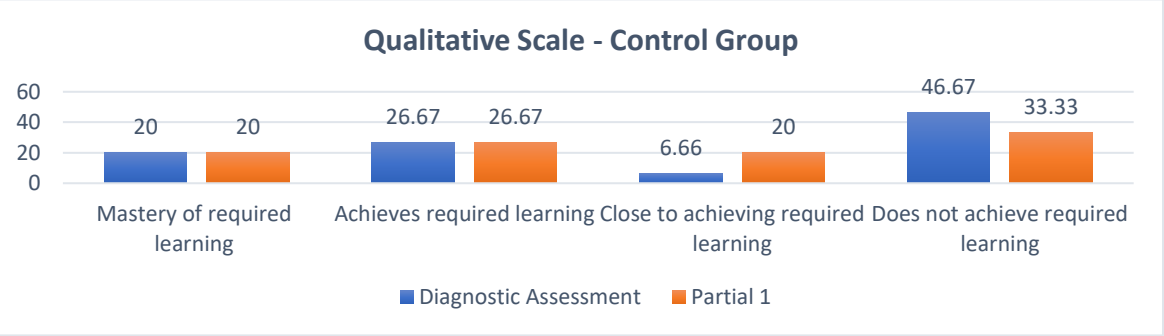
The SPSS 22 application was utilized to generate the Student's T statistic, which allows for determining the variations generated based on the first partial assessment. A value of 0.000 was obtained, which is less than the 0.05 used in social research, indicating that there are statistically significant differences when applying PBL in the Philosophy subject between the control and experimental groups.

Decision

Since 0.000 is less than 0.05, the alternative hypothesis is accepted, asserting that there are statistically significant differences in the first partial assessment between the experimental group and the control group. Consequently, Project-Based Learning is an active strategy that enhances the teaching process of Social Sciences and significantly impacts student averages, contributing not only to their academic performance but also making students more critical, reflective, analytical, and collaborative. Additionally, the teaching-learning process involves direct student engagement, facilitating a more effective acquisition and construction of knowledge through the creation of a product from which they learn.

Figure 3

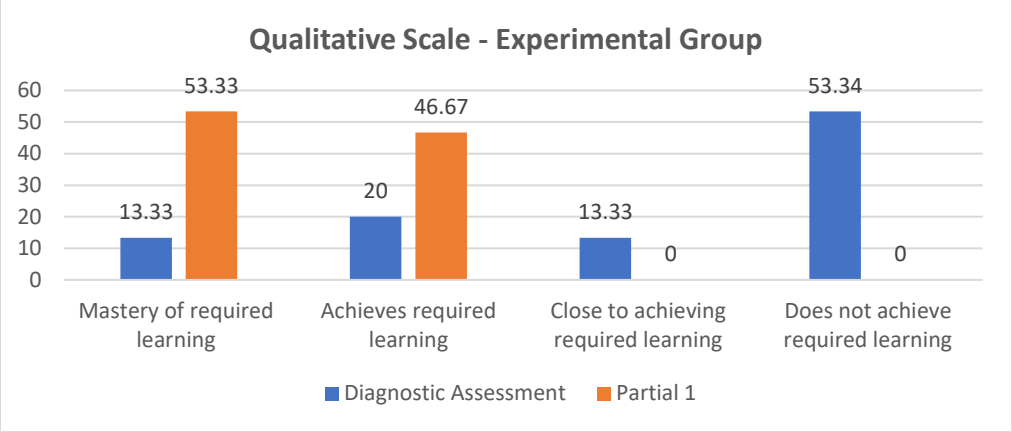
Qualitative scale for experimental and control groups



Note. Source: Grade records (I.E. San José de Minas, 2021).

Figure 4

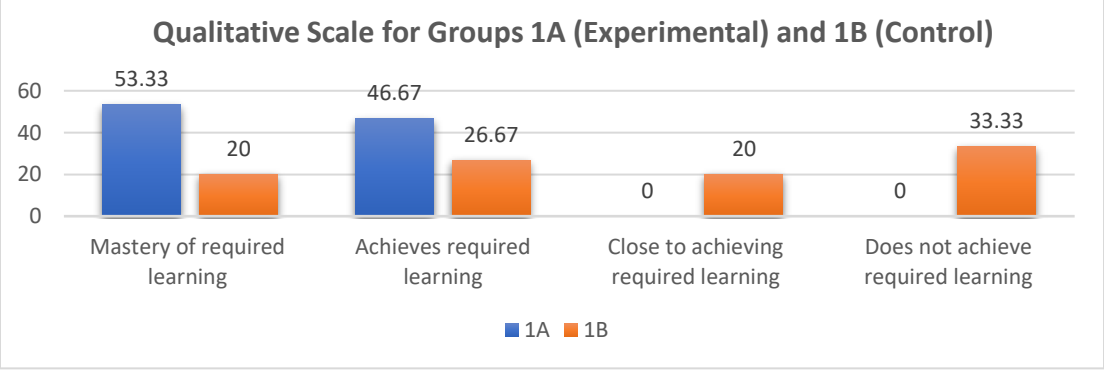
Qualitative scale for experimental and control groups



Note. Source: Grade records (I.E. San José de Minas, 2021).

Figure 5

Qualitative scale for experimental and control groups



Note. Source: Grade records (I.E. San José de Minas, 2021).

The proposal of this research is to implement Project-Based Learning (PBL) in teaching. Therefore, the product is a methodological guide for teachers instructing the Philosophy subject in the first year of high school, detailing the generalities of the PBL strategy and the steps for implementation in the classroom, contributing to effective educational management of teaching.

Conclusions

By analyzing the importance and pedagogical contributions of the variables, the constructs that gave rise to the theories, paradigms, principles, and concepts addressed in this research were clarified. Project-Based Learning (PBL) is an active strategy that, when applied correctly, generates significant changes in how Philosophy is taught and learned. Collaborative work, reflection, debate, and autonomy transform classrooms into spaces for participation, exchange, and idea generation, which traditional strategies do not achieve. The teacher, in their role as an educator, motivates students to learn and develop skills applicable in their daily lives. In other words, PBL is a strategy that enhances the teaching of Social Sciences.

When applying the instruments to teachers, shortcomings were identified in managing and applying active and innovative strategies, particularly PBL in teaching Social Sciences to high school students. Analysis of the surveys revealed that 47.83% sometimes plan and organize their classes interdisciplinarily, while the same percentage indicates they almost always encourage students to have their questions addressed by peers. Additionally, 39.13% of teachers report that they almost always create spaces for students to exchange and share experiences. Furthermore, 47.83% of respondents claim they use projects to develop group and individual skills, while 65.22% indicate that they almost always address prior knowledge through questions or real situations posed by students. These aspects favor the implementation of PBL in the classroom, thereby improving the teaching of Social Sciences.

Regarding negative aspects, teachers face difficulties in collaboratively working through projects or products aimed at knowledge construction. Results show that 43.48% only sometimes assign roles to students in group work, while 30.43% state they sometimes promote projects or products that contribute to solving real problems. Moreover, 34.78% indicate that they sometimes conduct activities for knowledge construction accompanied by didactic resources. These results provided input for the development of the innovative proposal.

From the explanatory analysis, the relationship between the Project-Based Learning strategy and the teaching of Social Sciences was established. After a thorough analysis of the theoretical and statistical framework, a close relationship was recognized in the teaching-learning processes, particularly in applying active strategies to improve the teaching of Social Sciences, thus contributing to the exit profile of high school students.

The proposal was evaluated by two specialists in Project-Based Learning and validated by the institution's rector, who indicated that the objectives, structure, and evaluation were clearly articulated; that the relevance of the developed content reflected the fulfillment of the stated objectives; and consequently, the application of PBL in the teaching processes of Philosophy is viable due to its degree of creativity and innovation when addressing complex philosophical skills and topics for students, who are the protagonists of their learning and approach content from their experiences to solve real problems.

Educational innovation is necessary and essential for transforming society. The application of Project-Based Learning in the classroom, specifically in the Philosophy subject during one partial assessment, achieved significant and motivating results for both students and the teacher, as they were more motivated and collaborative during each phase of the PBL. The average score of the experimental group improved from 5.50 to 9.06 points, representing an increase of 2.47 points upon applying PBL. During this process, students developed skills to solve real problems, learned at their own pace through collaborative work, and improved their vocabulary while presenting their products, in contrast to the control group, which showed no significant improvements. They also raised their scores in evaluative processes compared to traditional methods. For these reasons, Project-Based Learning is an active strategy that contributes to improving the teaching processes of Social Sciences, making students critical, reflective, analytical, and collaborative in their training and knowledge construction.

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