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Research Article

Calls for Research at the University of Nariño: Perception Analysis Based on AI-Powered Computational Linguistics

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ABSTRACT

This study presents an AI-powered computational linguistics analysis of researchers' perceptions regarding the calls for research at the University of Nariño. A survey was conducted among 48 researchers, in which they provided open-ended responses about the challenges faced in previous calls for research and suggested improvements to enhance the research system. Using natural language processing (NLP) techniques, the analysis identified recurring themes and sentiments expressed in the responses. The results highlight key areas of difficulty, including administrative barriers, funding allocation, and transparency in evaluation criteria. Additionally, sentiment analysis revealed predominant concerns and potential areas for reform. The findings of this study contribute to an evidence-based improvement plan aimed at optimizing future calls for research at the University of Nariño. The application of AI-driven computational linguistics demonstrates its effectiveness in extracting meaningful insights from unstructured textual data, providing a replicable model for similar institutional evaluations.

Keywords: Computational Linguistics, Sentiment Analysis, Calls For Research, Artificial Intelligence, Natural Language Processing, Higher Education

INTRODUCTION

Calls for research play a crucial role in fostering scientific development by providing researchers with funding opportunities, institutional support, and academic visibility. However, these processes often face challenges that hinder their efficiency and effectiveness (Kahn et al., 2022). At the University of Nariño, researchers have frequently encountered obstacles related to transparency, administrative burden, and resource allocation in previous calls for research. Understanding these concerns is essential to designing a more efficient and researcher-friendly system (Donner, 2023).

With advancements in artificial intelligence and natural language processing (NLP), computational linguistics has emerged as a powerful tool for analyzing large volumes of text-based responses (Izacard et al., 2021). AI- powered methods enable researchers to extract patterns, identify prevalent themes, and assess sentiment in unstructured textual data (Wankhade et al., 2022). In this study, we apply these techniques to analyze responses from 48 researchers who participated in a survey about their experiences with calls for research at the University of Nariño. By systematically examining their feedback, we aim to identify major obstacles and potential areas for improvement.

The main objectives of this study are: (i) to identify recurring difficulties in the research call process, (ii) to analyze the sentiment expressed in researchers' responses, and (iii) to provide a data-driven improvement plan based on the findings. The results will serve as a foundation for refining institutional research policies, enhancing transparency, and fostering a more supportive research environment (Reeve & Cheon, 2021).

Furthermore, this study demonstrates the applicability of AI-driven linguistic analysis in higher education research, offering insights that may benefit other academic institutions.

The following sections present the methodology used for data collection and analysis, the key findings derived from computational linguistics techniques, and a discussion of the implications of these results. Finally, we propose an improvement plan based on the extracted insights, contributing to a more effective and researcher- oriented research call system.

METHODOLOGY

We explain the methodological approach used in this study, detailing the data collection process, the computational linguistics techniques applied, and the analytical framework employed to extract insights from researchers' responses (Reddy & Reddy, 2024). The methodology was designed to systematically analyze qualitative data using artificial intelligence (AI)-powered natural language processing (NLP) techniques, ensuring a rigorous and replicable approach (Jurafsky & Martin, 2021)

The data for this study were collected through an open-ended survey distributed to researchers at the University of Nariño. A total of 48 researchers participated in the survey, providing qualitative responses regarding the challenges they have faced in previous calls for research and their suggestions for improvement. The survey included the following open-ended questions:

1. What difficulties have you encountered in previous calls for research?
2. What improvements would you suggest to enhance the efficiency and fairness of the calls for research?

The open-ended format allowed participants to express their opinions freely, ensuring that diverse perspectives and unexpected themes could emerge (May & Perry, 2022).

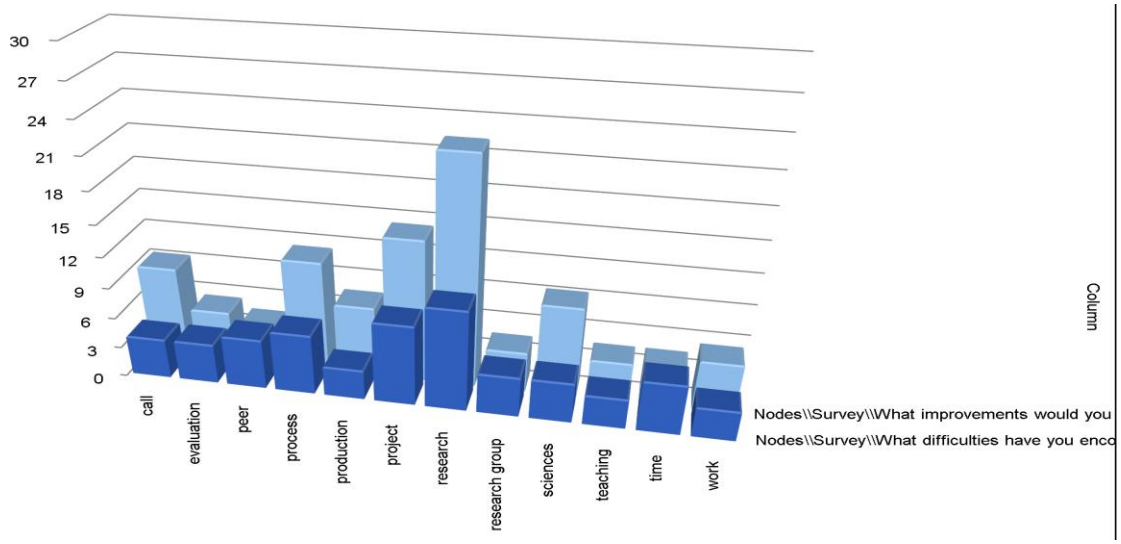
Before the computational analysis, the collected textual responses underwent a preprocessing phase to ensure consistency and quality. The text preprocessing phase involved several steps: cleaning by removing punctuation and special characters, tokenization (splitting sentences into individual words), and lemmatization (converting words to their base forms, e.g., "researching" to "research") (Locke et al., 2021). Additionally, lowercasing was implemented to standardize text, and spell checking was conducted to correct typographical errors (Naseem et al., 2021).

AI-driven computational linguistics techniques were employed to analyze the textual data, including theme modeling, sentiment analysis, and keyword extraction. NVivo 15 was used to process qualitative information, and pre-trained large language models, such as Llama 3.3 (70B parameters), were also used (Punnaivanam & Velvizhy, 2024).

Theme modeling was conducted using Latent Dirichlet Allocation (LDA), a machine learning algorithm that identifies latent themes in a text corpus (Zhou et al., 2023). Sentiment analysis was performed to assess the emotional tone of the responses, classifying them as positive, neutral, or negative using pre-trained NLP sentiment analysis models (Shaik et al., 2023). Keyword extraction and N-gram analysis further supported theme modeling results by identifying the most frequently occurring words and word pairs (Svete & Cotterell, 2024).

FINDINGS

We focused on detecting main themes in light of the researchers' responses. To this end, we obtained the following result regarding main themes using computational linguistics. Such a result is depicted in figure 1.



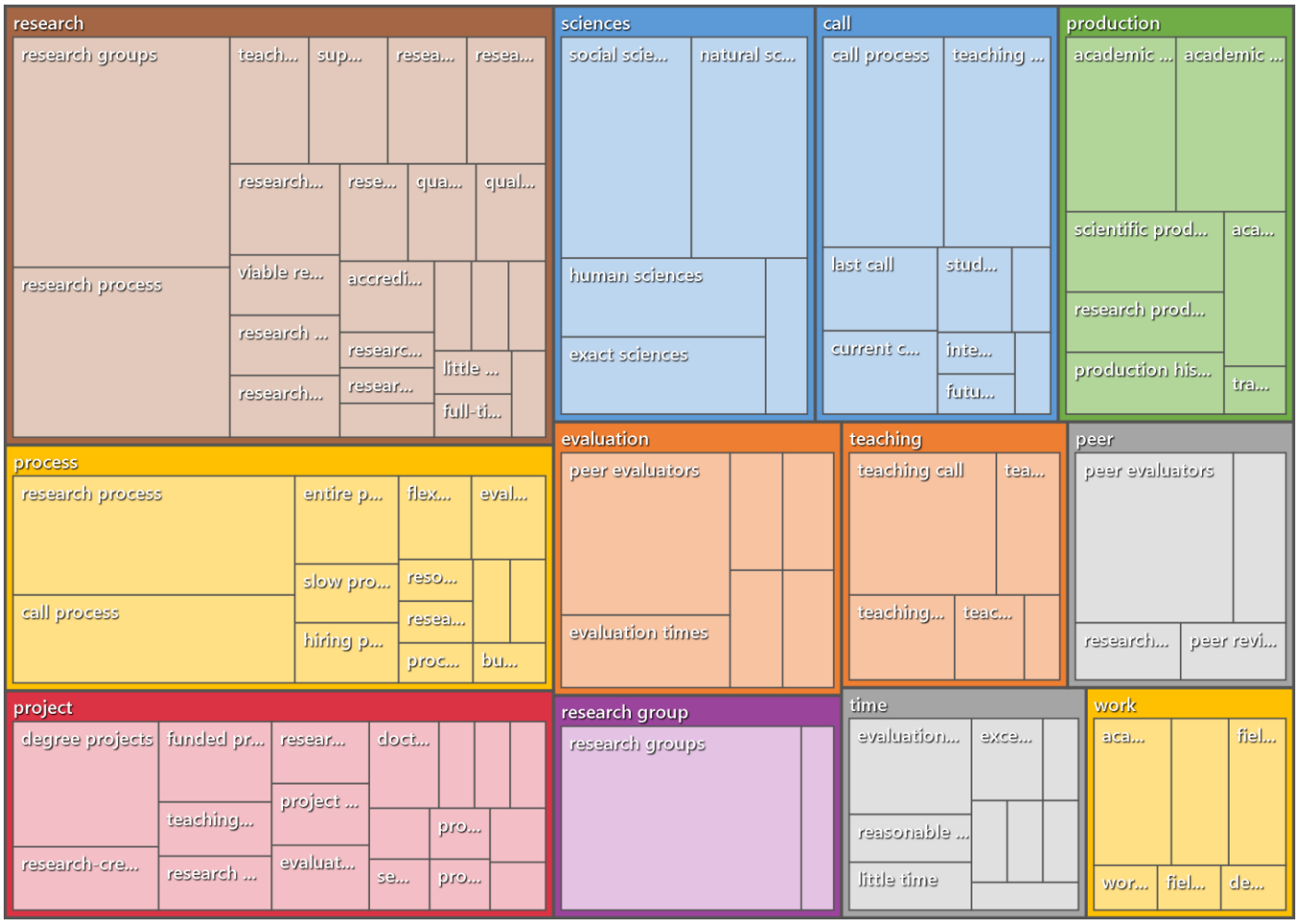


Figure 1: Theme Analysis.
Source: *The Authors*

Using AI-powered computational linguistics, we thematic analyzed researchers' qualitative responses regarding the calls for research at the University of Nariño. This process involved automated coding to identify recurring themes, classify feedback, and quantify key concerns and suggestions. The results are visualized in a 3D bar chart, highlighting the frequency of coded references associated with different research-related topics.

This study analyzed two categories: Challenges Encountered in Research Calls and Proposed Improvements to Enhance Research Calls.

By comparing these two perspectives, we identified critical gaps in the research system and areas that require intervention.

The top themes extracted from the survey responses include “research,” “project,” “process,” “production,” and “evaluation”. Below, we discuss each central theme in detail:

1. Research and Research Groups (Most Frequent Theme)

The "research" theme had the highest number of coding references, indicating that it is the primary focus of concerns and recommendations among researchers.

Many responses emphasized challenges in securing funding and the limited institutional support for research activities.

There is a demand for more transparent and structured research calls, particularly in how research groups receive financial and administrative backing.

Suggested improvements include better funding distribution, increased interdisciplinary collaboration, and more substantial support for early-career researchers.

2. Project-Related Concerns

The "project" theme was among the most frequently coded terms, indicating concerns about research project funding, execution, and evaluation.

Researchers expressed frustration with bureaucratic delays, rigid project timelines, and inefficient resource allocation.

Proposed solutions included simplified administrative processes, more precise evaluation criteria, and flexible deadlines to ensure project feasibility.

3. Process and Production Issues

The "process" and "production" themes reflect concerns about the workflow of research calls.

Respondents identified complex application procedures, excessive documentation, and unclear communication from research administration offices as significant obstacles.

Many researchers suggested the implementation of digital platforms to streamline submission, review, and feedback processes.

4. Evaluation and Peer Review

The "evaluation" theme was highly referenced in responses related to challenges and suggested improvements.

The lack of transparency in the peer review process was a significant concern.

Researchers recommended adopting double-blind peer review, improving evaluator qualifications, and standardizing assessment rubrics to minimize bias and inconsistencies.

5. Sciences, Teaching, and Work Balance

The themes "sciences" and "teaching" highlight concerns about balancing research responsibilities and teaching loads.

Many respondents felt that excessive teaching obligations hinder research productivity.

They suggested institutional policies that allocate dedicated research time for faculty members and additional incentives for research-active professors.

6. Time Constraints and Workload

The themes “time” and “work” frequently mentioned difficulties meeting research call deadlines.

Researchers reported that short proposal submission windows, unrealistic reporting deadlines, and extensive paperwork were significant obstacles.

Suggested improvements include extended application periods, streamlined reporting mechanisms, and administrative support for research teams.

Comparative Insights: Challenges vs. Solutions

From the comparison of difficulties and proposed improvements, several key insights emerge:

- The need for structural reforms – The institutional process for research calls needs simplification and greater transparency.
- Support for research groups and projects – Researchers seek better resource allocation, flexible project guidelines, and more substantial institutional backing.
- Evaluation improvements – A demand for fair, unbiased, and expert-led peer review mechanisms to improve research assessment.
- Workload distribution – Integrating research with teaching responsibilities should be managed to prevent faculty burnout.
- Digitalization and automation –AI-powered administrative tools could streamline document submission, evaluation, and feedback.
- In terms of sentiment detection, these responses were subjected to linguistic analysis, obtaining the following graphic representations.

Now, the sentiment analysis was performed by usign AI-powered computational linguistics techniques. In this regard, we present the results of such an analysis depicted in Figure 2.

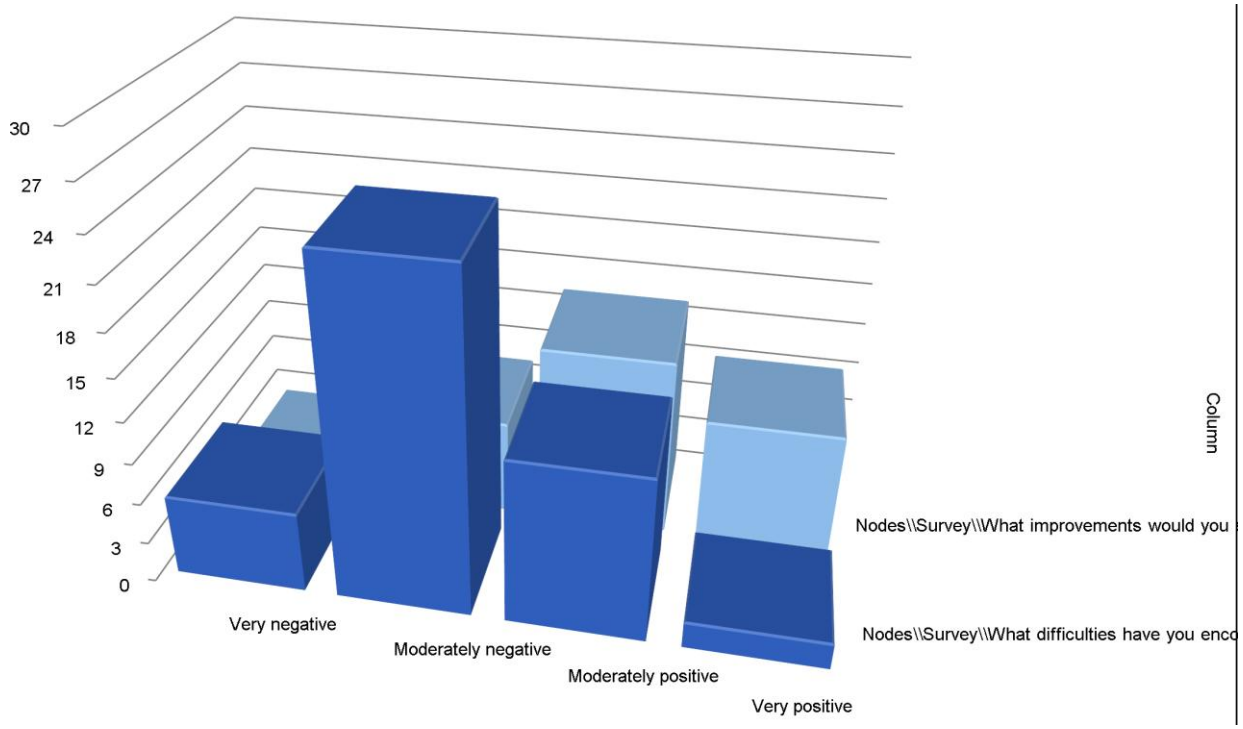


Figure 2. Sentiment Analysis.
Source: The Authors

The sentiment analysis performed on researchers' qualitative responses reveals dominant emotional trends in their perceptions of the research call system at the University of Nariño. This AI-powered analysis classifies the textual data into four sentiment categories: Very Negative, Moderately Negative, Moderately Positive, and Very Positive.
The 3D bar chart quantitatively represents these sentiments, highlighting the prevalence of dissatisfaction and optimism in researchers' feedback. This sentiment analysis allows us to interpret emotional responses, helping to identify pressing concerns and areas for improvement in the research call process.
The sentiment distribution suggests a substantial prevalence of negative sentiment, with moderately negative responses being the most frequent category. Below, we analyze the sentiment results in detail:

1. Prevalence of Negative Sentiment
Most responses fall into the "Moderately Negative" category, indicating that many researchers perceive issues within the research call system.
The "Very Negative" category also shows a notable presence, suggesting strong dissatisfaction among some researchers.
Common themes associated with negative sentiment include:
Bureaucratic challenges: Complaints about complex administrative processes, excessive paperwork, and lack of transparency.
Funding concerns: Researchers feel that funding distribution is not equitable or accessible, leading to frustration.
Evaluation and peer review: The evaluation process's lack of clear criteria and fairness was frequently cited as challenging.
Time constraints and work overload: Many researchers struggled to balance research with teaching responsibilities.

2. Moderately Positive Sentiment
A significant portion of responses fall into the "Moderately Positive" category.
These responses suggest that while issues exist, some researchers recognize positive aspects of the research call system.
Themes associated with moderately positive sentiment include:
Recognition of institutional support: Some researchers acknowledge that efforts have been made to improve funding opportunities.

Potential for reforms: Many respondents expressed hope that improvements will be made through policy adjustments.
Collaboration opportunities: Some researchers view the research calls as fostering collaborative projects within the university.

3. Limited Very Positive Sentiment

The “Very Positive” sentiment category has the lowest count, indicating that only a few researchers are delighted with the current research system.
Responses in this category typically emphasize:
Instances of well-structured research calls that were fair and efficient. Positive experiences with research groups that received institutional support. Successful funding outcomes that allowed researchers to advance their projects.
Comparative Analysis: Negative vs. Positive Sentiments
By comparing negative and positive sentiment categories, we derive the following insights:
Researchers are more likely to express dissatisfaction than optimism, with negative responses outnumbering positive ones. Moderately negative sentiment dominates, implying that while researchers recognize flaws, they may not consider the system entirely dysfunctional. The sentiment distribution highlights a need for institutional reforms, as negative feedback primarily concerns process inefficiencies, funding allocation, and evaluation fairness. Despite the criticisms, some researchers acknowledge the university's efforts, showing room for constructive change.

Implications and Recommendations according to the Sentiment Analysis

Based on these findings, we propose the following data-driven recommendations to improve the research call system:

- Increase transparency in funding allocation and evaluation criteria to address concerns about fairness.
- Simplify administrative processes by implementing digital workflows that reduce paperwork and improve efficiency.
- Enhance communication channels between researchers and administrative offices to clarify guidelines and expectations.
- Adjust research timelines and deadlines to provide greater flexibility for faculty balancing teaching and research responsibilities.
- Expand successful funding models that researchers have positively acknowledged.
- Promote collaborative research initiatives that facilitate networking and interdisciplinary work.
- Acknowledge and reward outstanding research efforts through recognition programs or incentives.

DISCUSSION

The thematic analysis of researchers' responses reveals significant concerns regarding the transparency, efficiency, and fairness of the research call process at the University of Nariño. One of the most recurrent themes in the dataset was the lack of clear evaluation criteria. Several researchers expressed frustration over the absence of justification when their projects were not selected. This aligns with the negative sentiment trends observed in our analysis, where a substantial portion of responses were categorized as moderately or very negative. The lack of transparency in evaluation processes has led to skepticism regarding the objectivity of peer review. Respondents emphasized that bias, favoritism, and a lack of rigorous assessment frameworks have hindered equal opportunity in research selection.
Another frequently mentioned difficulty was the requirement to belong to an accredited research group to apply for funding. Many researchers highlighted that this condition disadvantages independent researchers or those in smaller, emerging research teams. Some respondents suggested that this policy discourages new researchers from engaging in projects, limiting the potential for interdisciplinary and novel research approaches.
Additionally, bureaucratic obstacles were a significant point of concern. Several respondents noted that the administrative procedures for acquiring research supplies and processing payments are excessively complex and slow. These inefficiencies delay project execution and place an unnecessary burden on researchers who should instead focus on scientific progress. Moreover, coordination with ethics committees and research offices was also flagged as problematic, with several researchers pointing out delays and inconsistencies in obtaining necessary approvals.

Despite the prevalence of negative sentiment, a notable proportion of researchers provided constructive suggestions for improving the research call process. A key recommendation was to enhance the transparency of the selection process by providing detailed feedback for rejected proposals. By offering specific reasons for rejection, researchers would be better equipped to refine their projects and reapply successfully in future calls.

Another widely supported suggestion was the need for more dynamic and attractive research proposal calls. Many respondents advocated for greater thematic diversity in research calls, allowing for a broader range of disciplines and interdisciplinary collaborations. This reflects a moderately positive sentiment among researchers who believe that the current system, despite its flaws, has the potential for meaningful improvement if adjustments are made to accommodate a broader range of applicants.

Respondents suggested that administrative staff handling research projects should have at least a basic understanding of research processes to address bureaucratic inefficiencies. A lack of knowledge among assigned officials has contributed to unnecessary delays and miscommunication, frustrating applicants. Some respondents recommended that a training program for administrative personnel could help mitigate these issues and streamline project execution and resource allocation.

Additionally, several researchers proposed a digitalization initiative to reduce paperwork, automate submission procedures, and expedite funding disbursements. The university could significantly improve efficiency and researcher satisfaction by incorporating AI-powered systems for processing applications.

The evaluation and peer review system is one of the most controversial aspects of the research call process. Many respondents believe that peer review is not objective and often lacks rigor. Several researchers suggested implementing a double-blind review system to minimize bias and improve the credibility of the selection process. Additionally, there was a strong recommendation to introduce standardized assessment rubrics to ensure that all proposals are evaluated based on clear, predefined criteria.

Another recurring concern was the limited communication between applicants and research offices. Some respondents mentioned that important information regarding evaluation processes, deadlines, and funding allocations was not effectively communicated, leading to confusion and missed opportunities. A viable solution was establishing dedicated research liaison officers to facilitate communication and efficiently address queries.

Many researchers expressed concerns regarding the heavy workload associated with balancing teaching responsibilities and research obligations. Many faculty members feel that excessive teaching duties limit the time to conduct high-quality research. This issue was reflected in sentiment analysis results, where negative sentiments were often linked to time management difficulties.

To address this, researchers suggested implementing policies that allocate dedicated research time for faculty members. Some respondents recommended adjusting teaching loads for researchers who actively contribute to funded projects, allowing them to focus more on producing impactful research outcomes. Additionally, providing teaching assistants or research support staff could help alleviate the burden on faculty members, fostering a more balanced academic environment.

The insights obtained from this study have important implications for institutional policy reforms. By addressing the challenges identified through computational linguistics and sentiment analysis, the University of Nariño has the opportunity to develop a more equitable, efficient, and researcher-friendly system. The main takeaways from the study suggest that the institution should:

Enhance Transparency: To ensure a fair evaluation, implement detailed feedback mechanisms for rejected proposals and adopt a double-blind peer review process.

Reduce Bureaucratic Barriers – Streamline administrative processes through digital solutions, minimizing procurement and project approvals inefficiencies.

Support Emerging Researchers: Modify eligibility criteria to encourage more inclusive participation, particularly among early-career researchers and those outside established research groups.

Improve Communication – Establish dedicated research liaison officers to assist applicants, provide timely updates, and clarify submission guidelines.

Balance Workloads – Introduce institutional policies that allocate research time for faculty members and reduce excessive administrative burdens.

These proposed reforms align with the positive sentiment trends observed in our analysis, where researchers expressed hope for system improvements. The University of Nariño can foster a more productive and innovativeresearch environment by leveraging AI-powered data analysis and incorporating researcher feedback

into institutional policy.

CONCLUSION

This AI-powered thematic analysis reveals systematic challenges that hinder research development at the University of Nariño. The data-driven insights extracted from computational linguistics confirm the need for: A more efficient and researcher-friendly funding application process. A transparent and standardized evaluation system. A balanced workload between teaching and research responsibilities. Greater institutional support for research groups.

By implementing data-driven policy reforms, the university can enhance the research environment, making calls for research more efficient, fair, and accessible. Furthermore, using AI-powered computational analysis in higher education research provides a scalable model that can be applied across other academic institutions.

The sentiment analysis reveals that while there is significant dissatisfaction with the research call system, there are also elements of optimism and potential for reform. By leveraging these insights, the University of Nariño can implement targeted improvements to create a more transparent, efficient, and researcher-friendly environment.

The findings of this discussion highlight the critical areas for reform in the research call process at the University of Nariño. The dominance of negative sentiment in researchers' responses underscores the urgency of addressing key inefficiencies, particularly in evaluation transparency, administrative processes, and workload balance. However, the presence of constructive suggestions and moderately positive sentiment indicates a willingness among researchers to support and engage with an improved system.

By implementing strategic changes based on data-driven insights, the university can enhance its research landscape, attract greater participation, and ultimately elevate the impact of its funded projects. This study demonstrates that AI-powered computational linguistics provides a valuable framework for institutional evaluations, offering replicable methodologies that could benefit other academic institutions facing similar challenges.

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