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COMBINATION OF CHATGPT IN PROJECT-BASED LEARNING (PBL) FOR TEACHING SCIENTIFIC RESEARCH IN GRADUATE STUDIES IN BOLIVIA

Combinación de chatgpt en el aprendizaje basado en proyectos (abp) para la enseñanza de la investigación científica en el posgrado de Bolivia

Orlando E. Valdez-López
Universidad Técnica de Oruro (Bolivia)
(valdezlopezorlandoesteban@gmail.com) (https://orcid.org/0000-0001-6038-7313)

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ABSTRACT

This study addresses this issue by analyzing the synergistic integration of Project-Based Learning (PBL) methodology with the capabilities of Generative Artificial Intelligence (GAI), specifically ChatGPT. The goal is to develop a viable and sustainable theoretical strategy to improve the teaching of scientific research at this educational level. Through a hermeneutic-documentary methodological approach, the Bolivian context was analyzed (modular model, digital gap, "everything but thesis" syndrome) and the proposal was based on the Paradigm of the Integrals of Knowledge. The results present a pedagogical model of co-construction of knowledge, where ChatGPT acts as a supportive tutor and co-creation tool, alleviating cognitive load in mechanical tasks and allowing the graduate student to focus on critical analysis and methodological decision-making. A pilot application is designed that outlines roles, resources, and ethical considerations, anticipating a significant increase in the graduate student's autonomy, the strengthening of complex thinking, and, consequently, an improvement in the completion rates of research projects and theses. The article concludes with recommendations for institutional adoption and faculty training in the ethical and effective management of these disruptive tools.

Palabras clave:
Aprendizaje Basado en Proyectos, ChatGPT, Inteligencia Artificial, Investigación Científica, Integralidad Cognitiva.

RESUMEN

Este estudio aborda esta problemática mediante el análisis de la integración sinérgica de la metodología de Aprendizaje Basado en Proyectos (ABP) con las capacidades de la Inteligencia Artificial Generativa (IAG), específicamente ChatGPT. El objetivo es desarrollar una estrategia teórica viable y sostenible para mejorar la enseñanza de la investigación científica en este nivel educativo. Mediante un enfoque metodológico hermenéutico-documental, se diagnosticó el contexto boliviano (modelo modular, brecha digital, síndrome "todo menos tesis") y se fundamentó la propuesta en el Paradigma de las Integralidades del Conocimiento. Los resultados presentan un modelo pedagógico de co-construcción del conocimiento, donde ChatGPT funge como un tutor

asistencial y herramienta de co-creación, liberando la carga cognitiva en tareas mecánicas y permitiendo al estudiante de posgrado focalizarse en el análisis crítico y la toma de decisiones metodológicas. Se diseña una aplicación piloto que detalla roles, recursos y consideraciones éticas, anticipando un incremento significativo en la autonomía del posgraduante, el fortalecimiento del pensamiento complejo y, consecuentemente, una mejora en las tasas de culminación de proyectos de investigación y tesis. El artículo concluye con recomendaciones para la adopción institucional y la capacitación docente en la gestión ética y efectiva de estas herramientas disruptivas.

Introduction

In the era of digital transformation, higher education faces the challenge of incorporating innovative methodologies and technological tools to improve the quality of learning. One of these methodologies is Project Based Learning, which actively involves students in the planning, execution and presentation of projects that address real problems or authentic challenges of the immediate environment.

In parallel, the rapid evolution of Artificial Intelligence (AI) has given rise to advanced tools such as ChatGPT, a generative language model capable of holding conversations and generating coherent textual content. Leading international universities are already exploring the integration of advanced Chat Bots in their academic activities. For example, Arizona State University's (ASU) experience has incorporated ChatGPT to personalize higher education, fostering creativity and improving student outcomes while emphasizing responsible use of technology (OpenAI, 2024). This demonstrates the potential of AI to transform higher education at the undergraduate and graduate levels, making it more personalized and inclusive of teaching in the university community.

In Bolivia, the postgraduate level is in a process of consolidation and faces specific challenges. The teaching of scientific research in graduate programs has traditionally followed conventional educational models, with emphasis on theoretical classes and final works such as thesis reports, which students have difficulty in concluding. According to studies on Bolivian postgraduate education, these programs have historically favored professional training over research, which has led to low rates of thesis completion (Mayorga Lazcano, et al., 2024). The need for innovation in graduate digital pedagogical strategies is urgent in the country to train competent researchers and reduce attrition. Most diploma programs in Bolivia only require monographs to obtain the degree.

Scientific research training in Bolivian graduate programs faces several structural problems. First, traditional-classical teaching methods have focused on the transmission of theoretical content and courses, with little active student participation in real research projects. This prevalent "scholastic" approach is characterized by being content-centered, with itinerant teachers, and the priority on covering costs, leaving the research component in the background, somehow lagging behind. As a result, many master's students complete the theoretical part of the curriculum but fail to complete the thesis or final research paper, falling into the "everything but thesis" syndrome.

In the case of Bolivia, the incursion or access to digital and artificial technologies is scarce because of the costs involved in their use, and because of the obstacles to the purchase of these technologies, in public educational institutions access is more reduced, compared to the private system. According to Caballero-Calle (2024) in Bolivian universities the absence of a Knowledge Management Unit (KMU) and the lack of integration of advanced technologies such as artificial intelligence (AI) have limited their ability to effectively manage knowledge. This deficiency not only affects the organization and dissemination of knowledge, but also prevents its emancipation, an essential process for knowledge to be accessible and useful to more people and communities.

Several graduate programs in Bolivia hire teachers by module or course, without a permanent teaching staff dedicated to guiding students in their projects. This hinders the continuous monitoring of the student's progress and the creation of an academic research community, depriving the student of the necessary support to overcome obstacles during research, due to the constant changes in the teaching staff. Additionally, the professionalizing orientation over the research orientation, identified since the late beginnings of the Bolivian postgraduate program in the 1980s, means that traditionally

less emphasis has been placed on developing high-level research competencies (Mayorga Lazcano, et al., 2024).

In addition to the pedagogical limitations, there are important technological and digital skills gaps in the national context. The COVID-19 pandemic highlighted the structural weaknesses of Bolivian university institutions, as well as their educational actors, in the adoption and effective use of virtual platforms and digital tools. In an analysis conducted in the post-pandemic period, it was identified that both teachers and graduate students had significant deficiencies in digital competencies; in addition, academic content was not adequately adapted to virtual environments, and there were widespread difficulties in accessing and using educational technologies (Arenas Martínez, 2025). Although connectivity has shown progress, with 66% of the Bolivian population as Internet users at the beginning of 2023 (Kemp, 2023), inequalities persist in access to quality broadband services, particularly in rural areas and areas far from urban centers.

The central problem identified in this analysis refers to how to improve the teaching of scientific research in graduate programs in Bolivia, overcoming the traditional model of passive, behaviorist teaching and, at the same time, facing the technological limitations present in many Bolivian institutions. This requires a comprehensive pedagogical approach that actively engages students in real research projects throughout their training, and incorporates the use of artificial intelligence-based digital tools, such as ChatGPT, to provide additional resources and support.

The purpose of this review study is to analyze and propose a strategy for the integration of ChatGPT within the Project Based Learning (PBL) methodology, in order to improve the teaching of scientific research at the graduate level and respond to the pedagogical and technological needs of the Bolivian educational context. Within this framework, we propose to carry out a documentary diagnosis of the current state of postgraduate education in Bolivia in relation to the methodologies used for teaching research, the technological infrastructure available, the digital competencies of teachers and students, and the main academic challenges. This diagnosis will identify key strengths and weaknesses of the system.

Based on this analysis, we propose the design of a theoretical-methodological strategy for the implementation of ChatGPT-assisted PBL in graduate courses, including a detailed description of its stages, the necessary resources, the role of the educational actors, as well as the ethical and pedagogical considerations for an adequate use of artificial intelligence. In addition, the expected outcomes of this integration are anticipated, including: improved student research competencies, increased thesis or dissertation completion rates, and a more active and meaningful learning experience.

Consequently, there is an urgent pedagogical need. Traditional methodologies are not achieving optimal results in the training of researchers, which is reflected in the low completion rates of diploma monographic reports, graduate theses, and in the deficiencies in research skills of numerous graduates (Mayorga Lazcano et al., 2024). In this context, strengthening the teaching of scientific research through the use of digital tools is a priority action to raise the quality of higher education, promote the production of knowledge and train professionals capable of facing and solving complex problems in various areas of knowledge.

Theoretical Framework

Paradigm of Knowledge Integralities

The integrality of knowledge (or cognitive integrality) refers to a holistic educational approach that seeks to overcome the fragmentation of knowledge and address the formation of the university student as a whole. In academic terms, integrality implies coherently articulating the different dimensions of human development (cognitive, emotional, social, ethical, etc.) within the teaching-learning process (Green and Padilla, 2023). This paradigm is fundamental to integrate knowledge, taking into account the educational technology available to achieve significant learning on inquiry processes.

Cognitive and inquiry integralities are fundamental to the development of a triangular approach to research. Cognitive integralities are defined as the interrelation between philosophy, science and technology. The research integralities encompass theoretical, empirical and practical approaches. A structure is sought that allows for continuity in the research. The triangulation of these integrals promotes a more holistic approach (Valverde Garnica, 2023).

In the digital era, the paradigm of cognitive integrality finds new opportunities for application through learning technologies. Far from opposing technology with formative education, this approach seeks to take advantage of digital tools to enhance a holistic-holistic education. In education, the term LKT (Learning and Knowledge Technologies) is used to refer to the pedagogical use of ICT (Information and Communication Technologies) aimed at improving learning and managing knowledge in an inclusive manner.

Project Based Learning (PBL) at the Graduate Level

Project-Based Learning (PBL) is a learner-centered model that positively influences second language education by organizing learning around projects (Du & Han, 2016). In that sense, project-based learning (PBL) is inquiry-based, in which students design and execute projects that address meaningful challenges. Over time, PBL has been adapted to various educational levels, disciplines and cultural contexts, resulting in a diverse body of knowledge. Given these variations, it is crucial to systematize existing research to identify consolidated aspects and areas that require further exploration (Sánchez-García, R and Reyes-De-Cózar, 2025).

Project-based learning (PBL) in project management education enhances teamwork, critical thinking and communication skills, while fostering adaptability and real-time decision-making skills (Afzal and Tumpa, 2025), important aspects in PBL development strongly drive the linkage of theory and research practice. According to Sutarjo, et al. (2025), project-based learning with a heutagogical approach significantly improves students' critical thinking, creativity, and independent learning skills, but faces challenges such as limited technological resources and unequal access to technology.

Project-based learning in higher education improves student learning, with affective, cognitive, and behavioral outcomes measured through various methods (Guo, et al., 2020). PBL involves psycho-affective aspects when linking praxis and theory that touches the emotional part of the student when learning is meaningful.

These experiences document the benefits of using PBL, particularly in scientific research training and other disciplines. Integrating PBA in a postgraduate program encourages the training of researchers: project-based doctoral courses were designed to develop research competencies through knowledge construction processes using the scientific method, applied to problem solving in real contexts. That is, instead of just receiving theoretical classes, which enhanced their ability to design experiments, analyze data and propose innovative solutions as they will be required in their professional practice as scientists. This approach proved to be a curricular update aligned with the

competency-based training model, and its application is recommended in all subjects and educational levels due to the positive results observed (González Navarrete, 2024).

As project-based learning was initially popularized in elementary and middle school education, its principles have been successfully extended to higher education, including international master's and doctoral programs. At the graduate level, PBL is used as a strategy to bridge the gap between academic theory and professional or research practice, providing graduate students with applied learning opportunities commensurate with the demands of their specialized-professional field. Currently, PBL is a competency-based methodology used at the undergraduate level in several universities in Bolivia: UPB, UCB, UMSA, UNIFRANZ.

In Bolivia, PBL has great potential at all university levels, as stated by Lucero Vargas and Antezana Pérez (2019), PBL seeks that students leave the classroom and understand the needs of communities, especially vulnerable groups, listen to proposals for solutions, activate in him or her the ability to cooperate, motivate collaborative work and demonstrate that their academic training serves for long-term change. This overcomes the rupture between academia and social reality. The adoption of PBL in graduate programs could be an innovative step to improve the quality of education, as long as it is adapted to the characteristics of the context and the students, who are of an adult age, and the institutional reality of each university, whether public or private, is taken into account.

ChatGPT and Its Educational Potential at the Graduate Level

ChatGPT is an advanced language model (from the GPT family, for Generative Pre-trained Transformer), trained with a wide variety of texts, which allows it to generate coherent and relevant responses on a wide range of topics in various domains (Hinojosa Mamani, et al., 2024). Tools such as ChatGPT can enhance self-directed learning and the student experience when facing research papers (Galli and Kanobel, 2023), hence PBL.

Among the potentialities offered by ChatGPT in postgraduate higher education are, just to name a few: assistance in academic writing, formulation of research questions and ideas, search for sources and literature review, support in methodological design, support in data analysis, among others (OpenAI, 2023). The general trend in higher education points to the fact that AI, and ChatGPT in particular, will undoubtedly be an integral part of the educational ecosystem. As noted by Michael Crow, president of ASU, AI will continue to transform higher education by making it more diversified and present across the lifespan (OpenAI, 2024).

Preparing graduate students to intelligently use these tools can give them an important competitive advantage in their academic and professional careers, while enhancing their immediate educational process. The key will be in the strategic and thoughtful integration of ChatGPT: clearly defining when and how to use it to maximize benefits without detracting from the pedagogical objectives. The challenge is vital to integrate tools such as ChatGPT and HI (Human Intelligence) in educational processes linked to scientific research.

Moreover, ChatGPT is a valuable resource for processing academic and scientific texts, most of which are published in English. This tool can take excerpts or abstracts of *papers* and quickly translate them into Spanish-Spanish. Beyond literal translation, AI has the ability to **explain or paraphrase** complex concepts or specialized terminology, facilitating the understanding of high-level articles by students who are still developing their language proficiency. This streamlines the literature review phase, allowing

postgraduates to focus on critical content analysis rather than struggling with the language barrier (OpenAI, 2024).

Method

The hermeneutic method is used in the interpretative study of documents to understand the coherence and meaning of several analyzed documents, based on the contrast of several digital sources, repositories, personal databases and OpenAI artificial intelligence, in convergence with the paradigm of cognitive integralities.

For this reason, the present research falls within the framework of qualitative research, with a documentary-projective design. The qualitative approach is suitable, since the primary objective is not the measurement of variables, but the deep understanding and systematic interpretation of a complex educational phenomenon: the integration of artificial intelligence in the teaching of scientific research. The projective nature of the study lies in the fact that, based on the diagnostic analysis, a viable methodological model (ABP+ChatGPT strategy) is structured and proposed for future action in the Bolivian postgraduate context.

In order to achieve the objective, the hermeneutic method was used, which is fundamental for the interpretative study of documents. The hermeneutic procedure allowed transcending the superficial description of the texts, focusing on understanding the internal coherence and deep meaning of the analyzed documents, particularly those referring to the foundations of Project Based Learning, the philosophy of the Bolivian postgraduate program and the pedagogical implications of AI.

The method was applied based on the contrast of digital sources (repositories, academic databases, institutional reports) and the artificial intelligence of OpenAI (ChatGPT), in an exercise of documentary triangulation. This contrast was carried out under the perspective of the Paradigm of the Integralities of Knowledge, in this way, the hermeneutic method not only allowed the interpretation of the current reality, but also laid the foundations for the proposed methodological prospective.

For the application of the hermeneutic method, the following techniques were used:

Digital documentary review was the primary data collection technique. This procedure was applied systematically for the contextualization of the phenomenon and the construction of the theoretical framework. Three main types of documents were collected and examined:

Regulatory and Institutional Documents: Bolivian graduate regulations, university policies on research and teacher training.

Academic Literature on Pedagogy: Indexed articles, theses and books on Project Based Learning (PBL) and its implementation experiences in higher education.

Specific Literature on Educational Technology: Documents and papers on the application, potential and ethics of Generative Artificial Intelligence (AI) in higher education contexts, including direct sources on OpenAI technology (ChatGPT).

The information obtained was processed using the Contrasted Content Analysis technique. This procedure was not limited to coding themes, but involved:

Critical Diagnosis: Identification of the problematic categories of the postgraduate program (low terminal efficiency, traditional methods, technological gap).

Theoretical Convergence: Articulation of the benefits of PBL with the functionality of ChatGPT as a complementary and not a substitute resource.

Contrast with Professional Experiences: The documentary findings were weighed against previous professional experiences in graduate management and teaching.

This contrasted analysis made it possible to interpret the pedagogical and technological feasibility of the integration (PBL+ChatGPT) and, consequently, to project plausible alternatives for future implementation for pilot applications in the Bolivian context. The concreteness of the foresight was manifested in the detailed design of the steps of the proposed Implementation Strategy.

Results

Academic and Pedagogical Context

The higher education system in Bolivia is made up of autonomous public universities, private universities and indigenous universities. All of them are supervised by the Executive Committee of the Bolivian University (CEUB), in the case of public universities, and by the Ministry of Education, in the case of private universities. Historically, the offer of postgraduate programs (master's and doctoral degrees) in Bolivia emerged late compared to other countries. It was not until the 1980s that the first formal master's degree programs were initiated, and the first national doctorate was established in the late 1990s (Mayorga Lazcano, 2024). During the following decades, there was an accelerated growth in the creation of programs, especially master's degrees oriented to professionalization, often without an equivalent development of research culture, although plausible in their constitution.

This rapid growth, coupled with little previous experience, resulted in the "traditional school" model mentioned above, characterized by a focus on theoretical classes and student-financed graduate programs. Currently, the majority of master's degree students in Bolivia are practicing professionals seeking to improve their credentials or specialize. They are usually taken in weekend or modular modalities, which presents pedagogical challenges (short time of exclusive dedication to study, intensive sessions). In addition, several programs hire teachers per module, sometimes from other cities or abroad, which, although enriching with their international experience, sometimes complicates continuity in research mentoring due to their very busy tasks.

Culturally, it can be said that Bolivian university pedagogy has traditionally been magisterial and vertical. However, in recent years, higher education reform efforts have promoted active methodologies. For example, some universities have implemented university teacher training courses that include PBL, collaborative learning and the use of ICT in education. Thus, although not yet a majority, there is a growing understanding among Bolivian academics that there is a need to move from teacher-centered to student-centered teaching, integrating technology as an important tool of the 21st century.

An important aspect of the academic context is multilingualism and interculturalism. Although most graduate programs are taught in Spanish-Spanish, Bolivia is a multicultural country where some students may be native speakers of Aymara, Quechua, Guarani or another language. In addition, comprehension of English texts is variable, graduate students have difficulties with scientific literature in English, since the high impact journals in the current Scopus and WOS networks are English-language versed. This is relevant for the use of ChatGPT, since this tool could help translate or explain texts in English, and could also provide information in Spanish that the student would otherwise not easily access. The ABP+ChatGPT approach can therefore help bridge the language gap by assisting in the translation and localization of content.

Technological Context

In terms of infrastructure, Bolivia has made progress in connectivity, but still faces challenges. As mentioned, about two-thirds of the population has access to the Internet, with a higher concentration in urban areas. According to Kemp (2023), the main public universities (UMSA, UMSS, UAGRM) have data networks on their campuses and internet rooms, although speed and stability vary. Recent data indicates that the median mobile connection speed is low (~10 Mbps) and fixed is moderate (~25 Mbps), which may impact the experience with web-intensive applications such as ChatGPT. However, most urban campuses can support their use, especially during off-peak hours. This is a major constraint that must be overcome, in addition to access to technologies due to the high cost.

An internal technological challenge for the institutions is the availability of equipment. Not all classrooms are equipped with computers; several graduate programs operate under the traditional classroom modality. To implement this proposal, universities may need to enable computer classrooms or mobile labs (*laptops/tablets*) for classroom use. Alternatively, rely on the "let each student use his or her device" policy. Given that the graduate population tends to be composed of professionals, it is likely that a good portion will have laptops; however, 100% should not be assumed, and alternatives should be provided for those who do not.

Another factor is access to virtual platforms and software. Many Bolivian universities adopted virtual environments (such as Moodle) especially after the pandemic, and became familiar with videoconferencing (Zoom, Google Meet). This increase in digital literacy during 2020-2021 may be a plus point for now introducing ChatGPT, as both teachers and students had to adapt to new tools in that period. However, the development of media literacy and, therefore, media competence in Bolivia is precarious, so a study conducted in Bolivia and Ecuador highlights that "media and information competencies play a fundamental role in our times, because they help us to manage information correctly, allowing us autonomy as individuals and solid democracies as a society" (Loaiza Lima, et al., 2025, p. 52).

Regarding ChatGPT itself, its use requires circumventing the restriction that officially OpenAI did not initially offer open access from all countries (although Bolivia can now access ChatGPT). There is also the issue of cost: the free version of ChatGPT has limitations (especially if it is based on GPT-3.5, which may be sufficient, but has less capacity than GPT-4). A paid version (ChatGPT Plus) could improve responses and allow for a greater volume of queries, but would imply a monthly cost of US$20 per account (OpenAI, 2023), however, currently from Bolivia the bank must be requested to open the payment each month (this is a limitation that must be overcome). A contextual solution could be for the university to purchase one or more managed Plus accounts and students access through them at defined times, or to explore the OpenAI API for integration into an

internal system with shared costs. Moreover, ChatGPT-5 already exists, which is a more advanced model, not to mention the ChatGPT-5.1 model. These are technical details to be resolved, but not insurmountable, since the amounts are relatively low compared to other educational investments. It is recognized that accessibility to this resource is still limited.

In terms of policy, to date there are no known specific regulations in Bolivia that limit the use of AIs in education, except for delinquent purchases of AIs with Bolivian banks (probably due to the scarcity of dollars in circulation). This provides a space of freedom to innovate, as long as it is done responsibly. It is foreseeable that guidelines or regulations will be developed in the future, so pioneering experiences (such as the one proposed) could inform regulators on best practices and responsible use considerations to take into account. It is a matter of ethics and conceiving AI tools as resources.

Academic and Attitudinal Considerations

A final contextual element is the attitude of the academic community toward changes such as this use of technology. The introduction of PBL plus ChatGPT represents a twofold idea (methodological and technological). Both enthusiasts and skeptics are to be expected. Some academics may question whether the use of ChatGPT could undermine academic rigor or encourage the "law of least effort" in students or other "anything but theses". Some, on the other hand, will view with optimism the possibility of modernizing teaching and making it more attractive to the new generations; we must use what is within our reach with creativity, a rationale put forward by my own experience at the undergraduate level, which can be applied to the graduate level.

To increase acceptability, it is key to frame the initiative not as a replacement for teachers or serious research, but as a support to achieve educational objectives. It is possible, for example, to present evidence (as in this paper) that PBL improves competencies and that ChatGPT, when used well, improves performance. Also, involving teachers from the design stage, addressing their doubts and showing tangible results after a pilot will help to gain confidence.

From the students' side, several will probably be motivated to use a novel technology in class. Since some may already use it on their own, bringing it into the formal, teacher-oriented setting may even be a relief (less personal ethical conflict). However, we will have to work on instilling responsibility: make them understand that AI is a tool, not a substitute for their learning. Here the Bolivian context could be fertile, since most graduate students have a genuine interest in learning (given the sacrifice involved in studying and working at the same time), so they will appreciate improving their skills, as long as they see that the tool really contributes to them and that the project is useful beyond just "passing the module".

In conclusion, the Bolivian context presents significant challenges, but also favorable conditions for this proposal. Challenges include: variable infrastructure, ingrained pedagogical habits and limited prior graduate PBL experience. The enabling conditions include: a critical mass of teachers and students with greater digital proficiency (Digital Competence-IA), recognition of the need to improve the quality of graduate programs, and a growing interest in aligning with international education standards. This contextual review analysis reinforces that the proposal should be implemented in a pilot, adaptive and participatory manner, from an integral cognitive approach, involving the educational community in its detailed design and adjusting it according to the realities of each university institution.

ABP and ChatGPT Integration

The integration of ChatGPT in Project-Based Learning (PBL) for the teaching of graduate scientific research (Open AI, 2025) aims to achieve a series of positive results, both immediate and in the medium term, in the training of students and in the educational dynamics. The following is a list of the main results expected in the:

- Improvement of students' research skills: By learning research "by doing" through real projects, and with the support of ChatGPT to reinforce knowledge and suggest resources, students are expected to gain a more solid understanding of the scientific research process. This includes formulating clear research questions, designing appropriate methodologies, handling data skillfully, and discussing results with a theoretical foundation. For example, at the conclusion of the course/project, students should be able to pose a relevant research problem and structure a coherent methodological proposal much better than at the beginning, thus evidencing the learning achieved.
- Increase in the completion rate of theses and dissertations: A critical objective is to reduce dropout or stagnation in the thesis phase of graduate studies. With the experience accumulated in the PBA project (which could be a preliminary thesis project developed with intensive and sustained support from the beginning of the program until the last module), students will have advanced much of the research work, mitigating the "everything but thesis" syndrome. The use of ChatGPT will have helped to overcome obstacles (the no time factor) that often delay completion. In the pilot groups, a significantly higher percentage of students would be expected to present and defend their theses within the established deadlines, without delays or dropouts, compared to previous groups or courses without this methodology.
- Development of transversal (soft) skills: PBL and AI-enhanced teamwork will foster in students skills such as effective collaboration (coordinating in teams and also with an AI "agent"), communication (presenting and discussing ideas in various formats), self-learning and adaptation (learning to use new tools on their own, becoming digitally literate). The ability to learn how to learn will also be strengthened, as interacting with ChatGPT requires formulating good questions, critically analyzing answers and seeking additional information when something is found to be missing or unreliable, contrasting.
- Increased motivation and engagement with the graduate program: Students are expected to find the learning experience more interesting and relevant. Working on solving a genuine problem and using a modern tool like ChatGPT can increase your enthusiasm. Indicators of this would be higher attendance to classes/workshops, active participation in discussions and lower dropout rate during the development of the course. In student satisfaction surveys, it is expected that they will rate the methodology positively (although they may also point out challenges).
- Measurable improvement in academic performance: In addition to practical skills, improvement could be observed in grades or other evaluation instruments. For example, if a test of theoretical and practical knowledge of methodology is administered at the beginning and at the end, a significant increase in post-intervention scores would be expected, greater than the typical increase with a traditional class. This would validate that the ABP + ChatGPT combination not only pleases, but teaches effectively.

- Empowerment of the teaching role and teaching efficiency: Although it might be thought that AI detracts from the teacher's role, in reality teachers are expected to benefit from the tool to optimize their work. They will be able to spend less time on routine aspects (such as correcting basic writing or repeating theoretical explanations that Chat Bot can give) and focus more on high-level mentoring, human customization and motivation. Teachers will also develop new skills (AI-mediated tutoring), increasing their professional profile. One expected outcome is that teachers report that, after the initial learning curve, their workload became more manageable and they gained more satisfaction from seeing better student products. The teacher is proficient in digital educational skills.
- Culture of innovation and continuous improvement: The implementation of this pilot project in one or more Bolivian institutions can generate a multiplier effect. If the results are positive, it is expected that more graduate programs will show interest in adopting similar methodologies. At the institutional level, this would contribute to a culture of educational innovation, where teaching strategies are regularly evaluated and new evidence-based practices are incorporated. It also paves the way for AI to be incorporated into other academic functions (undergraduate tutoring, library assistance, etc.) with the accumulated experience.
- Contribution to local educational research: As this is a novel initiative in Bolivia, its documented results (for example, in terms of improved indicators or qualitative experiences) may serve as a basis for publications or presentations at academic educational events. This would position the participating universities as a reference in the adoption of AI in education in the region, and would contribute to global knowledge from a Latin American perspective.

Naturally, along with these expected positive outcomes, risks must be monitored and managed. Among them, one could be that some students develop an over-reliance on ChatGPT and do not strengthen certain skills (such as manual calculation or traditional bibliographic search). Therefore, cognitive comprehensiveness must prevail in all areas of knowledge and application of technologies. However, the way in which the methodology is approached - balancing tools and supervision - seeks to minimize this risk.

This does not mean that Bolivia has not made incursions into the use of digital tools and IAs, it is in full incursion of the particular teacher, or with certain institutional programs. The expected results paint an encouraging picture: more competent graduate students, more effective and updated teachers, research projects of higher quality and relevance, and ultimately, a contribution to the strengthening of the Bolivian scientific-academic system. If these results materialize, even partially, they would validate the hypothesis that the synergy between PBL and AI can be a powerful lever for change in higher education in terms of research processes. This is a prospective idea.

ABP+ChatGPT Implementation Strategy

Based on the previous theoretical approach and the diagnosis of the problem, we propose an implementation methodology that integrates Project Based Learning with the use of ChatGPT for the teaching of scientific research in graduate courses in Bolivia. This methodological proposal acts as a guiding model that institutions or teachers can adapt according to their reality. Below, based on OpenAI (2025) contrasted and curated, the key components and steps of the proposal are detailed:

A. Design of the Environment and Necessary Resources.

This phase establishes the logistical and training bases:

- *Space Selection:* Priority is given to methodology courses, thesis seminars or research workshops, where the preliminary project is traditionally developed.
- *Technological Infrastructure:* Access to broadband Internet and the ChatGPT-Plus tool (ideally through educational licenses or institutional subscriptions) should be guaranteed to avoid usage limitations.
- *Initial Training:* It is crucial to conduct practical and ethical workshops to level the digital competencies of students and teachers. Training should focus on the effectiveness of prompts, interpretation of responses, and ethical responsibility (citing sources, verification).

B. Planning the Research Project with the PBA

The project framework is defined under the PBA principles:

- *Problem Definition:* The teacher and students select a real, authentic problem relevant to the professional area (e.g., the impact of AI on learning).
- *Team building:* Collaborative teams (e.g., 3-5 students) are created to address sub-projects or specific aspects of the central theme, simulating research collaboration.
- *Elaboration of the Plan:* The teams, guided by the teacher, design their plan (objectives, methodology, chronogram). ChatGPT assists in this initial phase by generating drafts of possible research questions or suggesting methods.

C. Project Development with ChatGPT Integration (The Core).

This is the operational phase where ChatGPT acts as an assistant in the Teaching-Learning Process (PEA):

Table 1
ChatGPT assistance in research teaching-learning process

Research Activity	ChatGPT (Wizard) function	Human Function (Critical)
Bibliographic research	Summarize key theories, suggest conceptual approaches or references (check necessary).	Traditional database searching, source verification and detection of fabricated references (hallucinations).
Instrument Design	Refine questions (surveys/interviews) to avoid bias, translate instruments.	Final decision on instruments, methodological validation and adaptation to the context.
Data Collection and Analysis	Reduced role in harvesting. Assists in the preliminary interpretation of data patterns, summary of qualitative trends or explanation of basic statistical calculations.	Rigorous analysis, use of specialized *software* (e.g. MAXQDA), and contextual interpretation of findings.
Preparation of the Final Report	Assistance in improving coherence, grammar, clarity and formatting (writing assistant), exploration of ideas for discussion of implications.	Intellectual authorship, guarantee of the accuracy of the data, contrast and final decision on the academic composition of the text.
Feedback	It is used live during sessions for quick answers or suggestions on data visualization.	Human feedback, collective reflection and critical debate between teacher and peers.

D. Project evaluation and closure

Assessment is comprehensive and focuses on learning and critical competence:

- *Final Presentation:* Teams present their results and should include an internal reflection on their PBL learning experience and the use of ChatGPT (critical awareness).
- *Integral Evaluation:* A rubric is used that weighs methodological rigor, depth of analysis, originality and team performance. It is not the amount of AI use that is evaluated, but the final result and the critical-investigative degree acquired. Dishonest use of AI should have a negative influence.
- *Feedback:* Surveys and focus groups are used to gather participants' perceptions of the usefulness of ChatGPT and to improve future implementations.

E. Specific considerations for the Bolivian context

For a successful implementation in Bolivia, contextual challenges must be considered:

- *Language and Cultural Context:* Ensure optimal use of Spanish-Spanish ChatGPT and recommend including local context in *prompts* for more accurate responses.
- *Connectivity Limitations:* Schedule AI-intensive activities at times or locations with better bandwidth, alternatively, download responses in advance.
- *Dedication and Groups:* Adapt the PBL to the reality of working students (evening/weekend mode) with modular planning. ChatGPT functions as an asynchronous virtual tutor between face-to-face sessions.
- *Inter-institutional Collaboration:* It is recommended to seek alliances with the Ministry of Education or local technology companies (Entel, Tigo) to finance pilots (e.g. subsidized *ChatGPT Plus* accounts) and share resources and experiences among universities.

PBA Pilot Experience + ChatGPT

In my own experience regarding the application of PBL - Project Based Learning in real scientific research projects - even in undergraduate - in the Research Workshop IV: Latin American Theoretical Approach to Communication, of the Social Communication Sciences Career of the Technical University of Oruro, the facilitator role of the teacher focused on student learning according to the PBL, linking the use of IAs and ChatGPT was applied in the present management.

It should be noted that this experience can be considered as a pilot proposal applicable to the postgraduate level, with the necessary adaptations according to the students' educational level and previous knowledge. In this sense, the following is a systematic exposition of the process developed -from its planning to the teaching evaluation stage-, within the framework of the implementation of the Project Based Learning (PBL) approach enhanced with the use of ChatGPT as a support tool in the teaching of scientific research:

From the methodological text entitled *Investigación Para Todos: Methodological practical orientation* -authored by the person responsible for this study-, which provides structured orientations, applied examples and guided spaces for the progressive development of the research process, the research work began in March 2025. The activity was developed by teams made up of five student-researchers, who addressed issues related to the social and media reality of the Department of Oruro. The implementation of generative artificial intelligence (GAI) tools, in particular ChatGPT, strengthened several stages of the scientific process, from problem formulation to conclusion writing. The work culminated in October 2025 with the delivery of final reports, presented in scientific article format. This research was presented at the XXV Jornadas Nacionales de Jóvenes Investigadores de la Asociación Boliviana de

Investigadores de la Comunicación (ABOIC), held in the city of Sucre, Bolivia, from October 1 to 3 of the same year.

During the development of the research project, we worked with students using a PBL approach. In each class session, the teacher explained the corresponding phase of the research process, following the content of the textbook that each student had available. Subsequently, each phase or stage was articulated with the specific research topic that each group had selected.

With the purpose of enriching and optimizing the proposals, the use of ChatGPT artificial intelligence was recommended as a support tool at each stage of the process, with ethical solvency, contrastation, verification of sources and curation of the content obtained. For this purpose, a demonstrative explanation of its operation and the possibilities it offers in the construction and review of the different components of scientific research was previously carried out.

In the following session, the students presented the practical progress corresponding to the assigned stage. These products were subjected to review, feedback and contrast by the teacher, allowing for correction, improvement and advancement to the next stage of the research process.

In this way, the integration of ABP + ChatGPT favored active learning based on practice, application and continuous research. The students went through all the phases of the research process - from the formulation of the idea to the elaboration of conclusions and the construction of the final report in scientific article format - consolidating essential research and technological competencies.

Table 2

Guided steps of the research process and mediated by ChatGPT

Stage	Activity	Using ChatGPT/Book	Result
Research idea	Work in groups of 3 potential ideas according to theoretical basis	Brainstorming	An idea was chosen
State of the art	Background review of the chosen idea.	Background search	Validation of the idea
Research Project	Group work: drafting of the research topic, problem statement, formulation of objectives, others.	Refinement of approaches	Exact formulations. Final project design
Theoretical Framework (TM)	Construction of the theoretical basis: direct and indirect quotations	MT Refinement - APA 7	Accurate writing in the APA 7 system
Methodological Strategy	Selection and design: type of research, approach, method, techniques, and tools	Book	Concretization of a methodological design four: operationalization
Field Work	Information gathering: use of tools	Book	Forms, files and other records
Tabulation and analysis	Interpretation of results	Table generation and analysis	Preliminary results
Results	Writing of results	Refinement of the wording	Results achieved

Conclusions	Drafting of conclusions	Book	Conclusions
Final Report	Writing a scientific article	Refinement	Scientific articles
Disclosure	Presentation at national event	Assisted slide construction	XXV ABOIC Young Researchers' Day Exhibition

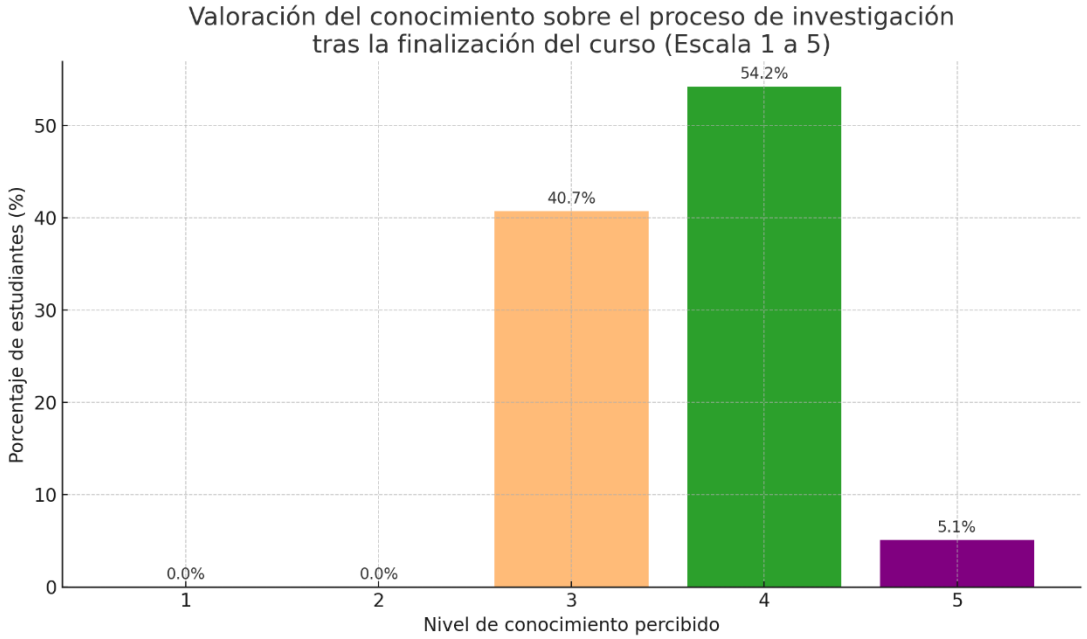
Teaching Evaluation of the Pilot Experience ABP + CHATGPT

It is important to clarify that the evaluation presented in this article is not part of the survey study conducted specifically for this research, but constitutes a reflective assessment based on the direct experience of the teacher-author in implementing the ABP methodology integrated with ChatGPT in the teaching of scientific research. This assessment was based on the interaction with students during the development of the project at the undergraduate level, and is considered a relevant contribution that could serve as a reference for future methodological applications at this educational level.

The students positively valued the methodological proposal implemented by the teacher, based on the integration of Project Based Learning (PBL) with the use of generative artificial intelligence, specifically ChatGPT, in the teaching-learning process of scientific research in the subject "Research Workshop IV": Latin American Theoretical Approach to Communication". The following are the results of a survey applied at the end of the course, which was administered through the Google Forms platform. The instrument was aimed at fourth year students of the Social Communication Sciences career, belonging to the Faculty of Law, Political and Social Sciences (FDCPS) of the Technical University of Oruro, Bolivia. For reference, some graphs illustrating the main findings are included.

Figure 1

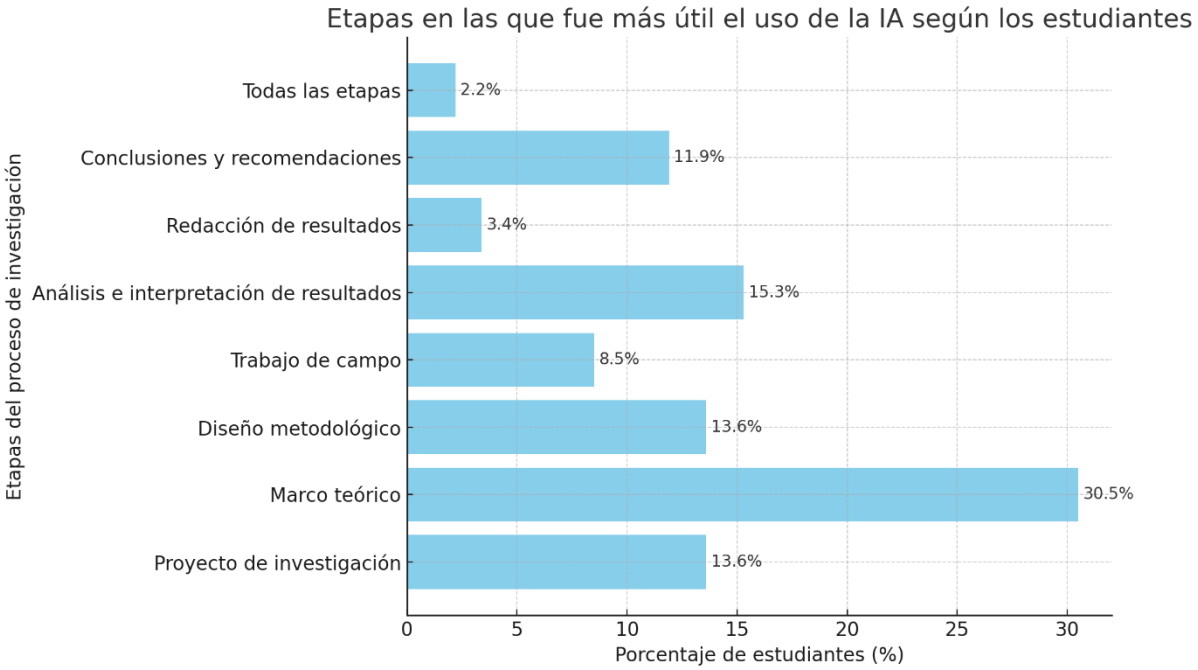
Qualification of knowledge about the research process



The graph shows the students' perception of their level of knowledge regarding the scientific research process at the end of the course. The majority (54.2%) indicated having a high level of knowledge (level 4), followed by 40.7% at an intermediate level (level 3). Only 5.1% rated themselves at the highest level (level 5), while no responses were

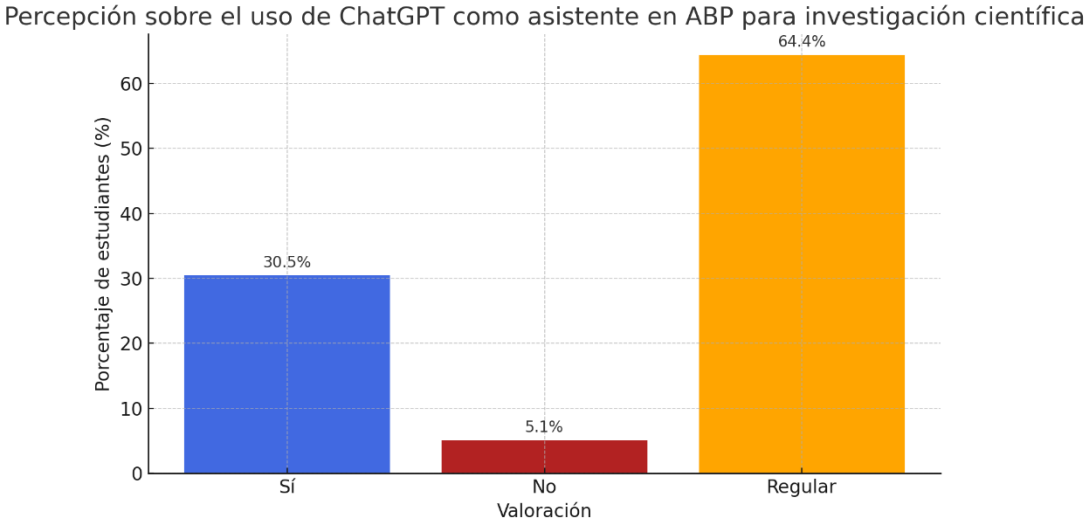
recorded at the lowest levels (1 and 2). These results reflect a positive evaluation of the training process and suggest that the PBL strategy combined with ChatGPT favored the strengthening of research competencies.

Figure 2
Usefulness of ChatGPT in scientific research phases



The graph shows that the majority of students identified the theoretical framework phase as the most useful for applying artificial intelligence, with 30.5% of responses. This is followed by the analysis and interpretation of results (15.3%), and the stages of methodological design and formulation of the research project, both with 13.6%. To a lesser extent, the use of AI was valued in conclusions, field work, writing of results and in all stages of the process. These data suggest that AI support was especially valued in phases requiring theoretical and argumentative structuring.

Figure 3
Feasibility of ChatGPT in the ABP



The graph reveals that a large majority of students consider the incorporation of ChatGPT as an assistant in scientific research processes within the project-based learning approach to be adequate or acceptable. 64.4% rated it as fair and 30.5% as adequate, indicating that more than 94% of the respondents recognize its usefulness at different levels. These results reflect a favorable assessment towards the use of artificial intelligence in academic environments, suggesting that ChatGPT can be an important complementary resource to strengthen research skills in the university context.

In the evaluation conducted by the teacher, the relevance of Project Based Learning (PBL) in combination with the use of ChatGPT as an effective pedagogical strategy for teaching scientific research methodology is highlighted. This experience especially highlights the approach to the phases of the research process that require both theoretical and practical application, placing the student at the center of the learning process. Based on the results observed, this pilot proposal could be adapted for other training contexts, such as research teaching in graduate programs, degree processes, thesis writing or monographic work.

Discussion and Conclusions

The integration of ChatGPT in the Project Based Learning methodology for the teaching of scientific research at the graduate level represents an innovative and timely proposal for the Bolivian educational context. At the same time, it contributes to national higher education with the global trends of pedagogical innovation.

In the Bolivian context, where traditional graduate training has focused on lectures, the adoption of PBL represents a paradigm shift that can help bridge the gap between theory and practice, and between training and application. Integral learning that links technology, science and epistemology, which comes from the paradigm of cognitive integrality.

In this proposal, ChatGPT acts as a virtual assistant that complements the teacher's work and empowers the student to quickly access information, improve their writing and explore ideas. A key conclusion is that ChatGPT does not replace the teacher or the student's effort, but well integrated, it multiplies the opportunities for feedback and personalized learning. Of course, this requires educating students in its critical use by verifying and contrasting information, and teachers have the role of methodological and technological facilitators, i.e., they become digitally competent in the teaching-learning of scientific research.

The contextual analysis shows that the proposal is viable in Bolivia, although with particular adaptations and considerations. Graduate institutions have increasing access to ICT with a university community that is more accustomed to digital tools. Although challenges persist in infrastructure and digital skills, these can be managed with planning: starting with pilot projects (as proposed), ensuring equitable access to technology, and providing specific training.

It also concludes that the ABP+ChatGPT synergy brings benefits beyond the immediate scope of scientific research: it prepares professionals for a work environment where collaboration with AI systems will be increasingly common. Instead of seeing AI as a threat, this proposal incorporates it as a learning ally, teaching by example how to use it responsibly. Thus, graduates will not only be more competent in research, but also more skilled in the use of advanced tools (they acquire digital competencies), which will enhance their professional competitiveness.

Institutional policies or guidelines should be developed that define the acceptable use of AI in academic activities. Also, offer workshops and courses to graduate teachers in active methodologies (PBL, problem-based learning, etc.) and in the pedagogical use of AI tools. This not only at the beginning, but on an ongoing basis, creating communities of practice where teachers exchange experiences and advice on what works best. Incentives (recognition, reduction of workload in other areas) may even be considered for teachers who lead educational innovation.

The focus must shift from being the source of all knowledge to being the guide of the learning process. In PBL, this involves allowing students to make decisions, experiment and make mistakes, intervening to guide them and providing timely feedback. With ChatGPT, it means helping students formulate good questions and reflect on the answers rather than directly giving the answer.

Keeping content up to date, ChatGPT can easily provide information, it is the teacher's responsibility to ensure that questions and tasks lead to higher cognitive levels (analysis, synthesis, evaluation) and not just recalling facts. Also, be aware of tool updates to take advantage of them in teaching.

Students should approach this methodology with an open mind, willing to take charge of their learning. They are encouraged to participate fully in project activities, as the practical experience will directly benefit them in their thesis and professional life. As for ChatGPT, students should use it as a complement and not as a substitute for their effort. That means always critically reading the responses, cross-checking them with academic materials, and never presenting an AI-generated text without substantial personal review and input. Take advantage of opportunities to improve their digital literacy.

Organizations such as CEUB, Ministries or science and technology agencies should support (even financially) pilot projects of AI integration in education, such as this one. This could be done through calls for projects to improve the quality of education, incentives for universities to modernize their curricula, or dissemination of best practices.

In sum, the adoption of AI-supported active methodologies in postgraduate education is not an end in itself and ends there, but a process of continuous improvement. The recommendations presented here lay the groundwork for initiating this process in Bolivia, anticipating that the lessons learned and adjustments along the way will allow the model to be refined. With vision, commitment and the right actions, it is possible that in a few years we will see Bolivian universities leading cutting-edge educational practices.

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