

Effectiveness of online education in postgraduate programs at bolivian public universities

Efectividad de la educación virtual en programas de posgrado de universidades públicas bolivianas

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Abstract

Online postgraduate education in Bolivia is undergoing an expansion phase, accompanied by significant challenges. Accordingly, this study aimed to analyze the effectiveness of online education models in postgraduate programs at Bolivian public universities. The study adopted a mixed-methods, descriptive and comparative design, with a sample of 50 faculty members, 200 students, and 10 administrators, who completed differentiated questionnaires and semi-structured interviews; institutional academic records were also analyzed. The results revealed strengths in flexibility (70% favorable assessment) and autonomy (66%), as well as student satisfaction regarding access to resources (78%) and overall experience (72%). However, weaknesses were identified in academic interaction (55%) and inclusion (44%). Academic performance in online programs surpassed that of traditional programs, with higher approval and retention rates. It is concluded that online postgraduate education is adequate, although it requires policies that strengthen inclusion and quality.

Keywords:

Online education; Postgraduate education; Higher education; Academic performance; Student satisfaction.

Resumen

La educación virtual en posgrado enfrenta un escenario de expansión y desafíos en Bolivia. Por ello, esta investigación tuvo como objetivo analizar la efectividad de los modelos de educación virtual en programas de posgrado de universidades públicas bolivianas. El estudio adoptó un diseño mixto de carácter descriptivo y comparativo, con una muestra de 50 docentes, 200 estudiantes y 10 administradores, que respondieron cuestionarios diferenciados y entrevistas semiestructuradas; además de analizarse registros académicos institucionales. Los resultados evidenciaron fortalezas en flexibilidad (70 % de valoración favorable) y autonomía (66 %), así como satisfacción estudiantil en acceso a recursos (78 %) y experiencia general (72 %). Sin embargo, se identificaron debilidades en interacción académica (55 %) e inclusión (44 %). El rendimiento académico en programas virtuales superó al tradicional, con mayor aprobación y retención. Se concluye que la educación virtual en posgrado resulta efectiva, aunque requiere políticas que fortalezcan inclusión y calidad.

Palabras clave:

Educación virtual; Educación de posgrado; Educación superior; Rendimiento académico; Satisfacción estudiantil.

INTRODUCTION

Postgraduate programs in Bolivia have shown an evolution marked by tensions between professional training and scientific production. Since the mid-1980s, the predominant orientation has been formative and professionalizing, with few exceptions of scientific postgraduate programs supported by international cooperation (Mayorga et al., 2024). This trend reflects a historical construction that conditions the quality and impact of advanced education in the country. The absence of a solid research-oriented approach has limited the generation of indigenous knowledge and reduced programs' capacity to respond to the region's scientific and technological demands.

In this context, public policies for quality assurance in higher education were proposed in the 1990s, when Bolivia positioned itself alongside Argentina and Colombia in the regional discussion. However, as Chambi (2022) highlights, the lack of consolidation of a national accreditation agency has left the country lagging behind its neighbors, which have strengthened their institutions and academic programs. The absence of a formal accreditation system has prevented the establishment of uniform standards and has created uncertainty about the quality of postgraduate programs. This situation has weakened confidence in Bolivian higher education and limited its international competitiveness.

This is compounded by territorial inequality in program offerings. Corini's (2024) analysis shows that between 2002 and 2024, the concentration of programs in urban areas—led by universities such as UMSA and UPEA—contrasts with the scarce presence in rural areas. Disparities across face-to-face, blended, and online modalities reveal inequitable access that restricts opportunities for advanced training in peripheral regions. This territorial inequality reflects a structural problem that affects educational equity and limits rural students' access to quality programs, perpetuating social and professional gaps.

Complementarily, the expansion of offerings has been significant. Poma and Pereira (2022) note that in 2018, more than 3,000 postgraduate programs were registered with the CEUB, excluding those of private universities. However, the absence of systematic evaluations of impact and academic return on investment raises questions

about the relevance and quality of this proliferation. The need for rigorous evaluation models poses a challenge for linking postgraduate education with national development. The lack of information on real outcomes prevents assessing contributions to economic, cultural, and scientific growth, underscoring the importance of implementing coherent and sustainable evaluation mechanisms.

In parallel, Caron and Mattos (2023) emphasize that academic marketing strategies and online education can enhance postgraduate offerings in Bolivia, while Landriel et al. (2023) argue that educational innovation requires technological competencies and active methodologies. Sandoval et al. (2024) add that distance education is an ideal alternative for expanding access. García (2025), in turn, identifies challenges in interaction, time management, infrastructure, and faculty motivation. Montes (2021) warns that the absence of a research culture limits postgraduate quality, and Mollo et al. (2022) indicate that ICT use remains more personal than academic. In this regard, Torres et al. (2024) reaffirm that student satisfaction in online education depends on factors such as self-efficacy, teaching presence, and platform quality.

Within this scenario, online education in postgraduate programs at Bolivian public universities faces tensions between expansion and quality. The situation is characterized by growing offerings but unequal access, a lack of accreditation, and limited inclusion. The causes relate to technological gaps, unclear policies, and a weak research culture. The ideal scenario would be an equitable, accredited online education system sustained by pedagogical innovation. This study addresses the problem by analyzing the effectiveness of online models in postgraduate education. Accordingly, the research question is: How effective are online education models in doctoral programs at Bolivian public universities?

Conducting a study to address this question would inform institutional policies, strengthen quality, and promote inclusion in the university system. Moreover, it would provide evidence to identify strengths and weaknesses of online education, offering inputs for strategic decision-making in postgraduate education. Analyzing the results would contribute to designing more relevant pedagogical methodologies, ensuring equitable

access to digital resources, and consolidating academic practices that favor student retention. Consequently, the objective of this research was to analyze the effectiveness of online education models in postgraduate programs at Bolivian public universities.

METHODOLOGY

The study adopted a mixed-methods, descriptive, and comparative design to analyze the effectiveness of online education in postgraduate programs at Bolivian public universities. The methodological strategy combined quantitative and qualitative techniques to obtain a comprehensive view of the phenomenon. In the quantitative phase, the effectiveness of online education, satisfaction with this study modality, and academic performance compared with traditional programs were measured. The qualitative phase enabled a deeper exploration of stakeholders' perceptions and complemented statistical data with testimonies and assessments.

The study population comprised faculty members, students, and administrators associated with postgraduate programs at Bolivian public universities. The sample was selected based on accessibility and relevance criteria and included only participants with at least one year of experience in online programs. Questionnaires were completed by 50 faculty members and 200 students. From this group, a subsample of 20 faculty members and 20 students was selected, along with 10 administrators, who participated in semi-structured interviews. Selection criteria for the subsample included institutional representativeness, disciplinary diversity, and availability to participate in in-depth sessions, ensuring a broad and balanced view of perceptions of online postgraduate education.

Data were collected using differentiated questionnaires for faculty and students. The faculty instrument assessed the effectiveness of online education across dimensions such as flexibility, autonomy, access to resources, academic interaction, and inclusion. The student instrument measured satisfaction with the modality in aspects related to flexibility, resource availability, online communication, relationships with faculty, and peer interaction. Both instruments were reviewed by methodology specialists and validated through a pilot test that allowed adjustments to item clarity and relevance. Regarding academic records,

average grades, approval rates, and retention rates were analyzed, maintaining the integrity of the information as recorded in institutional records.

Questionnaire administration was conducted online via Google Forms, facilitating participation from faculty and students in different regions of the country. Semi-structured interviews were conducted in previously agreed settings, with an average duration of 25 minutes, and were recorded with participants' consent for subsequent transcription and analysis. Student academic records were obtained from postgraduate program academic offices with prior authorization from coordinators.

The study complied with ethical principles of social and educational research. Participants received clear information about the study's objectives, data confidentiality, and voluntary participation. Informed consent was obtained prior to questionnaire completion or interview participation. Collected information was used exclusively for academic purposes and safeguarded in accordance with data protection standards, ensuring respect for participants' dignity and rights.

Quantitative data analysis employed descriptive statistics, calculating frequencies, percentages, and comparisons of indicators across study modalities. This procedure identified trends and differences in effectiveness and satisfaction with online education, as well as academic performance. Qualitative analysis was conducted through thematic coding of interviews, facilitating the identification of categories related to strengths, limitations, and challenges of online education. Integration of both approaches ensured a more comprehensive interpretation of findings and strengthened the validity of conclusions.

RESULTS

The following results derive from questionnaires and interviews conducted with faculty members, students, and administrators of postgraduate programs at Bolivian public universities, as well as an analysis of institutional academic records. The findings address the effectiveness of online education, satisfaction with this modality, and comparisons of educational performance between online and traditional programs, offering insight into strengths, limitations, and challenges of postgraduate online

education.

Results from the faculty questionnaire on the effectiveness of online education (Table 1) show differentiated assessments. Most participants identified adaptability and flexibility as strengths, with 70% responding favorably, indicating that online environments allow schedules and work rhythms to be adjusted to students' and faculty's needs. Similarly, 66% indicated that the modality favors self-directed learning, reflecting that online programs stimulate autonomy and responsibility in knowledge management.

Regarding technological tools, 60% of faculty reported this aspect positively, recognizing the usefulness of digital platforms and interactive resources in teaching. However, responses to access to resources were less favorable, with only 56% considering it effective. Perceptions of virtual interaction were divided, with 50% favorable and

50% unfavorable opinions. The lowest-rated aspect was contribution to inclusion, with only 44% of faculty recognizing it as effective.

These findings indicate that flexibility and autonomy are the main strengths of online education, enabling students to balance training with other responsibilities. However, divided perceptions of virtual interaction highlight the need to strengthen pedagogical strategies that enhance collaboration and community in digital environments. The low assessment of inclusion poses a significant challenge, reflecting inequities in access stemming from technological gaps, socioeconomic inequalities, or insufficient faculty training. Consequently, the effectiveness of postgraduate online education depends on institutional policies that ensure resources, digital competencies, and interaction- and inclusion-centered learning experiences.

Table 1. Postgraduate Faculty assessment of the effectiveness of online education in Bolivian public universities

Effectiveness aspect	Favorable assessment		Unfavorable assessment	
	f	%	f	%
Adaptability and flexibility	35	70	15	30
Facilitates self-directed learning	33	66	17	34
Greater use of technological tools	30	60	20	40
Better access to resources	28	56	22	44
Promotes virtual interaction	25	50	25	50
Contributes to inclusion	22	44	28	56

As a complement to the quantitative study, interviews were conducted with postgraduate faculty to gain deeper insight into their perceptions of the effectiveness of online education. In this regard, they likewise considered flexibility and autonomy to be the main contributions of this modality, as it facilitates time organization and allows students to assume a more active role in managing their own learning. They also highlighted the value of technological tools for diversifying teaching strategies and expanding support resources. However, they expressed concern about limitations in virtual interaction and identified inclusion as a weak aspect, conditioned by

inequalities in access to devices and connectivity.

Administrators interviewed agreed that online education constitutes a strategic alternative to expand postgraduate program coverage in the Bolivian university system. They acknowledged that flexibility favors the persistence of students with work and family responsibilities, strengthening academic continuity and expanding training opportunities. However, they noted that effectiveness depends on institutional investment in technological infrastructure and faculty training programs. They also warned that the absence of clear inclusion policies limits benefits, as access gaps persist that directly affect lower-resource sectors.

Students interviewed valued the ability to organize schedules and advance learning with greater autonomy, enabling them to balance studies with work and family responsibilities. They recognized that online platforms provide valuable resources and strengthen individual responsibility, although they noted limited interaction with faculty and peers compared to face-to-face modalities. They also emphasized that connectivity difficulties and lack of adequate equipment particularly affect those from less advantaged contexts. Nevertheless, they agreed that online education is a valuable alternative that requires improvements in inclusion and academic interaction strategies.

Another analysis dimension examined student satisfaction with online education (Table 2). Data show high satisfaction levels in flexibility (85%) and access to resources (78%), confirming that this modality facilitates balancing studies with

responsibilities and ensures access to resources. Overall experience reached 72%, and faculty relationships 68%, reflecting positive assessments with room for improvement. In contrast, online communication (63%) and peer interaction (55%) reveal weaknesses that limit consolidation of academic communities.

These findings highlight the need for Bolivian universities to strengthen the social dimension of online education by implementing policies and strategies that foster academic interaction and faculty support. The challenge lies in balancing flexibility and access to resources with formative experiences that foster belonging and collaboration. Achieving this requires investment in technological infrastructure, faculty training programs, and participatory methodologies integrating inclusion and quality, allowing online education to consolidate as a sustainable and equitable postgraduate alternative.

Table 2. Student satisfaction assessments regarding online postgraduate education

Satisfaction aspect	Positive assessment		Negative assessment	
	f	%	f	%
Flexibility	170	85	30	15
Access to resources	156	78	44	22
Online communication	126	63	74	37
Overall experience	144	72	56	28
Relationship with faculty	136	68	64	32
Peer interaction	110	55	90	45

As a complement to the quantitative study, interviews were conducted with a group of students to further explore their perceptions of satisfaction with online education. Participants highlighted the flexibility of this modality, as it allowed them to continue their studies while fulfilling work and family responsibilities. They also valued the ability to organize their schedules and access online materials that strengthened their learning autonomy. However, they noted limitations in interactions with faculty and peers, which hindered the development of academic relationships. They further indicated that connectivity difficulties and the lack of adequate equipment particularly affected those from less advantaged contexts. Despite these limitations,

they considered online education a viable alternative for postgraduate study.

The interviewed faculty members agreed to assess online education positively, highlighting that it expanded access to postgraduate programs and facilitated the diversification of pedagogical strategies through the use of digital resources. They acknowledged that this modality promoted student autonomy and stimulated innovation in teaching practices. However, they expressed concern about limited interaction in virtual environments, difficulties in assessing learning outcomes, and the additional workload associated with online tutoring. They also noted that the effectiveness of this modality depends on faculty training and

institutional investment in technological infrastructure. In their view, online education offers relevant opportunities, although it requires methodological adjustments and sustained institutional support.

Administrators expressed satisfaction with online education as a strategy to expand postgraduate coverage. They indicated that flexibility supports persistence among students with work and family responsibilities, strengthening academic continuity. However, they warned that effectiveness depends on investment in technological platforms and faculty training programs. They also stressed the need for clear policies to reduce access gaps affecting lower-resource sectors and to consolidate institutional guidelines ensuring quality, equity, and sustainability in online education.

Another analysis compared the academic performance of postgraduate students in online and traditional programs (Table 3). Results show more favorable performance in the online modality: average grade 8.5 versus 8.1 in face-to-face programs, a 4.9% difference in favor of online education. Approval rates were also higher in online programs (92%) compared with traditional (89%), a 3% difference. Similarly, retention reached 85% online, exceeding face-to-face by 7 percentage points (78%).

These findings are relevant for the Bolivian university system, demonstrating that online education can consolidate as an effective postgraduate alternative. Higher retention reflects flexibility supporting academic continuity and reducing dropout, expanding advanced training opportunities. Increased approval rates and average grades indicate that virtuality does not diminish learning quality and may enhance it when supported by appropriate resources and pedagogical strategies.

Table 3. Comparison of the academic performance of postgraduate students in online and traditional programs

Academic indicator	Online programs	Traditional programs	Percentage difference
Average grade	8,5 %	8,1 %	+4,9 %
Approval rate	92 %	89 %	+3 %
Retention rate	85 %	78 %	+7 %

Overall, postgraduate online education is perceived as strong in flexibility, autonomy, and access to resources, but weak in academic interaction and inclusion. Students valued balancing studies with personal responsibilities; faculty highlighted pedagogical diversification; administrators recognized coverage expansion potential. At the same time, limitations in connectivity, faculty support, and academic community building underscore the need for institutional policies to strengthen quality and equity.

DISCUSSION

Among the results, flexibility emerged as the main strength of postgraduate online education, with 70% favorable assessment by faculty and 85% student satisfaction. This aligns with Escobar

2025) in Bolivia, who found microlearning enhances personalization and flexibility in postgraduate programs, optimizing learning under high work demands. Both findings show that adjusting time and content is decisive for virtual modality effectiveness and confirms flexibility as key for academic continuity in professional-demand contexts.

Continuing this analysis, autonomy reached 66% positive valuation among faculty and was highlighted by students as a significant benefit. Alanoca (2024) in Bolivia reported a moderate positive correlation ($r = 0.673$) between hybrid classes and student satisfaction, indicating that autonomy increases perceived quality. Convergence confirms autonomy as a crucial component for consolidating innovative higher education modalities, enabling active learner roles and

strengthening responsibility in knowledge construction.

Conversely, technological tool use received a 60% favorable assessment, with noted limitations in equitable access. Arenas (2025) in Bolivia showed that the virtual transition at Universidad Autónoma Juan Misael Saracho was constrained by a lack of digital competencies and platform-use difficulties. Comparison indicates that tool effectiveness depends on availability and stakeholder training. Technology alone does not guarantee quality; institutional support and faculty training are required for a positive learning impact.

Regarding student satisfaction, 78% rated access to resources positively and 72% overall experience. López and Gómez (2024) found high satisfaction with virtual platforms in Spain, though with gender differences favoring women. Consistency shows access to digital resources and content planning directly influence perceived quality, while equity and pedagogical organization may generate satisfaction variations, reminding the need for inclusive, differentiated strategies.

Academic interaction showed weaknesses: 63% satisfaction in online communication and 55% in peer interaction. Chambi et al. (2025) in Bolivia reported positive accessibility and flexibility but noted connectivity issues and the need for faculty training. Interaction remains a recurrent challenge, shaped by technological and pedagogical factors. Effective interaction depends on platform capacity, faculty ability to foster participation, and stable connectivity infrastructure.

Similarly, inclusion was rated favorably by only 44% of faculty, reflecting access gaps. Velarde et al. (2024) in Peru found 57.1% of master's students rated online education as good and 52.4% high satisfaction, though with tool-use limitations. Inclusion depends on overcoming connectivity and equipment inequalities, reinforcing the need for institutional policies to reduce socioeconomic and technological gaps to ensure equitable, sustainable online education.

In academic performance, online students averaged 8.5 versus 8.1 in traditional programs (4.9% difference). Ortiz (2023) in Guatemala concluded that postgraduate online education was satisfactory across variables, highlighting the need to improve communication and synchronous

participation. Performance can be maintained or improved online if interaction processes are strengthened. Academic quality is not compromised by virtuality but depends on strategies promoting active participation and constant feedback.

Approval reached 92% online versus 89% traditional; retention 85% versus 78%. Stanley and Montero (2022) reported performance increases in 57% of cases in virtual environments, with effect sizes above 0.60. Convergence confirms virtuality can positively impact performance and persistence, maintaining quality standards and even surpassing face-to-face modalities when supported by pedagogical innovation and adequate infrastructure.

Overall satisfaction with online education is linked to institutional policies strengthening inclusion and quality. Asalde and Cárdenas (2022) noted that students require faculty support and feedback for satisfaction. Díaz et al. (2022) emphasized that satisfaction depends on connectivity, faculty roles, and institutional management. Urdaneta et al. (2022) in Ecuador and Flores (2021) in Peru also showed high valuation when infrastructure and participatory methodologies are ensured. These contrasts reaffirm that sustainable postgraduate online education requires investment, pedagogical innovation, and inclusive policies.

CONCLUSIONS

An analysis of the effectiveness of online education models in postgraduate programs at Bolivian public universities identified both strengths and challenges. Results demonstrate considerable effectiveness, grounded in key advantages such as time-management flexibility and promotion of self-directed learning. Academic performance measured through average grades, approval rates, and retention was comparable or superior to traditional programs, indicating that virtuality does not compromise learning quality and may favor academic continuity.

However, limitations also affect effectiveness. Academic interaction among peers and with faculty shows lower satisfaction levels, indicating weaknesses in learning community construction and collaborative dynamics. Similarly, online education's contribution to inclusion is perceived as low due to persistent gaps in connectivity access, adequate devices, and digital training. These factors

constrain the modality's democratizing potential and reflect socioeconomic and territorial inequalities.

Based on these findings, consolidating postgraduate online education requires institutional policies ensuring technological infrastructure, continuous faculty training, and participatory methodologies that promote collaboration and community. It is recommended that Bolivian public universities prioritize investment in digital platforms, establish inclusion guidelines, and develop innovative pedagogical strategies to ensure quality, equity, and sustainability in postgraduate online education.

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