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Student Perspectives on Enhancing Hybrid Doctoral Education (On Site and Online)

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Abstract: An increasing number of studies incorporate doctoral students' perspectives to enhance programs. However, research specifically addressing these perspectives in hybrid doctoral education remains limited. The objective of this study was to analyze the strengths and challenges perceived in a doctoral program based on students' experiential testimonies and to identify dynamic cores that contributed to the enhancement of hybrid doctoral education. The study adopted a qualitative approach with the deployment of the descriptive phenomenological method; 190 students on the doctoral program in Education at a private university in Lima, Peru, participated. A virtual interview was used as a method. Six cores were revealed: technological, pedagogical, and disciplinary integration in the doctorate, doctoral supervision, specialized support in research and scientific publication, the development of transversal competencies, organizational infrastructure, and student agency and emotional climate in the doctoral program. These dynamic cores provide a comprehensive framework that encapsulates both the challenges and strengths of hybrid doctoral education, offering key insights for its improvement and innovation. As this study moves beyond a fragmented analysis of specific aspects, it contributes to a more integrated and holistic understanding of hybrid doctoral education, paving the way toward a comprehensive model. Implications, limitations, and future directions are discussed.

Keywords: doctoral training; mentorship; research training; online postgraduate; student

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1. Introduction

In a world marked by rapid technological advances, complex global challenges, and the need for innovative solutions, doctoral training programs are positioned as a fundamental pillar for the generation of knowledge and the development of scientific leaders. Doctoral training should promote advanced research and interdisciplinary innovation while responding to the demands of academic excellence, research ethics, and social relevance.

In this context, it is imperative to analyze and understand the strengths and challenges of these programs from the perspective of the students and key actors from the training experience. Their testimonies offer valuable insight to guide improvements in curricular structure, didactics, institutional support, and research strategies, ensuring that doctoral programs are effective and relevant in an increasingly demanding academic and professional environment.

The doctorate in education was developed in the context of the HyFlex Classrooms (Athens, 2023; Chan et al., 2022), a hybrid learning environment that simultaneously combines online and face-to-face classes (Deroncele-Acosta, 2024). This program includes

students from various regions of Peru, including the coast, highlands, and jungle, as well as professionals from different disciplines, enriching the exchange of experiences and perspectives. This modality not only provides greater flexibility for students by optimizing access to educational resources and fostering real-time interaction through various digital platforms, but it also gives a distinctive nuance to the educational dynamic. The integration of in-person and virtual learning merges into a unique space within the HyFlex Classrooms, creating an immersive and adaptive learning experience where participant interaction transcends geographical and disciplinary boundaries.

Considering that several studies demonstrate the challenges of online doctoral degrees, especially the anxiety experienced by some doctoral students when taking online courses, negatively impacting their satisfaction (Bolliger & Halupa, 2012), and considering the challenges of online mentoring in doctorate programs (Gray & Crosta, 2019; Kumar & Coe, 2017; Kumar & Johnson, 2017; Welch, 2017), there is a trend of moving towards hybrid doctoral programs combining synchronous face-to-face learning and computer-assisted cooperative learning (Kumar & Dawson, 2022; Roseth et al., 2013).

Even a very recent study gives some guidelines for conducting doctoral research at a distance and talks about flourishing off-campus, hybrid, and remote pathways (McChesney et al., 2024) as it is still a challenge to rework a traditional curriculum into a hybrid doctoral program (Alvich et al., 2012).

Based on this panorama, it is essential to deepen the analysis of doctoral training programs from a critical and reflective approach, which allows an understanding of how hybrid environments, such as the "HyFlex Classrooms", impact the educational and formative experience of students. This analysis not only addresses the challenges and opportunities of doctoral training in hybrid environments but also lays the groundwork for a theoretical framework to guide curricular innovation, pedagogical strategies, and the development of effective institutional support in the training of researchers and academic leaders of the 21st century.

1.1. Doctoral Education in Peru and Global Perspectives

In Peru, higher education is regulated by the National Superintendence of Higher Education (SUNEDU), which is responsible for ensuring the quality of universities and supervising compliance with academic standards. The university reform of 2014, established through University Law No. 30220 (Congreso de la República del Perú, 2014), with its subsequent modifications, introduced stricter requirements for the creation and operation of doctoral programs, to strengthen scientific production and raise academic quality in the country. In this context, doctoral education programs have acquired special relevance, given that their purpose is to train highly qualified researchers with the capacity to generate innovative knowledge that responds to the challenges of the Peruvian educational system.

There are more than forty doctoral programs in education in Peru, offered by both public and private universities (Superintendencia Nacional de Educación Superior Universitaria, 2021). However, doctoral programs in education in Peru present notable differences in terms of curricular structure, access to resources, teaching methodologies, and research orientation. Most of these programs maintain a traditional model based on face-to-face classes and a strong emphasis on research methodology, with a significant component of subjects dedicated to research training. However, the growing demand for more flexible alternatives has prompted the creation of hybrid programs, which combine synchronous online sessions with face-to-face meetings, allowing practicing professionals to make their training compatible with their work and personal activities (Carrasco Loyola & Barrios Tinoco, 2019).

However, challenges persist in the effective implementation of these models, especially in terms of digital infrastructure, teacher training in hybrid environments, and thesis supervision. Thus, the lack of standardization in the requirements and contents of doctoral education programs has generated heterogeneity in their orientation, with programs that emphasize teaching, educational management, or research, without a clearly defined common structure. On the other hand, University Law No. 30220 establishes the obligation of universities to guarantee the quality of their graduate programs, including doctoral programs, with a focus on research and knowledge generation. However, studies have pointed out that many doctoral programs in education in the country do not require the publication of scientific articles as part of the graduation requirements, which limits the contribution of these programs to national academic production (Carrasco Loyola & Barrios Tinoco, 2019).

Internationally, in Europe, the development of doctoral training has been driven by initiatives such as Doctoral Training Partnerships (DTPs), in which several universities work together to offer advanced research programs with access to funding and international exchange opportunities (Nerad et al., 2022). One of the most distinctive aspects of these programs is their emphasis on interdisciplinarity since they allow the integration of education with other disciplines such as sociology, psychology, and learning technologies. In addition, academic supervision in these doctoral programs is highly structured, as each student has at least two advisors and must participate in seminars to discuss research advances, which contributes to a more rigorous training process.

In Canada, the experience of a doctorate in education in a blended learning mode was highlighted, highlighting relational trust as a distinctive element. Through interviews with supervisors and graduates, five key factors were identified that influence the effectiveness of supervision, focusing on program design, supervisor roles, and student experience. Building trust and learning partnerships from early stages to key milestones was found to be critical to successful supervision (Jacobsen et al., 2021).

A study in Australia, China, and Iceland noted that doctoral education is in transition, reflected in the diversification of degrees. The study analyzed the rise of the doctorate in education, highlighting its impact on the structure and status of the research-based doctorate (Wildy et al., 2015).

Another study in the United States analyzed the factors that influence the time to obtain a doctorate through a mixed quantitative–qualitative approach. Based on the analysis of data from 1028 education graduates (1990–2006) and interviews with students, graduates, and faculty, it was identified that in the attainment of the doctorate results from the interaction of academic, social, economic, personal, and external factors, academic integration was the most determining factor. Social integration, especially advising and selection of the thesis topic, also had an impact, followed by economic and personal factors such as financial support and family responsibilities (Wao & Onwuegbuzie, 2011).

In the United Kingdom, a study found that the effectiveness of the doctorate in distance education on professionalization, professional change, integration between academia and practice, and professional self-esteem was made possible by a structured but flexible support system (Butcher & Sieminski, 2006).

In Latin America, countries such as Brazil, Chile, and Mexico have developed doctoral models in education with their particularities (Gacel-Ávila & Rodríguez-Rodríguez, 2018). In Brazil, investment in doctoral training has been supported by the *"Coordenação de Aperfeiçoamento de Pessoal de Nível Superior"* (CAPES), which has made it possible to consolidate one of the most solid educational research networks in the region (De Medeiros Pinheiro, 2017). In Chile and Mexico, the expansion of higher education programs in hybrid and distance formats has been a key strategy to foster internationalization and improve

accessibility to doctoral training. In both countries, the trend towards dual degrees with foreign universities has gained relevance, especially in the private sector, where 47% of institutions offer this type of program, compared to 34% of public institutions.

These initiatives, which are not limited to these countries, have made it possible to expand the academic offerings and consolidate strategic alliances with institutions in North America and Europe. However, these advances have not been without certain limitations. In several Latin American countries, academic mobility continues to be limited. The rate of student mobility at the graduate level barely reaches 0.03% of the total enrollment, which is evidence of significant obstacles such as restricted access to funding, administrative difficulties, and curricular rigidity. In addition, access to scientific databases and technological resources continues to be unequal, which impacts the ability of students to develop high-level research with international visibility (Gacel-Ávila & Rodríguez-Rodríguez, 2018).

The doctoral education program analyzed in this study is distinguished from others in the country by its focus on the HyFlex model, a methodology that combines face-to-face and virtual teaching to offer a more flexible and accessible learning experience. The implementation of the so-called *"HyFlex Classrooms"* allows students to participate in real-time sessions, both face-to-face and through advanced digital platforms. This model not only facilitates interaction between faculty and students but also expands opportunities for access to doctoral education for those who reside outside major urban centers.

In addition to its hybrid teaching model, this program is distinguished by its focus on scientific writing and academic production. From the beginning of the doctoral program, students are encouraged to publish in indexed journals and to present their research at international conferences. To this end, the program includes specialized courses in academic writing and advanced research methodologies, ensuring that doctoral students develop solid research skills. Likewise, thesis supervision follows a structured scheme with continuous advising and the use of digital tools that facilitate the monitoring of research progress. These strategies seek to ensure that students produce high-impact research and strengthen their academic trajectory, which is precisely what is expected of a doctoral program, according to University Law No. 30220.

Doctoral education in Peru has evolved under a regulatory framework that seeks to strengthen academic quality and scientific production. However, the offer of programs continues to be heterogeneous in terms of structure, methodologies, and research approaches, with the growing incorporation of hybrid models that seek to meet the needs of practicing professionals. Internationally, various strategies have been developed to strengthen doctoral education, such as interdisciplinarity in Europe, blended learning in Canada, and the expansion of hybrid programs in Latin America. These trends reflect the transformation of doctoral education in a global context, where flexibility, structured supervision, and the integration of research with professional practice are key aspects. In this scenario, the doctoral program analyzed stands out for its HyFlex model, its emphasis on academic production, and its use of digital tools for research support, consolidating itself as an innovative alternative in the Peruvian context.

1.2. Doctoral Training

Doctoral education plays a crucial role in the mission of universities to generate new knowledge through research and innovation, consolidating itself as a central axis in the advancement of modern societies. One of the central functions of universities around the world is the generation of new knowledge through research and innovation, with doctoral training playing a crucial role in it (Jowi, 2021).

In this context, interdisciplinarity and transdisciplinary emerge as key principles in the structuring of doctoral programs, showing that the doctoral training activity must be

located at the intersection of disciplines to facilitate innovation. (Pammer-Schindler et al., 2020). This approach encourages the integration of multiple perspectives and knowledge, particularly in emerging fields such as technology-enhanced learning (TEL), which connects disciplines such as learning sciences, educational psychology, and computer science. In addition, the importance of applying these connections in concrete ways through transdisciplinarity has been noted in that transdisciplinarity allows the practical application of integrated knowledge, facilitating the resolution of complex problems in real contexts. In addition, it promotes collaboration between different disciplines, transcending their traditional boundaries to generate innovative approaches and more holistic solutions in doctoral training (Matthies et al., 2022; Mumuni, 2022).

The impact of doctoral programs varies according to the university context, which reinforces the need for specific analyses in each educational system. For example, in Germany, doctoral training is linked to socialization towards academic excellence, new job opportunities in university management, and increased employment in research projects. Thus, doctoral education, as well as possible reforms in the training of doctoral students, must be analyzed in the context of the respective university system (Buenstorf et al., 2023). In this sense, this study focuses on analyzing a specific program, considering the particularities of its design and application.

In addition, doctoral training must adapt to the growing demands of ethics in research (González-Acuña et al., 2023; Sarauw, 2021). Another key challenge is the development of informational skills, essential in a research environment characterized by massive and continuous access to scientific information, since, as stated in a study, the impressive use of information and communication technologies in the field of research has resulted in the permanent growth and dissemination of information, which has led to the need to master the skills involved in the access and proper use of this resource (Castilla et al., 2020).

Collaborative research and reflective pedagogies are also fundamental pillars of doctoral training (Peck, 2023). International experiences have demonstrated the effectiveness of collaborative research projects in the construction of frameworks applicable to doctoral training (Donohoe et al., 2022). Collaboration among doctoral students, as well as with academics and professionals from various disciplines, enriches the research process, promoting the exchange of ideas, perspectives, and methodological approaches. This broadens the scope of the knowledge generated and prepares students to address complex problems more comprehensively and cooperatively. In addition, reflective pedagogy, by encouraging the self-reflection of the student, the teacher, and the program itself, fosters a process of continuous and critical evaluation that allows for the adjustment and improvement of educational practices, ensuring that both future researchers and training programs adapt and evolve to meet the emerging needs of the academic and professional environment.

Finally, responsible innovation should be integrated into doctoral programs, aligned with the demands of contemporary society (Ten Holter et al., 2023). For example, incorporating ethical research training, social impact assessment, and sustainability principles into doctoral curricula ensures that students develop a critical and responsible approach to knowledge production. This involves fostering interdisciplinary collaboration, engagement with stakeholders, and the application of research to address global challenges, aligning doctoral education with societal needs and technological advancements.

However, to integrate the above-mentioned aspects of interdisciplinarity, transdisciplinarity, ethics and scientific integrity, information skills, collaboration, reflective pedagogies, responsible innovation, and other important pillars into doctoral training in a holistic and consensual way, it is essential to listen to the main actors of this process, doctoral students, because, as a recent study emphasizes, "the design of doctoral training programs must consider the comments of doctoral candidates" (O'Connor, 2023, p. 567).

The present study precisely addresses this need, analyzing the strengths and challenges of a doctoral training program from the perspectives of its students. This approach seeks to contribute to the improvement of the curriculum and general aspects of doctoral training, ensuring that it responds effectively to the current demands of research, innovation, and the training of scientific leaders in specific contexts.

1.3. Hybrid Doctoral Education: Concepts, Structure, and Challenges

Hybrid doctoral training has emerged as an innovative alternative in higher education, combining the flexibility of online teaching with face-to-face interaction and supervision. This model has been implemented in various disciplines and institutional contexts, responding to the need to adapt doctoral programs to the dynamics of the 21st century. The literature highlights that these programs offer significant opportunities to expand access to doctoral education and improve the training experience, although they also present challenges that require specific attention in their design and management.

One of the most relevant aspects of hybrid doctoral programs is the impact of the cohort structure on the student experience. A qualitative study of a hybrid doctoral program in instructional technology identified that belonging to a learning community is a key factor for student success, as it facilitates the development of academic and personal support networks, promoting a more effective integration in the educational process (Rice et al., 2022). Along these lines, the implementation of strategies that promote interaction between peers and teachers is considered fundamental for the consolidation of these programs.

From an institutional perspective, the planning and evolution of hybrid programs have been the subject of analysis in universities that have incorporated this model in areas such as educational technology. A study on the implementation of a hybrid doctorate at a research university highlighted the importance of combining face-to-face and virtual components to engage practicing professionals in a rigorous doctoral process. However, it also noted that the coexistence of hybrid programs with fully face-to-face options presents administrative and curricular challenges, such as the need to redesign courses and optimize interaction in virtual environments (Koehler et al., 2013).

In terms of student perception, satisfaction with hybrid programs appears to be linked to factors such as faculty preparation, the availability of institutional resources, and guidance received in the degree-granting process. A study of a hybrid PhD in fashion design and marketing found that students rated the experience positively in terms of interaction with faculty and research opportunities. However, it identified weaknesses related to the limited course offerings in a hybrid format and the lack of adequate advice on academic procedures (Dorie et al., 2021). This finding highlights the need to strengthen academic and administrative guidance in these programs to ensure a more efficient and structured learning experience.

On the other hand, the professional identity of doctoral students in hybrid programs has also been the subject of study, particularly in disciplines such as counseling education. An analysis based on grounded theory revealed that the construction of professional identity in these programs was strongly linked to students' ability to establish connections with colleagues and faculty. Interaction with the academic and professional community was identified as an essential element in students' transition to teaching and research roles (Carrillo & Rubel, 2019). This reinforces the idea that the effectiveness of a hybrid doctorate depends not only on its curricular design but also on the degree of immersion it allows in academic and professional culture.

In terms of innovation, universities have explored various strategies for integrating technology into hybrid doctoral programs. A study of a doctoral program in educational leadership analyzed how the incorporation of technological tools contributed to improving

the quality of training and student experience. Among the main challenges identified was the restructuring of traditional curricula to adapt them to a hybrid environment without losing academic rigor (Alvich et al., 2012). These findings highlight the importance of designing hybrid programs with a sound pedagogical approach that combines flexibility with high-quality standards in teaching and research.

An interesting study indexed in the Web of Science draws a key distinction between fully online doctoral degrees and those offered by traditional universities with hybrid options. The proliferation of online and for-profit doctoral programs has generated broader access to graduate education for traditionally underrepresented populations, such as the African-American community in the United States. However, this access is not without challenges, as the study highlights that doctoral degrees earned at fully online or for-profit universities face a stigma in the academy, which can make it difficult for their graduates to access positions at highly prestigious research universities. The findings suggest that hybrid programs, being linked to institutions with a physical presence, are perceived with greater legitimacy in academia than fully online or for-profit doctoral degrees (Burrell, 2024). This reinforces the importance of designing hybrid programs that balance flexibility and academic rigor, minimizing the stigmas associated with online education and expanding career opportunities for its graduates.

In summary, hybrid doctoral training represents a strategic response to the current demands of higher education, allowing greater accessibility and flexibility in the training of researchers and academics. However, its implementation requires considering key aspects such as cohort cohesion, the balance between face-to-face and virtual components, faculty preparation, academic–administrative support, the quality of interaction of educational actors, the sense of academic community, and the integration of educational technologies. The evidence suggests that the optimization of these programs should be based on a systemic approach that considers both the student experience and the institutional and pedagogical structure of the hybrid doctoral program.

For this review, we conducted an open search in Scopus and Web of Science using the equation *"hybrid doctoral education" OR "hybrid doctoral programs" OR "hybrid PhD programs" OR "hybrid doctoral training"*; all the studies found were from the United States. This finding positions the United States as a leader in the scientific production of hybrid doctoral training, evidencing its pioneering role in the design, implementation, and analysis of these programs. However, the absence of studies in other contexts suggests the need for greater internationalization of research in this field, making it possible to explore how hybrid doctoral training adapts to diverse educational and cultural realities.

The growing adoption of hybrid doctoral programs in education presents both opportunities and challenges for academic institutions, faculty, and students. Understanding the factors that contribute to their effectiveness is crucial for optimizing their structure, support systems, and learning outcomes. In this context, this study explores the following:

> *What perceived success factors and challenges are associated with the optimization of hybrid doctoral programs in education?*

By examining student experiences and program dynamics, this research aims to identify key elements that enhance or hinder the effectiveness of hybrid doctoral education, providing insights for its continuous improvement.

2. Materials and Methods

This Materials and Methods Section is organized with methodological contents proposed for scientific articles in education with a qualitative route, consisting of six aspects: Methodological Approach, Categories of Analysis, Participants, Instruments for Obtaining Information, Fieldwork, and Data Analysis (Murillo et al., 2017).

2.1. Methodological Approach

This study adopted a qualitative approach to explore the students' perceptions and experiences regarding the strengths and challenges of a doctoral program. Contextualized information was obtained directly from the participants, favoring an in-depth understanding of the program's critical factors.

This study employed a three-stage descriptive phenomenological method: (1) the rigorous description of the participants' lived experiences, (2) the use of phenomenological reduction, adopting a reflective attitude and suspending preconceived judgments to focus exclusively on emerging meanings, and (3) the search for invariant meanings that universally represent the most essential aspects of the experiences studied in the specific context of the doctoral program (Giorgi, 1997).

In this sense, the phenomenological method allowed exploring, from the students' perspective, how the strengths and challenges of doctoral training are configured according to their personal and collective experiences. This approach was particularly relevant for this study since it prioritized the deep understanding of the meanings attributed by the students to their experiences, beyond external or normative interpretations.

2.2. Categories of Analysis

The central category of analysis in this study was hybrid doctoral education (Alvich et al., 2012; Burrell, 2024; Carrillo & Rubel, 2019; Dorie et al., 2021; Koehler et al., 2013; Rice et al., 2022), approached as a complex phenomenon that integrates academic, pedagogical, institutional, and personal dimensions. This approach made it possible to decompose and analyze the elements that structure the formative experience in the doctoral program, following a framework that articulates both structural aspects of the curriculum and the experiential dynamics of the doctoral students.

Doctoral training was not approached from a perspective that limited its conceptualization to pre-established definitions or closed criteria. On the contrary, this study was inscribed in an interpretive paradigm, giving priority to the meanings that emerged from the participants' testimonies. This approach avoided imposing pre-established categories.

This interpretative approach recognized that doctoral training is a dynamic, multifaceted, and deeply contextual phenomenon, in which human interactions, academic processes, and institutional realities converge. By allowing the data collected to define the most significant dimensions of this construct, the analysis was able to capture a more authentic and representative understanding of the phenomenon, aligned with the principles of the phenomenological method adopted in this study.

2.3. Participants

A total of 190 students from a doctoral program at a private university in Lima participated, selected through purposive sampling. Inclusion criteria considered students active in the program and their willingness to share their perceptions in a reflective and detailed manner. Participants from different cohorts were included to obtain a representative view of the training process in different stages. A balance between modalities was sought, ensuring the representation of students from both learning dynamics (pre-classroom and online). Informed consent was requested from the students, who participated voluntarily and gave their consent to publish the results anonymously and confidentially. Some general characteristics of the participants are shown below (see Table 1).

Table 1. Participants by sex, age, educational cycle, and university teaching experience.

Characteristic	Detail	Frequency	Percentage
Sex	Male	82	43.2
	Female	108	56.8
	Total	**190**	**100.0**
Age	20–30	6	3.2
	31–40	37	19.5
	41–50	63	33.2
	51–60	73	38.4
	61+	11	5.8
	Total	**190**	**100.0**
Study cycle	1st	25	13.2
	2nd	29	15.3
	3rd	27	14.2
	4th	23	12.1
	5th	27	14.2
	6th	19	10.0
	Graduate	40	21.1
	Total	**190**	**100.0**
Experience	0	2	1.1
	1–5	18	9.5
	6–10	37	19.5
	11–15	31	16.3
	16–20	31	16.3
	21+	71	37.4
	Total	**190**	**100.0**

Although the sample size (190 students) could be considered atypical for a qualitative study, it is increasingly common to find qualitative research with large samples. A recent study involving 851 Canadian adolescents is a case in point (Ferguson et al., 2021). This phenomenon has been driven, in part, by the impact of new technologies on data collection and analysis processes.

In phenomenological studies in education, it is common to find relatively small samples, as observed in research with 3 to 15 participants (Aras, 2016; Bolat, 2019; Crowley, 2019; Gleason & Hays, 2019; Hall et al., 2016; Henfield et al., 2013; Johnson & Howell, 2017; Livesay & Lawrence, 2018; Obizoba, 2018; Olive, 2014; Rawlings & Cowell, 2015). However, there are also studies with larger samples, ranging from 20 to 55 participants (Assing Hvidt et al., 2022; Günaydin & Arguvanli Çoban, 2021; Ismail et al., 2019; Wang et al., 2016; Yıldırım, 2021), and even exceptional cases with more than 100 subjects, such as a study with 100 students and 5 teachers (Yuksel-Arslan et al., 2016) and a study of 177 professionals from multi-professional teams (Simón et al., 2024). These examples show that, although small samples are still the norm, some phenomenological studies have incorporated considerably larger volumes of participants.

There are relevant antecedents of phenomenological studies on the life experience of doctoral students. For example, this issue has been explored with eight students, all women, in a virtual mentoring program within an online doctoral training program (Welch, 2017). In contrast, the present study sought to broaden the diversity of the sample. The inclusion of 190 students was justified by the need to capture the heterogeneity of experiences in a hybrid formative context, characterized by the interaction between face-to-face and virtual modalities. Since the purpose of this study was to co-construct the meanings that structured

the doctoral experience, a sample was selected to ensure variability in terms of cohorts, study modalities, academic trajectories, and gender, thus allowing a deeper and more nuanced understanding of the analyzed phenomenon.

Following the phenomenological approach, the interpretation of the data was oriented towards a rigorous understanding of the subjective experience of the participants, prioritizing the active listening of their voices and the reflection on the senses and meanings that emerged from their testimonies. To guarantee methodological rigor, the "epoché" was applied, suspending prejudices and previous conceptual frameworks to focus the analysis on the essence of the experience reported. Through an iterative process of reading, coding, and aggregation, invariant meanings were abstracted without detracting from the richness of the participants' experiences. This procedure ensured that the categories emerged from the data themselves, respecting the dynamic and contextual nature of the phenomenon studied.

As indicated in a relevant study, the phenomenological method offers a flexible approach to investigating complex educational phenomena, allowing the understanding of the human social experience, making it very valuable in educational research, with an emphasis on studies of students' lived experiences (Alhazmi & Kaufmann, 2022).

Thus, the large sample size of this study is a strength in capturing a rich and complex diversity of experiences within hybrid doctoral education. By including students with different trajectories, modalities, and formative contexts, the study achieves a deeper exploration of the meanings and dynamics that emerge in this environment. This variety of experiences provides nuances that enrich the understanding of the phenomenon, making it possible to identify connections, tensions, and variations that could go unnoticed in studies with smaller samples. Thus, far from seeking generalization, the breadth of the sample enhances the interpretative scope of the phenomenological analysis, ensuring that student voices are represented in their plurality and complexity.

Program Description

This study focused on a doctorate in education offered in a hybrid mode (face-to-face and online) by a private university in Lima. The selection of this program was according to three fundamental criteria: (1) its hybrid structure, which allowed us to analyze the dynamics of doctoral training in combined environments; (2) its institutional consolidation, with 11 active cohorts since its inception in June 2019, which provided a basis for longitudinal analysis; (3) its impact on the training of researchers in the field of education, evidenced by its success rate of over 80% in the first two completed cohorts and a dropout rate of less than 10%.

The program has a duration of three academic years, organized in six cycles, with research as a transversal axis. In addition, each student is continuously accompanied by an academic advisor, who provides personalized support throughout the research and thesis writing process.

In terms of attendance, approximately 35% of the students attend in person and 65% in an online format. To date, the program has enrolled a total of 504 students in its 11 cohorts, consolidating itself as an advanced training option in the educational field.

2.4. Instruments for Obtaining Information

An interview was used, designed specifically for this study, and distributed through the "HyFlex Classroom" platform with the support of the advising professors of each classroom of the program, through Zoom for online participants and face-to-face for face-to-face participants. The method included ten open-ended questions that allowed

the collection of qualitative data on the experiences, perceived strengths, and areas for improvement of the program from the students' perspective.

An example of a question follows: Discuss between 1 and 3 aspects that could improve your experience in the doctorate (it can be about the program in general, about a specific course or content, about the institution, the teachers, the materials, or even about yourself or any other aspect).

2.5. Fieldwork

The fieldwork was carried out during the first quarter of the year 2024. An important role in this stage was played by the faculty advisors. In each classroom, there is an advisor who is the teacher with the most communication and interaction with the students during the three years of study; this is the thesis director, and they teach the thesis seminar courses in all cycles. The empathy and trust between these teachers and their students were key in this fieldwork.

The design and implementation of the instrument followed a flexible approach to encourage open dialog and adaptability to participants' contexts. To ensure clarity and relevance, the interview questions were tested with a small group of doctoral students before full deployment, resulting in minor adjustments to improve effectiveness.

The data collected were transcribed and analyzed using thematic analysis, which identified recurring patterns and emerging themes that provided insights into program effectiveness and areas of development. This approach allowed for a nuanced understanding of student experiences, ensuring that their voices informed future improvements to the doctoral program.

2.6. Data Analysis

The data collected were processed using a thematic analysis, using the specialized ATLAS.ti version 8 for qualitative data management. This analysis made it possible to identify patterns, emerging categories, and relevant sub-themes in the participants' responses, ensuring a rigorous interpretation based on the evidence.

Considering that the main category of analysis in this study was doctoral training, the mass of data was examined from a phenomenological perspective to capture the essential aspects of student experiences in this context. According to the three criteria proposed by Giorgi (1997) for a descriptive phenomenological approach, the analysis was structured in three interrelated methodological stages:

- *Rigorous description of experiences.*

The analysis began with a detailed and faithful description of the experiences narrated by the students, exhaustively collecting their testimonies through interviews. In this stage, priority was given to the collection of rich and varied data that reflected the perceptions and emotions of the participants regarding the challenges and strengths of the doctoral program, always respecting their subjective perspectives.

- *Phenomenological reduction and emergence of categories.*

From the initial description, phenomenological reduction was applied, a stage in which previous judgments were suspended to analyze the data from a reflective position. This process made it possible to identify patterns and recurring themes in the reported experiences, distilling common and differentiating elements that reflected the most significant dimensions of doctoral training. As a result, categories emerged that grouped student perceptions around key aspects of the program.

- *Searching for invariant meanings and consolidation of macro-categories.*

Finally, the invariant meanings were sought, that is, those essential and universal elements that structure the doctoral training experience. This process made it possible to abstract the most representative and generalizable characteristics of the phenomenon studied, synthesizing them into global macro-categories that comprehensively captured the strengths and areas for improvement of the program. These macro-categories are the central axis of the findings presented in the results and reflect the deepest dynamics that affect the formative experience of doctoral students.

This approach allowed structuring the category of analysis in a way that articulated individual experiences with meaningful and generalizable patterns, ensuring that the findings reflected both the richness of experiences and their relevance in a broader context.

Coding

The coding process in this study followed an inductive approach based on thematic analysis, which made it possible to capture the essence of the doctoral students' experiences without imposing predefined categories, allowing a structured transition from individual testimonies to the identification of dynamizing nuclei that synthesized the doctoral experience.

Initially, the participants' testimonies were compiled based on the strengths and weaknesses of the program from the students' perspective and experience. The interviews were imported into the ATLAS.ti 8 program. From these accounts, a first phase of analysis was carried out, identifying discursive codes (the fragmentation of the testimony into units of meaning); then, these codes were grouped reflecting common dimensions in the student experiences, introducing initial categories, which maintained the distinction between strengths and weaknesses. Subsequently, through a process of abstraction and consolidation, these categories were grouped into macro-categories, still maintaining the differentiation between strengths and weaknesses, but structuring the information into key dimensions of the doctoral experience. The final step consisted of the integration of these macro-categories into dynamic cores, which articulated the most significant elements of the analysis without a dichotomous division between strengths and challenges. This synthesis made it possible to understand the interaction between the different factors that make up hybrid doctoral training, offering a more holistic and representative interpretation of the student experience (Figure 1).

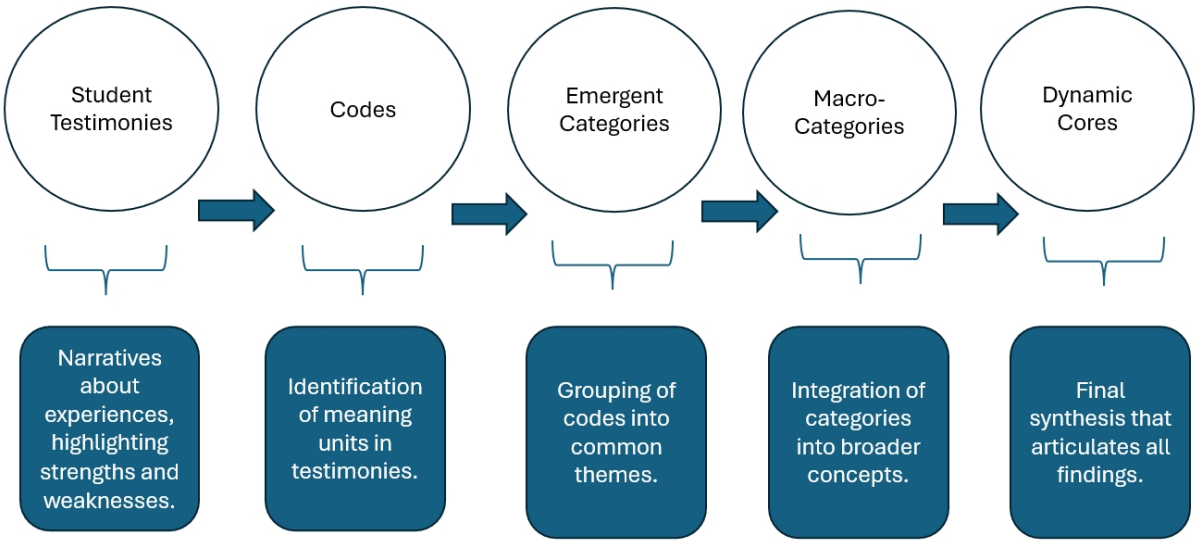


Figure 1. Coding process.

To guarantee the validity of the process, intercede meetings were held, where different researchers reviewed and verified the coherence in the assignment of categories. In addition, the use of ATLAS.ti 8 software facilitated the traceability of the analysis, ensuring methodological rigor and data fidelity.

3. Results

Analysis of the data collected identified several key strengths and challenges in the students' experience within the doctoral program. This section focuses on breaking down these findings, illuminating the areas that students perceived as essential contributors to the success of their training, as well as those that require priority attention to optimize the impact of the program. The challenges emerge as critical points for the design and management of the doctoral program, revealing the need for a thorough review of curricular, pedagogical, and institutional support aspects. These student perceptions, based on personal experiences and expectations, offer a unique perspective that complements and expands traditional evaluations of doctoral programs, underscoring the importance of integrating their voice into continuous improvement processes.

3.1. Challenges of the Doctoral Program

Student testimonials revealed several challenges that limit the potential of the doctoral program. These areas for improvement include critical aspects such as updating the curriculum about contemporary research needs, strengthening doctoral didactics, and providing adequate institutional and logistical support. Likewise, significant deficiencies were identified in research support, especially in the development of technological competencies, the use of artificial intelligence, and skills for scientific writing and publication. These points constitute strategic priorities for the optimization of the program and will be addressed below (see Table 2).

Table 2. Challenges of the doctoral program.

Codes	Emerging Categories	Macro-Categories
Include more courses in epistemology (RFC1) Include quantitative techniques such as factor analysis (RFC2) Focus courses on thesis development (RFC3) Reduce courses of little significance (RFC4) Incorporate scientific writing from the first cycles (RFC5) The relevance of the courses concerning the thesis (RFC6) The quality of the content of the courses (RFC7)	Relevance and focus of the courses (RFC)	Curricular Relevance and Teaching Quality (CRT)
Ensure that teachers have research and publication experience (TC1) Better select faculty to ensure their competence and preparation (TC2) Maintain the same thesis advisors throughout the program (TC3) Didactics and teaching methodology (TC4) The need for specialized and committed faculty (TC5) Consistency and rigor in classes (TC6)	Teaching competencies (TC)	

Table 2. *Cont.*

Codes	Emerging Categories	Macro-Categories
Implement interactive methodologies (ID1). Increase face-to-face sessions and classroom activities (ID2). Improve punctuality and attendance in classes (ID3) Encourage collaborative work among students (ID4) The organization of study groups and support networks (ID5) Participation in national and international academic events (ID6) The creation of learning communities (ID7)	Interaction and collaborative dynamics (ID)	Doctoral Didactics (DD)
Promote internships and exchange programs with foreign universities (PD1). Consolidate research teams to continue after graduation (PD2) Organize meetings and additional activities outside the regular schedule (PD3)	Professional development and collaboration (PD)	
Increase the quantity and quality of teaching materials (TMR1) Offer workshops on data processing and the use of databases (TMR2) Improve the supply of bibliographic resources and updated guides (TMR3) Clarity in evaluation criteria (TMR4)	Teaching materials and resources (TMR)	
Offer workshops on research tools (ATLAS.ti, SPSS) (AR1) Improve the use of technology and computer labs (AR2) Provide personalized advice and adequate resources for research (AR3). The use of bibliographic managers and artificial intelligence (AR4) The implementation of technology in the classroom (AR5) Improvement in administrative management (AR6)	Additional support and resources (AR)	Institutional and Logistical Support (ILS)
Improve classroom infrastructure (IL1) Streamline administrative processes and reduce bureaucracy (IL2) Make class schedules and homework distribution more flexible (IL3).	Infrastructure and logistics (IL)	
Improve access to scientific databases and bibliographic resources (AAR1) Provide adequate materials in all subjects and ensure their availability (AAR2) Facilitate the use of digital and technological tools in research (AAR3) Implement technology in the classroom (AAR4) Improve administrative management (AAR5)	Access and availability of resources (AAR)	
Provide personalized counseling and continuous support in the preparation of scientific articles (PS1) Increase the availability of professors outside regular classes to solve doubts (PS2) Improve feedback and follow-up on thesis work (PS3)	Personalized and continuous support (PS)	Personalized Learning Management (PLM)
Improve students' organization to balance time between work, family, and studies (OM1) Avoid the overload of tasks and establish the better coordination of activities and time (OM2) Promote greater discipline and organization in the study and development of the thesis (OM3)	Organization and time management (OM)	

Table 2. *Cont.*

Codes	Emerging Categories	Macro-Categories
Evaluate and recognize student progress fairly and equitably (SR1) Maintain high standards to ensure the quality of the doctoral program (ER2) Establish clear and consistent criteria in the evaluation of students' work and progress (ER3)	Recognition and evaluation (RE)	Personalized Learning Management (PLM)
Practical training in scientific writing and the publication of articles (WPS1) Accompaniment in the article writing process (WPS2) The integrated production of scientific articles in the curriculum (WPS3)	Writing and publication of scientific articles (WPS)	Research Support (RS)
Ethical and practical teaching for the use of AI tools in research (AI-R1) The integration of AI in research training (AI-R2)	Artificial intelligence in research (AI-R)	
Training in digital competencies for research (TCR1) The use of software to optimize the research process (TCR2)	Technological competences for research (TCR)	

Below, we share some of the testimonies associated with the emerging codes and categories identified in our analysis. Representative examples are selected to reflect the most common experiences and challenges reported by participants. Due to space limitations, we present only some of the most relevant testimonies, to illustrate in a concrete and meaningful way the evidence gathered around each topic discussed.

First, related to the category of the relevance and focus of the courses (RFC), some testimonies emphasize the following: E4: "That the tasks assigned (. . .) are oriented to nurture the thesis". E10: "I consider that in the first cycles, the coordination of tasks and activities could be improved, focusing, for example, on a specific topic, such as for the publication of articles. Carrying out related exercises would help doctoral students to focus more and would facilitate the revision and coordination of times for both reading and developing papers".

Regarding the category interaction and class dynamics (ID), E2 commented, "I would have liked to be in the classroom and interact in a personalized way with teachers and students, in addition to having sessions or study groups in the classroom and library, thus sharing points of view on articles, research by different authors". E69 states, "Encourage interaction not only with the teacher but especially with peers to develop strong networks of trust and learning".

The following regard additional support and resources (AR). E8: "1. Personalized advice on how to use APA. 2. Training on research tools provided by the institution. Workshops on the use of Atlas. ti version 8 and SPSS version 25". E112: "Support in the specialized theoretical framework and elaboration of scientific articles in small groups or personalized work".

Related to infrastructure and logistics (IL), E15 states that the classrooms are not adequate, indicating that "We should be able to have an adequate classroom to carry out the classes, the folders are very small and do not allow having a laptop and material to work with". E77 stated that it would be useful to adjust the schedules, mentioning that "They could change the schedule. . . Saturdays from 8 to 5 pm very extensive, they could move a course to Friday nights and finish Saturdays before 1 p.m.".

Also associated with professional development and collaboration (PD), E9 expressed the importance of promoting international collaborations: "Opportunities to share research at national and international conferences. Opportunity to take courses in universities abroad for one cycle". Meanwhile, E10 stated that there is a need for additional meetings: "I suggest holding meetings outside the regular schedule to exchange experiences, propose new projects and actions for social good". Meanwhile, E178 states the importance of "The mechanisms of academic and research collaboration among students, international exchanges or internships in other universities or research centers and exchanges of experiences between graduates and current students".

Regarding teaching materials and resources (TMR), the testimonies reflect a recurring concern about the quality and availability of these essential elements in the training process. For example, E19 highlights the importance of having more resources that allow for more effective and deeper learning: "Increase of didactic materials, time to process what we read, more expositions of our progress". This comment highlights the need to provide students with sufficient input to facilitate the understanding and application of acquired knowledge. On the other hand, E10 suggests expanding the offer of practical training, especially in the use of technological tools: "It would be beneficial to expand the offer of workshops on data processing, including exercises with tools such as SPSS, ATLAS.ti and use of databases". This input underscores the need to diversify and update the resources available, ensuring that doctoral students can develop technical skills fundamental to advanced research.

Regarding teaching competencies (TC), the testimonies show the importance of having a highly qualified academic body that guarantees the quality of the training process. E15 highlights this aspect by pointing out that, at a doctoral level, teachers need to have solid experience in research, publications, and effective classroom mastery: "At the doctoral level teachers should have experience in research, publications, and classroom mastery". This comment highlights the need for educators to not only transmit knowledge but also to provide a solid, up-to-date model of research practice.

In a complementary manner, E120 emphasizes the relevance of a rigorous selection process for the program's professors: "The selection of professors should be more rigorous, there were professors who did not prepare classes and were not specialists in the subjects". This observation underscores the need to ensure that teachers not only possess theoretical knowledge but are also prepared to provide practical and specific training, aligned with the standards required at the doctoral level.

Regarding personalized and continuous support (PS), the testimonies reflect the need for a closer and more specific accompaniment throughout the training process. E112 highlights the importance of having individualized support, especially in fundamental aspects such as the elaboration of scientific articles: "Support in the specialized theoretical framework and elaboration of scientific articles in small groups or personalized work". This comment underlines the relevance of a more targeted approach, where attention to the needs of each student facilitates the development of key competencies.

For their part, E125 highlights the lack of constant follow-up in the thesis writing process: "Feedback on thesis work should be improved. In a year and 3 months, I have not received much feedback on my progress in writing the book". This testimony highlights the importance of establishing a more effective and continuous feedback system that allows doctoral students to receive timely and constructive guidance to consistently advance their research.

Organization and time management (OM) emerges as a key concern among participants, reflecting both personal challenges and proposals for improvement in their academic lives. For some, such as E43, self-reflection is central: "I think that I should organize myself more to review classes…". Meanwhile, others, such as E85, identify the need to

adjust specific strategies: "Re-evaluate my time organization to do more reading about doctoral research". Managing academic loads is also noted as a recurring challenge. E180 expresses the importance of avoiding overload: "Avoid placing so many assignments in the same period for each subject, as many come together at times, and it feels loaded". On the other hand, E63 highlights the search for a balance between her work and academic responsibilities: "To organize my life schedule in a better way that allows me to balance my work hours with the preparation before my doctoral classes". These testimonies evidence how time management is perceived as a critical aspect of success and well-being in the context of advanced studies, inviting reflection on practices that promote more effective and realistic planning.

Regarding recognition and evaluation (RE), participants highlight the importance of guaranteeing a consistent level of demand and quality in the doctoral field, reflecting concerns about both equity and academic excellence. E55 suggests the need to maintain the same standards for all students, highlighting that "Encouraging a demanding pace as a doctorate demands" is fundamental to reaching the standards of this level of training. Similarly, E170 emphasizes that the prestige of the program is linked to academic rigor: "It is necessary to improve the quality of the contents, but, above all, of the academic demands for all. [...] I recommend that the level of demand be high so that we all feel proud of the PhD". This testimony reinforces the notion that high demand not only benefits individual students but also the recognition of the program. On the other hand, E125 emphasizes the need to improve feedback processes in doctoral dissertations: "Feedback on dissertation work should be improved. [...] So far, no thesis book is a clear referent". This comment underscores the importance of having quality guidelines and examples to guide and enrich the research process. Taken together, these testimonials suggest that strengthening evaluative and feedback practices, accompanied by high standards, can contribute significantly to the academic development of students and the prestige of the doctoral program.

Aligned with access to and the availability of resources (AAR), the participants highlight the need to strengthen the available academic resources. E186 suggests, "Improve scientific databases. Increase international teachers", while E79 emphasizes the importance of "Providing adequate materials in all subjects". For their part, E178 proposes, "Incorporate more training in digital tools and artificial intelligence to support research", underlining the relevance of integrating emerging technologies in the doctoral field.

In terms of the writing and publication of scientific articles (WPS), the participants highlight the need to strengthen the competencies for scientific production in the doctoral program. E51 proposes "to have a course in article writing, something more practical and that has as a final product the article itself". E114 stresses the importance of "accompaniment in the elaboration of the scientific article until becoming a doctor", while E125 suggests "improving the interaction between the doctoral courses aiming at the same objective: to contribute with theses and publications". These perspectives reflect the need for an integrated and practical approach to foster academic productivity.

A key emerging category is artificial intelligence in research (AI-R), with doctoral students highlighting the potential of artificial intelligence as a support in academia. E152 expresses interest in "learning how to handle artificial intelligence and easily search journals and bibliographies", while E177 suggests "including tools with artificial intelligence for research", in addition to "going deeper into qualitative analysis of results". These opinions reflect the growing demand to integrate advanced technologies to optimize research processes.

Finally, the need for technological competencies for research (TCR) is noted, and the doctoral students reinforce the practical learning of how to use key technological tools such

as Zotero, Mendeley, EndNote, RefWorks, SPSS (Statistical Package for the Social Sciences), R, Stata, SAS, ATLAS.ti, NVivo, MAXQDA, and Minitab, among others. In this regard, E89 suggests that "SPSS and ATLAS.ti courses should have been held in the laboratory of the Graduate School", emphasizing the importance of "directed and orderly step-by-step practices". For their part, E36 proposes including "teaching the use of bibliographic managers such as Mendeley and ecosystems such as Scopus-ScienceDirect-Mendeley", stressing the relevance of integrating digital resources in research training.

3.2. Strengths of the Doctoral Program

Despite the challenges mentioned above, the program has significant strengths that have a positive impact on doctoral training (see Table 3).

Table 3. Strengths of the doctoral program.

Codes	Emerging Categories	Macro-Categories
The quality of the research faculty and class schedule (QT1). Highly trained and empathetic teachers (QT2). The quality of teachers and positive experience (QT3).	Quality of teachers (QT)	Teaching Excellence and Personalized Mentoring (TEPM)
Timely support in the development of the thesis (PSA1). Support received from the advisor (PSA2). Follow-up, motivation, and good learning strategies (PSA3).	Personalized support from advisor (PSA)	
Good organization in terms of the planning and development of the doctorate (MO1) The thesis protocol is a research guide from the beginning of the doctorate (M2) Adequate order and planning (MO3) Epistemic mapping as a logical route of the research (MO4)	Methodological organization (MO)	Structured and Progressive Research Logic (SPRL)
Allowing the development of high-quality research skills (FR1) The development of scientific articles (FR2) A focus on research and epistemic mapping (FR3)	Focus on research (FR)	
Virtual modality allowing greater access (FXA1) Flexible schedules, a library implemented, and committed doctors (FXA2) The opportunity to take it virtually or face-to-face (hybrid) (FXA3)	Flexibility and accessibility (FXA)	Educational Infrastructure and Access Modes (EIAM)
A well-equipped virtual library (RSS1) Good service to doctoral students in terms of procedures and requests (RSS2) Well-organized and updated teaching material and texts on the platform (RSS3)	Resources and services (RSS)	
Expanding knowledge and experience (PFG1) Personal improvement and academic preparation (PFG2) Motivation to continue learning permanently (PFG3)	Personal and professional growth (PFG)	The Integral Development of the Doctoral Student (IDDS)
Sharing knowledge and experiences with peers (NC1) Networking (NC2) Classroom interaction between teachers and students (NC3)	Networking and collaboration (NC)	

The teaching excellence and personalized mentoring macro-category stands out for its focus on guaranteeing high-quality academic training through two key components: teacher quality, which ensures that teachers are highly trained and committed to learning, and personalized advisor accompaniment, which provides individualized and close support to

guide students in their academic and personal development, thus favoring a comprehensive and enriching educational experience.

Teaching quality highlights the strength of having highly trained and empathetic professors, who not only have a deep knowledge in their areas of expertise but are also committed to the personal and academic development of students. However, this quality is not uniform across all courses and cycles, it is also important to have more coordination between those responsible for research and methodology courses, and there is a need for the continuous evaluation of teaching performance to ensure that all professors maintain a high level of quality and empathy. This variability in teaching quality affects the educational experience of students.

There are "Skilled and empathetic teachers" and the "Teachers are highly trained professionals" (E2 and E9, respectively).

The macro-category structured and progressive research logic focuses on the implementation of a clear and continuous research process, composed of two fundamental elements: methodological organization, which establishes a coherent framework for the development of research, and the research approach, which prioritizes commitment and dedication to the production of knowledge, thus ensuring a logical and effective progression throughout the research process.

The accompaniment and advice during the development of the thesis is one of the greatest strengths of the PhD program, providing personalized support to students. This individualized attention allows doctoral students to advance more safely and effectively in their research projects. However, the quality of the support depends significantly on the assigned advisor.

The participants note "Accompaniment by the advisor throughout the program, even after completion. Development of scientific articles", "The Accompaniment Received from the Advisor", and "The Work of Personalized Accompaniment" (E7, E11, and E112, respectively).

The organization and methodology of the PhD facilitates the systematic and orderly progress of the students. The implementation of a thesis protocol from the beginning and the adequate planning of the semesters are aspects that contribute significantly and transversally to the development of the thesis. Despite these strengths, the adaptability of the methodology to the individual needs of the students must be fine-tuned, ensuring that the pedagogical tools and approaches are flexible enough to accommodate different learning styles and work rhythms.

The participants note "Good organization in terms of planning and development of the doctorate", "Order. New knowledge. Organization of content in thesis courses", and 'Very good organization' (E5, E135, and E189, respectively). "Epistemic mapping is an excellent route that guides us step by step" (E173).

The focus on the development of high-quality research skills and the production of scientific articles are fundamental aspects of graduating from the PhD program. However, the writing of a scientific article to obtain the degree should be improved, since more support is needed to generate greater opportunities for applied research and interdisciplinary collaboration, to enrich the research experience and broaden the practical impact of the research conducted by the doctoral students.

The participants state, "Final expositions of our thesis project that allows us to continuously improve our research", "The methodology of the research courses are A1", "Methodological sequence relevant to research", and "The methodology course in research is an example of how to systematize so much information" (E27, E48, E57, and E89, respectively).

The macro-category educational infrastructure and access modalities focuses on guaranteeing optimal conditions for learning through two key elements: flexibility and accessibility, which ensures that students can access and participate in the programs comfortably and adapt

to their needs, and resources and services, which provides the necessary tools and support for a quality educational experience, facilitating learning and academic development.

The flexibility and accessibility of the PhD, especially in its hybrid modality (virtual and face-to-face), are features that facilitate the participation of students from different locations and with different personal and professional commitments. They are aspects which mean that there is good technological infrastructure; however, pedagogical practices should be enriched to further enhance their effectiveness.

The participants state, "The methodology and strategies for virtual and hybrid learning are very good, it should be maintained", "Its virtual modality allows greater access to those of us who reside in provinces far from Lima and the quality of most of the teachers", "Access to important platforms such as Scopus and Web of Science, counseling, hybrid classes" (E12, E21, and E180, respectively).

The resources and services, such as the well-equipped virtual library, good administrative service, and good treatment, are fundamental for satisfaction in the program. These qualities must be maintained or improved, due to changing needs. It is critical to regularly assess student satisfaction with these services and continually look for ways to improve them, ensuring that the changing needs of the program community are always met.

The participants state, "Good service to doctoral students (paperwork, requests, etc.)", "(. . .) technological resources we have available", "The cost is adequate for the service", "Excellent program, good service in the library, quality teachers", "Research, share level colleagues and update knowledge", "Share learning experiences with peers/publication of scientific articles", and "Networking" (E5, E113, E116, and E164, respectively).

The macro-category of the integral development of the doctoral student focuses on the holistic growth of the student through two essential dimensions: personal and professional growth, which fosters the development of both academic and personal skills, and networking and collaboration, which promotes the construction of professional links and alliances, facilitating the exchange of knowledge and collaboration in research projects.

A PhD is seen as an opportunity for personal and professional growth, motivating students to expand their knowledge and skills. This dimension of integral development is crucial to forming complete and competitive professionals. However, attention must be paid to balancing academic demands with students' well-being, providing resources and support to manage stress, and maintaining a healthy balance between academic and personal life.

The participants state, "To grow professionally, to achieve a promotion in my job, it is a challenge on an intellectual level", "I acquire knowledge on which I can contribute in its growth and apply it", "It offers us the possibility to publish and develop ourselves professionally or academically", "To improve and move up in my professional aspect" (E53, E55, E76, and E93, respectively).

Networking and collaboration between students and faculty are valued aspects of the PhD. These interactions enrich the educational and professional experience of doctoral students. However, it is feasible to enhance them with networking events, collaborative workshops, and joint projects that promote greater interaction and cooperation among all members of the academic community.

The participants state, "Sharing knowledge, and experiences with my Peers", "Teamwork that allows sharing enriching experiences", "I find more ways to develop the community", "Researching, sharing level colleagues and updating knowledge", "Sharing learning experiences with peers/publication of scientific articles", and "Networking", (E8, E53, E55, E99, E105, and E154, respectively).

4. Discussion

As the final step of the coding process, the macro-categories associated with strengths and weaknesses were integrated into six dynamic cores. These cores transcended the initial classification of strengths and weaknesses, consolidating them into higher-order, essential categories that contribute to the field of hybrid doctoral education.

The identified weaknesses included the following:

- Curricular relevance and teaching quality (CRT).
- Doctoral didactics (DD).
- Institutional and logistical support (ILS).
- Personalized learning management (PLM).
- Research support (RS).

The identified strengths included the following:

- Teaching excellence and personalized mentoring (TEPM).
- Structured and progressive research logic (SPRL).
- Educational infrastructure and access modes (EIAM).
- The integral development of doctoral students (IDDS).

Through the process of synthesis, these elements were merged into six dynamic cores:

- Technological, Pedagogical, and Disciplinary Integration in the Doctorate.
- Doctoral Supervision.
- Specialized Support in Research and Scientific Publication.
- Development of Transversal Competencies.
- Organizational Infrastructure.
- Student Agency and Emotional Climate in the Doctoral Program.

These dynamic cores provide a comprehensive framework that encapsulates both the challenges and strengths of hybrid doctoral education, offering key insights for its improvement and innovation.

In the context of hybrid doctoral education, the students' experience cannot be fully understood without giving voice to their experiences and reflections. The underlying phenomenology of this study requires that the perceptions of doctoral students are at the center of the analysis, highlighting their challenges, achievements, and expectations. In this sense, the integration of representative testimonies allows us to illustrate in greater depth the interaction between the different elements of the doctoral program and the daily reality of the participants. Therefore, some illustrative quotations are presented as examples of the six dynamic cores, and then we move on to their theoretical discussion.

1. *Technological, Pedagogical, and Disciplinary Integration in the Doctorate*
    - E16, E90, E105, E107: "The methodology for hybrid learning is flexible and adapts to the needs of the doctoral student".
    - E22: "I suggest implementing more technology in classes to enhance the educational experience".
    - E67: "Teaching the ethical use and management of artificial intelligence tools for scientific research".
    - E184: "Implement statistical programs and other technological tools related to the thesis".
    - E82: "Include artificial intelligence tools for research".
    - E90: "Include an introduction to pedagogy and didactics (main currents, positions) for those of us who are not trained, teachers".
    - E100: "It would be very motivating to create workshops to present pedagogical experiences".

- E184: "More training in digital tools and artificial intelligence could be incorporated to support research".
- E278: "Have practiced in software management with the advice".

2. *Doctoral Supervision*
   - E101: "The permanent accompaniment of the thesis advisor throughout the program was key".
   - E209: "I need better advice in the design of the scientific manuscript".
   - E157, E159, 133, 151: "Personalized advising is crucial".
3. *Specialized Support in Research and Scientific Publication*
   - E94, E135: "I would like support for the development of scientific articles. . . in indexed journals".
   - E138: "The aspect of personal advice could be broader. . . provide support to those who do not handle many digital tools and also for the writing and publication of the scientific article".
   - E182: "To give more follow-up to the development of the article. . . to take a specific course with someone expert. . .".
4. *Development of Transversal Competencies*
   - E103: "It would be ideal to learn tools to improve the mechanisms of academic and research collaboration among students".
   - E112: "The PhD expands my level of critical thinking, motivates me to do research, improves my professional level. . .".
   - E124: "The PhD develops my creativity and persistence. . .".
5. *Organizational Infrastructure*
   - E49: "Excellent teachers, good infrastructure, focus on epistemics".
   - E45: "I would like to have sessions or study groups in the classroom and library, thus sharing views on papers and research of different authors".
   - E103: "The University has a good platform and applications for the hybrid learning process".
6. *Student Agency and Emotional Climate in the Doctoral Program*
   - E65: "I consider positive aspects of the PhD to be specialization, motivation, and responsibility. . .".
   - E80: "The PhD gives you a voice. . .".
   - E139: "I consider that I can improve my active participation in all courses".
   - E140: "I have the responsibility to make the dissertation have scientific novelty".
   - E148: "The demands of the professors invite us to have more challenges. . . but at the same time their human quality makes the person feel fulfilled. . .".
   - E165: "The doctorate is an experience that motivates me to continue learning".

4.1. Technological, Pedagogical, and Disciplinary Integration in the Doctorate

For this core, the TPACK framework is considered, which in the context of teaching refers to the mastery of technological, pedagogical, and disciplinary competencies in an integrated manner in the training process (Alemán-Saravia et al., 2023; Alemán-Saravia & Deroncele-Acosta, 2021). Regarding the pedagogical aspect, an illustrative study highlights the need for a pedagogical discourse structured in four pedagogical principles for doctoral programs:

> (1) an emphasis on collaborative peer learning, Higher Education Research & Development reflected in task design, (2) formative, rather than informative coursework, i.e., an emphasis on taking knowledge apart and seeing how it is

> produced, rather than on accumulating existing knowledge, (3) creating opportunities for reflection at various levels (individual projects, knowledge-making conventions, the process and the institutional conditions for doctoral research) and (4) course design flexibility (involving students in decision-making as regards course structure and content and drawing their attention to their active role in research training).
>
> (Blaj-Ward, 2011, pp. 701–702)

In the disciplinary aspect, studies argue that teachers should integrate their academic teacher training with specific disciplinary research. (Bleiklie & Høtaker, 2004; Crowder & Monfared, 2020), achieving a strong disciplinary identity. In this sense, one study confirms that "the disciplinary culture of a given field is a powerful factor to be taken into account" (Heen, 2002, p. 77).

Regarding the technological aspect, it is also argued that the technological skills of doctoral professors are important for several reasons, which impact both their teaching effectiveness and the learning outcomes of their students. First, they have been found to have a direct impact on teaching effectiveness, as professors with strong technological skills can better communicate complex topics, such as statistics, through various online platforms and tools, which makes the material more accessible and reduces student anxiety; such professors can diversify teaching strategies and achieve better feedback and interaction (Song & Slate, 2006).

These technological competencies also contribute to innovation and research, vital for conducting advanced research, as these teachers with strong technological skills can leverage digital tools for data analysis, simulations, and other research activities, leading to more innovative and impactful research results (Hock, 2009). At the same time, this allows for collaboration and knowledge sharing as technology has proven to enable better collaboration between researchers, academia, and industry, fostering a more dynamic and innovative research environment (Vemuri & Narasimharao, 2013; Watson et al., 2010).

While technology is essential, it is important to maintain a balance between technological dependence and the development of fundamental research skills. Over-reliance on technology can sometimes hinder the development of critical thinking and problem-solving skills (Hock, 2009). At the same time, it is essential to consider continuous learning; the rapid pace of technological advancement requires teachers to engage in lifelong learning to keep up to date with the latest tools and methodologies, ensuring that they can provide the most relevant and effective education to their students (Watson et al., 2010).

4.2. Doctoral Supervision

A key aspect of doctoral training is the role of mentors, supervisors, or advisors in the doctoral program (Hollingsworth & Fassinger, 2002). Supervision is one of the fundamental pillars of success in doctoral programs. Indeed, effective supervision not only supports the technical and methodological development of the doctoral student but also fosters an environment in which the student can explore their academic identity and develop confidence in their work. This support is essential to overcome the difficulties inherent in the research process. In addition, it is necessary to adopt an approach that allows providing emotional and academic support to students, especially those who face certain limitations, such as being native speakers of other languages (San Miguel & Nelson, 2007).

Returning to power dynamics in supervisory work, given the relevance of the supervisor's role to the emotions experienced by doctoral students, it is precisely such dynamics that can limit student agency (Zeegers & Barron, 2012). In many cases, traditional supervision models, based on the teacher–learner approach, perpetuate these hierarchical dynamics, which can hinder the development of student academic independence (Roos

et al., 2021). It requires reflective and intentional pedagogy that transforms supervision into a dialogic process, in which the supervisor and the student actively participate in the joint construction of knowledge. This equitable collaboration values the student as a scholar-in-training, capable of making decisions and contributing meaningfully to their research (Zeegers & Barron, 2012). To conclude, it is essential to implement strategies such as continuous formative feedback, co-authorship in scientific publications, and the joint design of research projects, which strengthens both the autonomy of the doctoral student and their integration into the academic community.

On the other hand, it is necessary to identify and address problems that may arise in the supervisor–student relationship. Indeed, problems of supervisor abandonment and inadequate supervision are common challenges that affect students' confidence and academic development. These supervisory problems, such as lack of feedback or poor communication, can leave students feeling abandoned or unmotivated. Such situations create a power imbalance, in which the student may feel vulnerable and without sufficient support to advance in their research, increasing the risk of attrition (Roos et al., 2021). Thus, the student–supervisor relationship is a determining factor for success or failure in doctoral programs. A good collaborative relationship with the supervisor improves student satisfaction and promotes progress in research. It has been shown that students who meet with their supervisors frequently and receive regular feedback tend to progress faster and have a more positive doctoral experience(Katz, 2016).

On the other hand, the publication process during doctoral studies, increasingly common in certain disciplines such as education, makes the supervisory relationship more complex. In this regard, supervisors need to be prepared to devote additional time and resources to students who seek, or require, publication during their doctoral studies. This approach requires supervisors to be intensely involved in the process and to be able to guide students not only in the technical aspects but also in publication and time management strategies (Mason, 2018).

To conclude this section, it is necessary to identify the ethical and cultural challenges that supervisors face, especially when students conduct field research in developing countries. These contexts often present additional challenges due to cultural, political, and economic differences, which can affect the development of fieldwork, either because of limitations in access to certain study samples or the application of data collection techniques. In these cases, the supervisor's responsibility is not only limited to guiding the student in the methodological aspects of the research but also to ensuring that international and local ethical protocols are respected. This includes handling sensitive issues such as informed consent, data confidentiality, and respect for local regulations, which are critical to avoid conflicts and to protect both the research realities and the academic integrity of the student, as well as the academic reputation of the university (Hutchings & Michailova, 2022).

4.3. Specialized Support in Research and Scientific Publication

One of the strengths emphasized by the participants was the structured and progressive logic of research as a contribution to effective doctoral didactics. In this sense, the present program recognizes the contributions of a route based on the epistemic competence of the researcher that offers a didactic–methodological sequence both for the research process itself and for the writing of the scientific text. (Deroncele-Acosta, 2022; Deroncele-Acosta et al., 2021).

4.3.1. Writing and Publishing Articles

Publishing during a PhD offers competitive advantages and fosters professional development, but it also involves challenges such as pressure and time management,

especially due to the demands of the peer review process. To balance these demands, supervision should include strategies for emotional and logistical support and constant feedback, helping students balance academic writing with their dissertation deadlines (Maher et al., 2014). On the other hand, in the context of doctoral studies, the increased pressure to publish, especially in environments of aggressive competition, can negatively affect the quality of supervision and support that students receive, which undoubtedly affects the emotional well-being of doctoral students (Lee & Bongaardt, 2021). This calls for reflection on the balance between academic demands and student stress, especially in hybrid contexts.

The self-efficacy and sense of belonging of doctoral students in academic writing are aspects that can define the results of scientific publications, so it is increasingly important to examine the experiences of students in the process of becoming academic writers (Naidoo et al., 2023). At the same time, the literature emphasizes that doctoral students need guidance from academic supervisors for academic publication (Tian & Guo, 2023). Thus, in a PhD, as one study postulates, understanding students' perceptions of their research self-efficacy and the mentoring process is of great importance given the relationship between the mentoring process and students' academic performance and personal well-being (Amador-Campos et al., 2023).

From the above, it is possible to affirm that doctoral programs that integrate publication as part of thesis development require an adapted pedagogical approach, in which supervision focuses on how to integrate multiple publications into a coherent thesis. This process not only improves the quality of the student's work but also strengthens their academic and professional development. In this way, the role of the supervisor becomes especially relevant to ensure an adequate structure and cohesion of the thesis in line with the publications made by the student (Mason, 2018).

Academic publication raises ethical dilemmas, especially in the attribution of authorship when co-writing with supervisors. Tensions arise when deciding authorship roles, as the hierarchical power of the supervisor may influence the recognition of the student's work. This can negatively affect the student's motivation, agency, and academic identity (Kumar & Johnson, 2017).

In general, scientific publication is a fundamental component of doctoral training and offers numerous benefits for the academic and professional development of students, such as the following.

Career advancement and employability

Career progression: Publication is often a requirement for advancement in an academic career. It serves as the main criterion for evaluating an academic's contributions and potential (Hao & Espino, 2024).

Employment prospects: the PhD-by-publication model, which encourages students to publish throughout their candidacy, enhances their employment prospects by building a strong publication record (O'Keeffe, 2022).

Skills development and academic socialization

Writing skills: participating in publishing projects helps PhD students develop essential writing skills, which are crucial for their future academic careers (Jalongo, 2024; O'Keeffe, 2022).

Academic socialization: through the publication process, students are socialized in the norms and practices of academic writing and communication, preparing them to be productive scholars (Aitchison et al., 2010; Jalongo, 2024).

Knowledge dissemination and academic dialog

Transmission of knowledge: scientific publications allow for the dissemination of new research findings and ideas within the scientific community, contributing to the collective knowledge base (Hao & Espino, 2024).

Academic dialog: publication allows doctoral students to join the ongoing dialog in their field, establishing their presence and contributing to academic discussions (Kirkpatrick, 2019).

Mentoring and collaboration

Co-authoring: co-authoring articles with supervisors and peers is an important pedagogical practice that enhances students' publication output and provides valuable mentoring (Kamler, 2008; Pinheiro et al., 2014).

Collaborative research: collaboration across disciplines is emphasized, and STEM students are particularly focused on collaborative research to enhance their publication success (Hao & Espino, 2024).

Overcoming barriers and challenges

Support structures: effective support strategies and structures, such as tutorials, writing groups, and publishing pedagogies, are essential to help students meet the challenges of academic publishing (Aitchison et al., 2010; Kirkpatrick, 2019; Van Der Merwe, 2015).

Ethical considerations: PhD students must also face ethical dilemmas and avoid predatory journals, which makes mentoring and strategic guidance crucial (Hao & Espino, 2024).

Programmatic implementation

Curricular integration: increasingly, doctoral programs are integrating publication requirements into their curricula, sometimes as an alternative to traditional dissertations, to ensure that students gain experience in publishing (Aitchison et al., 2010; Jalongo, 2024).

Pedagogical innovations: innovative pedagogies, such as co-publishing special issues of journals and incorporating publishing practices within programs, help students become prolific publishers (Aitchison et al., 2010; Van Der Merwe, 2015).

4.3.2. Importance of Artificial Intelligence in Scientific Research

One of the outstanding aspects of this study on research support is related to AI as a support for scientific research. Artificial intelligence (AI) has certainly become a crucial tool in scientific research, as it offers numerous benefits that improve the efficiency, accuracy, and scope of research activities. Below are some key points that highlight the importance of AI in scientific research.

First, it has the potential to improve the efficiency and accuracy of research through data analytics and pattern recognition, as artificial intelligence technologies, such as machine learning algorithms and neural networks, significantly improve the ability to analyze large data sets quickly and accurately. This capability enables researchers to uncover hidden patterns, identify new biomarkers, and accelerate the discovery of new drugs and therapies (Badrus et al., 2024) and also has a significant impact on the automation of repetitive tasks; AI can automate labor-intensive tasks, such as data collection, data analysis and predictive modeling, which traditionally require significant manual effort. This automation not only speeds up the research process but also reduces the likelihood of human error (Badrus et al., 2024; Efebeh et al., 2024).

Second, it has a role in transforming research paradigms by fostering interdisciplinary applications. The impact of AI extends to various scientific disciplines, including medicine, engineering, social sciences, and humanities. This interdisciplinary presence fosters collaborative innovation and helps address complex contemporary challenges (Carchiolo & Malgeri, 2024). New research methodologies are also being born; AI is changing research

paradigms by enabling virtual "in silico" experiments, which reduce reliance on costly and time-consuming laboratory experiments. This shift supports a more agile, data-driven approach to scientific research (Badrus et al., 2024).

Finally, the role of AI in fostering creative and critical thinking is highlighted, as AI systems can generate hypotheses and test them through statistical induction, which supports creative processes in science. This capability enables scientists to explore new avenues of research and gain exceptional insights (Hemmer, 2024). At the same time, AI facilitates better collaboration among researchers by providing tools that improve communication and data sharing. This collaborative environment is essential for the advancement of scientific knowledge and innovation (Efebeh et al., 2024).

However, despite the vast possibilities, there are important ethical considerations and challenges to be considered such as research integrity, for while AI offers significant advantages, it also presents challenges such as data falsification and text plagiarism. To ensure the ethical use of AI in research, there is a need to develop and implement comprehensive guidelines and mandatory ethics training for researchers and ensure responsible use to maximize the potential of AI in advancing scientific discovery (Chen et al., 2024; González-Esteban y Patrici Calvo, 2022).

4.4. Development of Transversal Competencies

In addition to thesis development and publication support, a PhD should also prepare students for a successful academic or professional career. Thus, doctoral programs should go beyond the mere production of knowledge and focus on the development of transversal competencies, such as the ability to work in interdisciplinary teams and the management of complex projects, as well as the strengthening of basic skills such as communication competence. This comprehensive approach is essential for doctoral students to meet the challenges of the contemporary academic world and other professional spheres (Boud & Tennant, 2006). The combination of face-to-face and online environments requires students to develop transversal competencies to manage their learning autonomously, collaborate in interdisciplinary teams at a distance, and adapt to different academic and professional work dynamics. The hybrid modality also enhances skills such as effective communication in digital environments, time management, and the use of advanced technologies for research, essential elements for success in flexible and globalized training contexts. Integrating these competencies into hybrid programs strengthens the preparation of doctoral students to face the challenges of both academia and the professional sector.

It is necessary to consider that doctoral research is a project, i.e., with a defined beginning and end and with clear objectives, such as contributing to the field of study. However, some studies show that most doctoral students lack the project management skills necessary to complete their dissertations efficiently (Katz, 2016). Another problem in terms of transversal competencies refers to difficulties in technical aspects of writing, such as grammar, syntax, and the appropriate choice of vocabulary. In turn, the lack of coherence in the central argument of the dissertation is a major challenge. According to various studies, many doctoral students often face difficulties in logically constructing and articulating their dissertation throughout the text, which negatively impacts the development of their research. Among the factors that influence such limitations are their lack of previous experience in writing this type of work, as well as insufficient support from academic authorities in strengthening these capacities (Rafi & Moghees, 2023).

Finally, it is important to highlight the importance of professional networks and social support in the development of the professional identity of doctoral students, which can undoubtedly contribute to the improvement of their transversal competencies. The

networks that students build during their doctoral studies, both inside and outside their institution, are vital to their long-term success. (Pifer & Baker, 2016).

Likewise, the emotional and motivational support among peers strengthens the identity and agency of doctoral students, creating a space for academic collaboration where they exchange ideas, solve research problems, and provide mutual feedback (Byers et al., 2014; McAlpine & Amundsen, 2009).

4.5. Organizational Infrastructure

The availability of up-to-date technologies and sufficiently equipped laboratories is essential for the development of high-quality research. In doctoral programs, access to these technological tools not only allows for more advanced research but also fosters efficiency in data management and collaboration among students. In this sense, the lack of adequate infrastructure can limit the ability of students to apply advanced research methods and to participate in collaborative projects that require specific technologies, such as specialized computer laboratories or access to software for data analysis (Acharya et al., 2024). Therefore, to maximize the potential of doctoral students, programs must ensure that technological resources are available and constantly updated (Kumar & Johnson, 2017).

Regarding the above, it has been shown that resource constraints (such as lack of access to equipment or funding) can generate high levels of stress among doctoral students. This situation can affect their ability to conduct quality research and meet deadlines, which in turn affects their academic progress and psychological well-being by increasing their levels of anxiety and depression (Barry et al., 2018). Regarding resource constraints, a related aspect is the increase in the number of doctoral degrees offered in recent decades, which may affect the number of resources and sources of funding available to these students. (Lee & Bongaardt, 2021).

Finally, other challenges of doctoral programs related to infrastructure and resources include financial inadequacy and excessive bureaucracy. Financial insufficiency, which often manifests itself in the lack of or limited access to scholarships or the need to seek external funding, imposes an additional burden on students, who must balance their academic responsibilities with the search for resources. In turn, excessive bureaucracy, with lengthy and inflexible administrative procedures, further hinders the research process, causing frustration and stress. These structural obstacles not only complicate academic progress but also jeopardize the continuity of doctoral studies, as many students are unable to overcome the barriers presented by these inefficient systems (Roos et al., 2021).

4.6. Student Agency and Emotional Climate in the Doctoral Program

This is a revealing aspect resulting from the synthesis of all strengths and weaknesses, student agency, and the importance of the classroom climate in students' emotions. Further examination revealed indirect codes, which we call "hidden codes". Thus, testimonies such as the following are indirectly related to it.

E28: "It is very important and necessary that we receive sufficient support for the execution of the publication required of us for the program".

E82: "I feel happy to study for the doctorate in education, but I feel that I still do not get the 'rhythm' of a doctoral student, I feel stressed, maybe the university could provide us with a faculty advisor or something similar".

The "agency" of doctoral students refers to their ability to act autonomously and proactively in their academic training, from making decisions that influence their experience and development as researchers. Therefore, at this level, it is not only a matter of following the guidelines of their supervisors or adapting to circumstances but of being active actors who construct their doctoral research process. In this regard, some studies explore how

doctoral students construct their identities as academics and highlight the crucial role that agency plays in this process (McAlpine & Amundsen, 2009).

The agency or action competence of doctoral students is a crucial aspect of doctoral training. Several studies highlight the importance of agency in various dimensions of doctoral experience.

Career advancement: Departments that encourage and legitimize multiple career paths, provide structured opportunities for skill practice, offer resources, facilitate networking, and provide mentoring significantly enhance graduate students' capacity for action. This action competence is vital to students' motivation, completion, and employability (O'Meara et al., 2014).

Knowledge creation agency: Doctoral students' agency in knowledge creation is classified into personal, distributed, and object-related agency. Personal agency involves self-reflection on academic competence, distributed agency includes sharing knowledge and receiving social support, and object-related agency integrates students' efforts with their research community (Hakkarainen et al., 2014).

Social and collective engagement: Doctoral students' capacity for action is manifested in their proactive engagement with development opportunities, their responsiveness to research problems, and their responsiveness to unsupportive institutional cultures. This capacity for action is influenced by personal, relational, institutional, and overall higher education conditions (Sun & Cheng, 2022).

Career decision-making: Autonomy plays an important role in how doctoral students approach career indecision. Students who demonstrate greater autonomy are more focused on exploration and development, while those with lower autonomy feel less control and clarity about their career choices (Griffin et al., 2023).

Cross-sectoral engagement: Doctoral students in the fields of science, technology, engineering, and mathematics who participate in cross-sectoral activities align their values and goals with broader conditions, creating opportunities beyond traditional academic paths. This boundary-transcending role underscores the importance of the initiative to pursue individual values and goals (Mars & Moravec, 2022).

PhD completion and success: the active role of PhD candidates in building their academic careers through professional action, such as proactive networking and seeking feedback, is crucial to their success and academic completion (Goller & Harteis, 2014).

However, this process is often influenced by the emotions, both positive and negative, that they experience during their academic career. In turn, the ability to adequately deal with these emotions is related to the ability to cope with obstacles and constraints that may arise during their academic career, as well as institutional expectations, and the power dynamics in supervision and challenges they face in the need to publish their research.

Among the positive emotions that can be identified are satisfaction, pride, and enthusiasm, which are usually associated with a sense of achievement and autonomy. Thus, when students feel that they have control over their research, that they are making progress towards their goals, and that their work is valued by their academic community, they experience an increase in their agency. Thus, in moments when students feel that they are making a significant contribution to their discipline or that they are being recognized by their supervisor or colleagues, they can generate a strong sense of belonging and self-confidence.

Likewise, positive emotions are closely linked to experiences of an agency, in which students not only receive instructions but can act independently and model their research process. Considering the amount of time and effort that doctoral studies often demand, these moments of pleasure are essential to maintaining motivation throughout the process (McAlpine & Amundsen, 2009).

On the other hand, negative emotions, such as frustration, anxiety, and uncertainty, are frequent during the process of doctoral studies and can arise from feelings of isolation, a lack of clarity in expectations, or pressure to meet deadlines and institutional norms. Such emotions can limit students' agency and affect their ability to make autonomous decisions and their motivation to continue their research. It should be noted that the anxiety and stress that students may experience in the face of unclear standards or even limited job prospects, as a result of their insecurities, can lead to academic dropout (McAlpine & Amundsen, 2009). Precisely, a study shows that the high levels of anxiety, depression, and stress that doctoral students tend to suffer are associated with difficulties in the perceived progress of their studies. Such a situation can affect completion time and overall success in the doctoral program (Barry et al., 2018).

Other feelings experienced by students in doctoral programs range from guilt and fear to confidence and pride as they move through their programs (Barry et al., 2018). Indeed, doctoral students often experience an emotional roller coaster, with ups and downs throughout their research (Katz, 2016). Many students feel guilty for not dedicating enough time to their research or meeting expectations, especially when struggling to balance academic and personal responsibilities. At the same time, fear arises from academic insecurity and uncertainty about completing the program or publishing in high-impact journals, leading to a fear of failure.

They also fear that they will not have access to the expected professional opportunities after graduation or that their research will not have the expected impact. This fear can lead to academic paralysis, whereby students avoid moving forward for fear of not meeting academic quality standards or failing. Conversely, as students advance in their research, publish papers, or receive positive feedback from their supervisors and colleagues, they may experience an increase in confidence. In turn, pride usually appears at key moments, such as when they achieve the successful publication of an article, the approval of a thesis chapter, or the defense of their work at a conference in which they manage to participate. This emotional balance is essential to overcome the crises that may arise during doctoral studies (Byers et al., 2014).

Similarly, there are cases in which students are subjected to work overloads that they perceive as unrelated to their thesis or are asked to perform tasks that do not benefit them academically. At this point, the inequality of power between supervisors and PhD students plays a key role in these "exploitative" situations. In many cases, supervisors may delegate to students tasks that are not necessary for their training, taking advantage of the students' hierarchical relationship and academic dependence, which negatively impacts their psychological well-being (Roos et al., 2021).

Finally, it is possible to refer to challenging demands as those that, although they require significant effort, have a positive impact on students' motivation and internal resources, since they help them to grow academically and learn. Such is the case of the effort involved in publishing articles, learning new methodologies, or tackling complex research, especially if they lack the prior knowledge to carry them out. On the other hand, obstacle demands are those that negatively affect motivation and exhaust students' internal resources. These include ambiguity in program expectations, an excessive workload, and a lack of adequate resources, which can lead to stress and demotivation (Acharya et al., 2024). It is important for institutions offering doctoral programs to focus their efforts on addressing the issue of mental health in doctoral students so that they offer them not only academic support but also emotional support to promote their psychological well-being (Lee & Bongaardt, 2021).

In summary, the "agency" of doctoral students in terms of their ability to act autonomously and proactively in their academic training is a crucial aspect of their success.

In this context, the importance of experiential learning and the encouragement of research readiness, as a lifelong learning process, are fundamental to helping candidates develop research competencies (Solmon, 2009). In addition, understanding motivation and training needs—including the complexity of content, increasing interactions between doctoral peers, the use of new technologies, and communicating the value of the PhD—are key factors in improving doctoral training (O'Connor, 2023).

In this regard, the research training environment (RTE) has been identified as a crucial factor in enhancing the research intentions of doctoral students (Chumwichan et al., 2023). Also, recent research results have indicated that students' research self-efficacy is positively correlated with their research productivity (H. Woo et al., 2023); hence, there is a need to create a learning environment that ensures safe emotional and academic development.

It is vital to continue to raise awareness that the emotional connections students foster in their classrooms affect their success because there is an essential link between the emotional climate in the classroom and academic performance (Reyes et al., 2012). It has been proven that this emotional climate is related to students' behavior (Brackett et al., 2009) and is also related to social self-efficacy and psychological health (Hong et al., 2021) and impacts teacher–student interpersonal relationships (McLure et al., 2022).

The power of the emotional climate in the classroom transcends the limits of academic performance and stands as a fundamental pillar for the integral development of doctoral students. The emotional connections forged in this educational space influence behavior and academic success and profoundly impact social self-efficacy, psychological health, and the quality of interpersonal relationships. Recognizing and nurturing this bond is essential, as an emotionally positive environment fosters learning and enhances the personal and professional growth of future doctors. Therefore, building a healthy emotional climate is a key investment in developing resilient and socially engaged academic leaders.

4.7. Hybrid Doctoral Education: Towards a Comprehensive Model

In Latin America, a relevant study analyzes changes in postgraduate policies, focusing on doctoral training and insertion in the context of the transition to post-pandemic higher education. The paper highlights how the continuity of education in remote, face-to-face, or hybrid modalities generated diverse positions and responses among the actors in the system. This transformation also prompted new regulations in university life and opened debate on the redefinition of academic space, teaching, and learning in hybrid environments. This was especially relevant for students with geographical limitations, time restrictions, health problems, or specific needs. Among the main challenges was the need to reconfigure tutorials, peer interaction, and doctoral defenses, adapting them to hybrid or fully virtual formats (Rovelli & Fare, 2021).

Another study in Latin America stresses the need to increase the supply of PhDs in the region, given the low proportion of PhDs in comparison with developed countries. It highlights the importance of strengthening research and academic production to raise educational and scientific quality. The hybrid modality is proposed as a viable alternative to broaden access to doctoral training without requiring total mobility abroad, allowing for a combination of on-site and virtual studies. In addition, the importance of adequate technological infrastructure and the creation of strategic alliances with international universities to consolidate these programs is emphasized (Tokuhama-Espinosa, 2011).

A document from the Latin American Faculty of Social Sciences (FLACSO) describes the implementation of the hybrid modality in the doctoral programs of FLACSO Ecuador, highlighting strategies to promote the participation of national and international students (FLACSO Ecuador, 2021). This would make it possible to optimize teaching and learning processes in blended environments.

The development of hybrid doctoral programs has been the subject of growing interest in higher education globally. Several studies have analyzed their impact on different disciplines, highlighting their capacity to broaden access to advanced training without compromising academic quality. Among the main contributions of this modality are flexibility in learning, the integration of teaching technologies, the optimization of doctoral supervision, and the strengthening of interaction between students and teachers. Research that has explored these dimensions in international contexts is presented below, providing evidence of the benefits and challenges of hybrid doctoral education.

An interesting study analyzes blended learning in doctoral programs in nursing, highlighting its acceptance in the medical field and its expansion thanks to the advancement of communication technologies and Internet access. Through a descriptive phenomenological approach, the experiences of doctoral students in this modality are explored and three main themes are identified, "failure", "synergy", and "specific interaction", each with sub-themes that illustrate the challenges and perceived benefits. The findings highlight the complexity of this modality, showing both difficulties and opportunities in doctoral training in hybrid settings, which is consistent with the results found in the conducted study (Emami Sigaroudi et al., 2016).

Another study examined the evolution of the doctoral program in Health-Related Sciences at Virginia Commonwealth University, designed to offer flexible training to practicing professionals through a hybrid model. Through alumni evaluations in 2006 and 2008, six key areas were identified, including goal attainment, skill development, quality of mentoring, and use of technology. The findings led to improvements in the curriculum, the greater integration of distance learning, teacher training in multimedia technologies, and strengthened interaction between students and teachers, highlighting the importance of technological support and collaboration in hybrid environments (Goldberg et al., 2011).

Another study explored the experience of doctoral students in social work with online and hybrid courses, analyzing their preparation for teaching in these formats. Through interviews and surveys with 14 students, benefits such as flexibility and the accessibility of the material were identified, but there were also limitations in interaction with teachers and peers. The findings underline the need for innovative pedagogical strategies and more complete training in technology and digital didactics for future educators, recommending specific training for the adaptation of content and methodologies to hybrid and online environments (B. Woo et al., 2021).

It has also been confirmed that hybrid programs are an effective alternative to face-to-face training, achieving relevant academic results. A study confirmed that hybrid modality offers flexibility without compromising performance in certifications and internships, which supports its use in doctoral education. Further research on its impact on affective development and student experience is recommended to optimize its implementation (Mu et al., 2014).

Another study analyzes the perceptions of students and graduates of hybrid doctoral courses, focusing on course design, teaching and learning activities, the use of virtual educational platforms, and interaction and evaluation techniques. The findings reveal a moderately high correlation between perceived interaction and overall student satisfaction, which underlines the importance of pedagogical strategies that foster active participation and connection between students and teachers to optimize the learning experience in this modality (Rodríguez Villanueva, 2021). Meanwhile, another author offers perspectives on hybrid learning in higher education, discussing how this modality can enhance the learning experience in graduate programs, including doctoral programs (Vaughan, 2007).

Other authors also analyze the experiences of doctoral supervisors in hybrid and distance programs, highlighting the need for strategic approaches for effective supervision.

The findings suggest that the hybrid modality requires a more structured accompaniment to strengthen research training. The importance of developing research capabilities in virtual environments is emphasized, highlighting the key role of supervision in the quality of these programs (Roumell & Bolliger, 2017).

Meanwhile, one study contributes to the scientific field of hybrid doctoral programs by demonstrating how flexibility in curricular design can broaden access to doctoral education without compromising its academic rigor. It highlights the importance of adapting doctoral training to diverse geographic and demographic realities, encouraging the inclusion of non-traditional students. It also emphasizes the need for innovative strategies in doctoral teaching and supervision, offering a replicable model that balances the advantages of face-to-face and distance education in high-level programs (Nordyke et al., 2011).

Other research contributes to the development of hybrid doctoral programs by highlighting how the combination of face-to-face teaching and online activities broadens access to higher education. It emphasizes that reducing the need for face-to-face attendance allows more people, in different locations, to access advanced training. It also emphasizes the potential of active learning in virtual environments, underscoring the importance of careful planning to balance both modalities and optimize the educational experience (Pablo, 2012).

Finally, one study examined how the combination of online and face-to-face teaching can optimize the educational experience and learning outcomes. Through the analysis of a graduate program in computer science, a high level of acceptance of the hybrid modality was identified among students, who valued its flexibility and effectiveness. The findings reinforced the importance of structured planning to maximize the advantages of hybrid learning, promoting analytical, technical, and teamwork skills within a dynamic and interactive environment (Uskov, 2023).

While previous studies have made relevant contributions to specific aspects of hybrid doctoral education, such as technological integration, academic supervision, curricular flexibility, the interaction of key actors, changes in graduate policies, the reconfiguration of the university space after the pandemic, the strengthening of research and the establishment of international alliances, student participation, autonomy in the learning process, dual training in digital environments, and the strengthening of the link between students and professors, these approaches tend to analyze each element in isolation.

In contrast, this study provides a more holistic perspective by articulating these factors within a structured model of six dynamic cores. Moreover, while much of the literature has focused on the perceptions of faculty and supervisors or on institutional evaluations, this paper places the voice of doctoral students at the center, exploring not only their academic and technological challenges but also their student agency and the emotional climate within the program.

By transcending fragmented analyses and proposing a holistic view of hybrid doctoral training, this study not only broadens the understanding of this modality but also provides a solid conceptual basis for its continuous improvement. Ultimately, the quality of a hybrid doctoral program depends not only on the technology that supports it but also on how it manages to integrate knowledge, human interaction, and the integral development of its participants.

Hybrid doctoral education cannot be understood as the simple combination of face-to-face and virtual environments, but it can be understood as an interconnected academic ecosystem where multiple dimensions converge to ensure a comprehensive education. In this sense, the six proposed dynamic cores not only address fundamental aspects of doctoral teaching and learning but also reveal their interdependence, ensuring that the doctoral experience is coherent, effective, and transformative.

Technological, pedagogical, and disciplinary integration is not an end but a pillar that supports all the other cores. Technology not only facilitates access to academic resources and flexible learning spaces but also redefines pedagogical methodologies and how doctoral students develop knowledge in their respective disciplines. However, this integration is meaningless if it is not accompanied by structured and effective doctoral supervision, where continuous advice, formative feedback, and closeness between tutors and doctoral students allow for sustained progress in research.

In turn, the success of supervision depends largely on specialized support in research and scientific publication, ensuring that doctoral students not only produce original knowledge but are also capable of disseminating it in high-impact academic circuits. The generation of scientific publications, training in academic writing, and access to international collaboration networks are essential elements for the consolidation of their identity as researchers.

However, the production of knowledge is not only a technical issue; it requires a solid development of transversal competencies, where critical thinking, research self-comics, time management, and collaboration are integral parts of doctoral training. These competencies do not emerge in isolation but are fundamentally linked to the organizational infrastructure of the program.

The organizational infrastructure is not limited to the provision of technology and resources but also shapes the environment in which the doctorate is managed, from the availability of research spaces to the administrative agility in the management of academic processes. A program with deficiencies in its organizational structure will inevitably affect the quality of supervision, access to publications, and training in transversal competencies, weakening the overall impact of the doctorate.

Finally, all these elements make sense to the extent that they promote student agency and the emotional climate in the doctoral program. An empowered, motivated doctoral student with a sense of belonging within their academic community will be more likely to complete their training successfully. Confidence in the learning process, emotional management in the face of challenges, and the ability to establish support networks are as important as the knowledge and skills acquired.

Thus, these six cores are not isolated dimensions but gears of the same system. A weakness in one of them has a direct impact on the others, while their strengthening generates a synergy that raises the quality of doctoral training. Only through an integral and articulated vision of these factors is it possible to design hybrid programs that are not only accessible and flexible but also train researchers capable of generating significant, high-impact knowledge.

This study is limited to a sample of students from a single private university in Lima, which restricts the generalizability of the findings to other educational and cultural contexts. In addition, the qualitative approach, although in-depth, does not allow us to establish causal relationships between the variables analyzed.

For future research, it is recommended that the sample is expanded to include doctoral students from diverse institutions and regions to capture a greater diversity of experiences and perspectives. It would also be valuable to incorporate a mixed approach that combines qualitative and quantitative methods to delve deeper into the factors identified and establish more precise relationships. Likewise, integrating the opinions of other key actors, such as teachers and managers, could offer a more comprehensive view of doctoral programs. Finally, it is suggested to explore the impact of specific strategies, such as the use of artificial intelligence and emerging technologies, on the improvement of research competencies.

Given that research on the lived experience of the teacher–student relationship in the context of hybrid doctoral education is still limited (Giles et al., 2012), future studies could

delve deeper into how this interaction influences the academic and emotional development of doctoral students. Specifically, it would be valuable to explore how the dynamics of supervision and mentoring impact the construction of research identity, autonomy in scientific production, and retention in the program. Also, future research could analyze the perceptions of both students and faculty to identify strategies that strengthen communication, academic support, and the co-construction of knowledge in hybrid environments.

5. Conclusions

This study concludes that the effectiveness of a doctoral program is deeply related to the balance between its strengths and areas for improvement, according to the students' experiential experiences. Among the main strengths, teaching excellence and personalized mentoring stand out, which are fundamental for the integral development of doctoral students, as well as the structured logic of research, which provides a solid framework for academic and scientific training. In addition, the educational infrastructure and flexible access modalities guarantee optimal conditions for learning. However, the analysis also identifies critical areas that require attention, such as curricular relevance, teachers' TPACK mastery, doctoral didactics, and institutional and logistical support. Special emphasis should be given to research support, which includes aspects such as the writing and publication of scientific articles, the integration of artificial intelligence in research processes, and the strengthening of technological competencies. These areas represent key opportunities to optimize the educational experience and maximize the impact of programs on the formation of competent and critical researchers.

Based on the findings of this study, several areas and lines of future research that can contribute to optimizing doctoral training are identified. A key line would be to explore how innovative curricular approaches, such as the incorporation of TPACK competencies and the design of specific didactics for the doctoral level, impact the quality of academic and research outcomes. Another relevant area is the analysis of the use of technological tools and artificial intelligence in doctoral research, evaluating their effectiveness in improving writing, scientific publication, and data management processes. It is also relevant to investigate the role of institutional support, both in its logistical and emotional dimensions, and how these strategies influence the satisfaction and performance of doctoral students. Finally, it would be valuable to broaden the focus of analysis to the perspective of other actors in the program, such as teachers, managers, and graduates, to achieve a more comprehensive understanding of the educational ecosystem in doctoral programs.

This study is of great relevance because it approaches doctoral education from an integral perspective, considering not only the academic aspects but also the experiences and needs of the students, an essential element to guarantee the effectiveness and relevance of the programs. Research training is a central axis in doctoral education since it not only trains doctoral students to generate innovative knowledge but also develops critical, ethical, and technological competencies that are fundamental for their professional performance and their contribution to the advancement of society. By identifying strengths such as teaching excellence and areas for improvement such as research support, this study offers practical tools for educational institutions to optimize their programs, ensuring comprehensive training that fosters both the academic and personal development of doctoral students. In addition, its findings provide the scientific community with a basis for strengthening research practices and educational policymakers with concrete evidence to design strategies that promote quality and equity in graduate education, maximizing its impact on the generation of knowledge and the solution of complex social problems.

The research conducted makes it possible to make the "voice" of doctoral students visible to identify areas for improvement in the program to ensure academic excellence

essentially from formative research. This study shows that the experiences of doctoral students can be stressful and challenging; therefore, paying attention to them allows a university to implement timely measures to support and strengthen the emotional and academic well-being of doctoral students, which influences their overall satisfaction with the program. In the same way, an institutional culture of continuous improvement is fostered.

The study conducted systematizes the students' opinions to know their expectations and ensure that doctoral students receive relevant and useful training that allows them to consolidate their training as competent researchers. From this perspective, doctoral programs should be aligned with the changing needs of the academic and professional environment that demand the strengthening of transversal competencies such as effective communication, teamwork, and research ethics, as well as a dynamic and flexible curricular framework.

It is important to keep in mind the view of science as a collective activity, where scientific networks play a crucial role in social development; therefore, there is an urgent need for doctoral students to work in teams with other researchers to address complex problems and generate significant and innovative knowledge to provide sustainable and relevant solutions to society in collaboration with other institutions.

The experiential testimony of the students is valuable for the program; at the same time, it contributes to institutional research as it provides valuable data that will allow the development of more effective policies and educational strategies to align the doctoral program with the expectations of the labor market. Currently, for example, the curriculum of this program is being redesigned based on some key results of this study, so this comprehensive approach benefits current students, future cohorts of doctoral students, and the overall success of the doctoral program.

The practical implications of this study can be translated into feasible and immediate recommendations for improving curricular design, research supervision, and logistical support in hybrid doctoral programs. The effective implementation of these improvements should be articulated around the following six dynamic cores: technological, pedagogical, and disciplinary integration in the doctoral program; doctoral supervision; specialized support in research and scientific publication; the development of transversal competencies; organizational infrastructure; and student agency and emotional climate in the doctoral program. Practical strategies for each of these areas are presented below:

1. *Improving Curricular Design (Technological, Pedagogical and Disciplinary Integration in the Doctorate)*
    - Redesign the curriculum so that each subject contributes directly to the development of the doctoral thesis, ensuring a closer relationship between training and research production.
    - Incorporate scientific writing courses from the first cycles, favoring the early publication of articles in indexed journals.
    - Encourage the use of artificial intelligence tools in data analysis, bibliographic search, and the optimization of academic writing processes.
    - Implement active and interdisciplinary methodologies, ensuring the integration of technological, pedagogical, and disciplinary knowledge in doctoral training. An example is below:

In a doctorate in education, the integration of technological, pedagogical, and disciplinary knowledge can be materialized through an educational innovation seminar. In this space, doctoral students work in interdisciplinary teams to design innovative proposals that respond to real educational challenges, through a project that combines technology, pedagogy, and disciplinary knowledge.

A group of students could investigate how the use of artificial intelligence optimizes data analysis in education, applying project-based learning strategies to improve the teaching of critical thinking in hybrid environments. Throughout the seminar, doctoral students would have the opportunity to experiment with digital tools, design didactic interventions, and analyze their impact in real educational contexts. The process would culminate with the elaboration of a scientific article systematizing the team's findings, which would be presented at an academic congress or submitted to a specialized journal. In this way, doctoral training would not only guarantee interdisciplinary and applied learning but would also strengthen scientific production and the transfer of knowledge to the educational community.

2. *Strengthening Research Supervision (Doctoral Supervision)*
    - Standardize doctoral supervision processes and guarantee regular meetings and structured follow-up of thesis progress.
    - Train advisors in doctoral pedagogy and mentoring strategies, promoting a more equitable and dialogic approach to thesis supervision.
    - Encourage co-authorship between professors and doctoral students to strengthen scientific production and consolidate the integration of students into the academic community.
    - Implement continuous feedback systems that allow for effective monitoring and reduce the dropout rate.
3. *Optimization of Logistical and Institutional Support (Organizational Infrastructure)*
    - Strengthen digital infrastructure, guaranteeing access to scientific databases and advanced learning platforms.
    - Improve administrative management to streamline academic procedures and reduce bureaucracy in key processes such as thesis registration and article publication.
    - Ensure that physical resources (classrooms, laboratories, libraries) are adequate for the hybrid modality and foster an optimal learning experience.
    - Integrate artificial intelligence tools in academic administration to facilitate the organization of classes and meetings and monitoring of student performance.
4. *Specialized Support in Research and Scientific Publication*
    - Design a structured training plan for scientific publication, with specialized advice and personalized tutoring to produce high-impact articles.
    - Incorporate practical courses on the use of qualitative and quantitative analysis software (ATLAS.ti, SPSS, R, NVivo, Mendeley, Zotero) to strengthen students' methodological skills.
    - Facilitate the integration of doctoral students in national and international research networks, promoting academic mobility and the visibility of their work.
5. *Development of Transversal Competencies*
    - Implement training programs in epistemic competence, time management, collaborative work, academic leadership, and preparing students for strategic roles in research and teaching.
    - Encourage the development of communication skills for scientific dissemination, ensuring that doctoral students can present and defend their research in national and international forums.
    - Promote training in research ethics and responsible use of technological tools, including artificial intelligence in academic processes.
6. *Fostering Student Agency and Emotional Climate in the Doctoral Program*

- Create spaces for dialog and reflection on the emotional well-being of doctoral students, implementing strategies for psychological accompaniment and peer mentoring.
- Establish continuous evaluation mechanisms that integrate students' perception of the quality of teaching, doctoral supervision, and institutional climate.
- Design strategies to foster an academic culture based on compensation, motivation, and the recognition of individual and collective achievements.

The success of hybrid doctoral training depends not only on the flexibility of the model but also on strategic planning that guarantees high-quality teaching, effective supervision, and solid institutional support. The six dynamic cores identified in this study offer a key roadmap for transforming weaknesses into opportunities for improvement and consolidating a doctoral training model that responds to the academic and professional demands of the 21st century.

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