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## Reflection and narrative writing as formative mediation in the self-perception of research competencies in higher education

Reflexión y escritura narrativa como mediación formativa en la auto percepción de competencias investigativas en educación superior

Reflexão e escrita narrativa como mediação formativa na auto percepção de competências investigativas no ensino superior

### Abstract

**Introduction:** research training in higher education requires pedagogical mediations that enable students to understand the purpose of the investigative process rather than merely executing methodological procedures. **Objective:** to analyze the formative contribution of reflection and narrative writing to the self-perception of research competencies among higher education students. **Method:** a qualitative study with complementary descriptive quantitative support was conducted in the course Métodos y Técnicas de Investigación II at the Universidad Pedagógica de El Salvador during term I-2025. Psychology students organized into thirteen teams participated; each team produced group reflective narratives about their research experience. In addition, participants completed an instrument individually at the beginning and at the end of the formative process; results were aggregated by team for descriptive purposes. **Results:** narrative-thematic analysis identified three formative processes: from task to meaning, from instrument to connection, and from fear to agency. Complementary descriptive comparison between the initial and final instruments showed favorable changes in the self-perception of research competencies. **Conclusion:** this pedagogical mediation is pertinent for strengthening how students recognize their research competencies, particularly by fostering a more integrated understanding of the method and a more active stance toward research.

**Keywords:** self-perception of research competencies, higher education, research training, formative mediation, reflection and narrative writing

### Resumen

**Introducción:** la formación en investigación en educación superior requiere mediaciones pedagógicas que permitan al estudiantado comprender el sentido del proceso investigativo y no limitarse a ejecutar procedimientos metodológicos.



**Objetivo:** analizar la contribución formativa de la reflexión y escritura narrativa en la autopercepción de competencias investigativas de estudiantes de educación superior. **Método:** se desarrolló un estudio de enfoque cualitativo con apoyo cuantitativo descriptivo-complementario en la asignatura Métodos y Técnicas de Investigación II de la Universidad Pedagógica de El Salvador durante el ciclo I-2025. Participaron estudiantes de Psicología organizados en trece equipos, quienes elaboraron narrativas reflexivas grupales sobre su experiencia investigativa. Además, respondieron individualmente un instrumento aplicado al inicio y al cierre del proceso formativo, cuyos resultados fueron agregados por equipo con fines descriptivos. **Resultados:** el análisis narrativo-temático permitió identificar tres procesos formativos: de la tarea al sentido, del instrumento al vínculo y del miedo a la agencia. De manera complementaria, la comparación descriptiva entre el instrumento inicial y el final mostró cambios favorables en la autopercepción de las competencias investigativas. **Conclusión:** esta mediación pedagógica resulta pertinente para fortalecer la manera en que el estudiantado reconoce sus competencias investigativas, especialmente al favorecer una comprensión más articulada del método y una posición más activa frente a la investigación.

**Palabras clave:** autopercepción de competencias investigativas, educación superior, formación investigativa, mediación formativa, reflexión y escritura narrativa

### Resumo

**Introdução:** a formação em pesquisa no ensino superior requer mediações pedagógicas que permitam aos estudantes compreender o sentido do processo investigativo e não se limitar a executar procedimentos metodológicos. **Objetivo:** analisar a contribuição formativa da reflexão e da escrita narrativa na autoperceção das competências investigativas de estudantes do ensino superior. **Método:** desenvolveu-se um estudo de enfoque qualitativo com apoio quantitativo descriptivo-complementar na disciplina Métodos y Técnicas de Investigación II da Universidad Pedagógica de El Salvador durante o ciclo I-2025. Participaram estudantes de Psicología organizados em treze equipes, que elaboraram narrativas reflexivas grupais sobre sua experiência investigativa. Além disso, responderam individualmente a um instrumento aplicado no início e no término do processo formativo; os resultados foram agregados por equipe para fins descriptivos. **Resultados:** a análise narrativo-temática permitiu identificar três processos formativos: da tarefa ao sentido, do instrumento ao vínculo e do medo à agência. De forma complementar, a comparação descriptiva entre o instrumento inicial e o final mostrou mudanças favoráveis na autoperceção das competências investigativas. **Conclusão:** essa mediação pedagógica mostra-se pertinente para fortalecer a forma como os estudantes reconhecem suas competências investigativas, especialmente ao favorecer uma compreensão mais articulada do método e uma posição mais ativa frente à pesquisa.

**Palavras-chave:** autoperceção de competências investigativas, ensino superior, formação em pesquisa, mediação formativa, reflexão e escrita narrativa



## Introduction

Research training holds a decisive place in the higher education student experience. Its importance extends beyond the production of university coursework, as it shapes how students formulate research problems and the stance they adopt toward knowledge. From this perspective, research methodology courses require pedagogical conditions that effectively articulate problem, theory, method, and evidence, a point also highlighted in recent studies on research methodology in higher education (Acosta Luis et al., 2021).

The specialized literature has noted that many research methodology courses continue to be structured around content transmission and procedural prescription. This concern has resurfaced in recent studies on teaching research methodologies in education, which point to the need to move beyond pedagogical cultures centered on exposition toward experiences more closely tied to investigative practice and the construction of a research-based culture (Jensen et al., 2025; Lederer, 2025; Matos et al., 2023a, 2023b; Nind & Lewthwaite, 2023).

In practice, this has led to experiences where students learn to reproduce methodological steps without fully appropriating the meaning of conducting research. Various studies have shown that this technical orientation can create a gap between research courses and students' educational trajectories, especially when the method is presented as a closed sequence of academic operations or when active, experiential, and applied strategies that foster more engaged student participation are overlooked (Arosio, 2025; Lederer, 2025; Myers-Coffman et al., 2021; Ribeiro-Silva et al., 2022).

This difficulty has direct effects on learning. When methodology is taught as task completion, the investigative process loses formative density, and its epistemological dimension weakens (Granados Muñoz, 2025). In such a scenario, students may move between formats and submissions without fully understanding what supports problem formulation or justifies a methodological decision. The ethical responsibility involved in working with information produced alongside others may also receive insufficient attention. Therefore, learning to research involves more than mastering techniques. It requires developing the judgment to question phenomena, sustain well-founded decisions, and produce consistent interpretations.

Given this landscape, the discussion on teaching research methods has shifted toward proposals more closely tied to students' active experience. Recent studies have questioned the predominance of the lecture-based class and called for strategies that bring theory closer to practice, fostering more engaged participation in inquiry processes, active learning, and the experiential construction of knowledge (Gardner, 2024; Jensen et al., 2025; Jeram, 2024; Lederer, 2025; Nind & Lewthwaite, 2023; Radović et al., 2021; Ribeiro-Silva et al., 2022).

This orientation also engages with recent research on active learning in higher education, which has shown that a variety of interactive methods can strengthen perceived teaching clarity and student engagement (Beimel et al., 2024). In Portuguese, Seabra et al. (2023) have noted that active methodologies break with the hierarchical transmission of knowledge and contribute to academic and scientific training. Similarly, Guarda et al. (2023) have addressed the need to evaluate active

methodologies with specific instruments, which proves relevant when studying situated formative experiences.

Within this pedagogical shift, narrative reflection offers a pertinent avenue for thinking about research training from the student's own experience. Narrating what one lived through during learning involves revisiting decisions, recognizing shifts, and giving comprehensible shape to what occurs during the process. Recent studies on reflection and reflective writing in higher education have shown that these practices favor experience review, meaning-making, lifelong learning, and the articulation between theoretical learning and formative practice (Alt et al., 2022; Franco et al., 2022; Lim et al., 2023; Tight, 2024). In turn, recent research has linked reflective practices with student collaboration and academic writing processes in higher education (Harvey et al., 2025; Schürmann et al., 2025). In the Lusophone context, Festas et al. (2023) have shown the importance of source-based writing strategies for university students, while Gonçalves and Alves (2024) have situated university pedagogical training as a space for experimentation and transformation of teaching practice.

Despite these advances, a gap persists that requires further attention. The literature has recognized the value of reflection and narrative writing in higher education, yet empirical evidence on their specific use in research methodology courses remains limited. This absence is more visible in Latin American contexts and in undergraduate training processes, where understanding how students interpret their learning experience and recognize progress in their research competencies is of interest. Therefore, it is necessary to examine how reflection and narrative writing can operate as formative mediation in the relationship students establish with methodology.

In this study, research competencies are understood as academic capacities related to searching for and critically analyzing information, making methodological decisions, producing written work, interpreting data, and acting ethically throughout the investigative process. This understanding aligns with recent studies that define them as skills necessary for producing and disseminating scientific knowledge in university training, as well as with reviews that associate them with critical evaluation, information synthesis, problem-solving, analysis, and data communication (George-Reyes et al., 2023; Mori et al., 2025). From this perspective, the self-perception of these competencies is relevant for exploring how students recognize their progress during formative experiences oriented toward research.

In this study, the term reflection and narrative writing refers to the pedagogical mediation through which students reconstructed, interpreted, and made sense of their research experience via narrative-reflective essays.

Addressing this problem, the study aims to analyze the formative contribution of reflection and narrative writing to higher education students' self-perception of research competencies. The analysis focused on the transformations students recognize when narrating their experience and the perceived changes regarding those competencies. To this end, a didactic experience was designed within the course Research Methods and Techniques II at Universidad Pedagógica de El Salvador, in which participants produced narrative-reflective essays about their

research process and responded to an instrument at two points during the course. The study adopts a qualitative approach with descriptive-complementary quantitative support, aiming to provide situated evidence on the pedagogical value of this mediation in university research training.

## Methods and materials

### Approach and design

The study employed a qualitative approach with descriptive-complementary quantitative support, aimed at understanding how university students elaborated their methodological learning through reflection and narrative writing. The qualitative dimension formed the core of the design, allowing analysis of the meanings participants attributed to their formative experience. The quantitative component provided descriptive information on variations in the self-perception of research competencies between the beginning and end of the didactic experience.

This decision followed a logic of methodological complementarity, understood as an articulation between qualitative and quantitative evidence with different analytical weights, oriented toward strengthening understanding of the studied phenomenon without necessarily equating the weight of both components (Gierus et al., 2025; Hernández-Sampieri & Mendoza, 2018). Following this orientation, the research adopted a narrative-reflective perspective, working with accounts produced by the students themselves about their inquiry experience. The corpus was examined using reflexive thematic analysis to recognize shared patterns of meaning within the narratives (Braun & Clarke, 2021).

### Context, participants, and unit of analysis

The research took place during the first academic term of 2025 in the course Research Methods and Techniques II at Universidad Pedagógica de El Salvador. Thirteen teams of Psychology students participated, with ages ranging from 18 to 45 years. During the course, the groups developed inquiries focused on educational trajectories shaped by conditions of vulnerability, within the formative framework established for the course.

At the end of the process, each team produced a narrative-reflective essay aimed at reconstructing their inquiry experience. Because the written production was done collectively, the qualitative unit of analysis consisted of each narrative-reflective essay produced by the teams. Consequently, the analysis did not seek to reconstruct individual trajectories or attribute findings to isolated personal experiences, but rather to interpret shared meanings expressed in the group narratives produced at that point in the process. This decision is grounded in qualitative approaches that admit collective units of analysis when the data produced corresponds to a group elaboration or a collectively constructed textual artifact. Consistent with this decision, the qualitative analysis was based on 13 group narratives. The quantitative component, in contrast, drew from individual responses to the instrument, subsequently aggregated by team through mean calculation, to maintain descriptive correspondence with the group narrative units.

Participation was voluntary and had no impact on the academic evaluation of the course. Confidentiality measures were also applied by anonymizing the narratives before analysis to protect participant identity.

## Data production

Data production relied on two articulated sources. The first consisted of narrative-reflective essays produced by each team, which constituted the main corpus for qualitative analysis. The second corresponded to a diagnostic and follow-up instrument on research competencies, administered individually at two points during the course.

The instrument was constructed based on an operational organization of research competence into five dimensions: cognitive, methodological, communicative, collaborative, and digital. These dimensions integrated capacities related to research problem formulation, searching for and critically analyzing scientific information, methodological design, data analysis and interpretation, ethical conduct, academic production, collaborative work, and the use of digital tools for research.

The instrument included 17 closed items organized on a five-point Likert scale and two open-ended questions aimed at gathering assessments of the methodological learning achieved and possible areas for improvement. Due to its ad hoc nature, results were interpreted for descriptive-exploratory purposes, without assuming them as standardized performance measures.

## Procedure

The procedure began with the individual application of the diagnostic instrument, aimed at capturing students' initial self-perception of their research competencies. Subsequently, during the course, students formulated research problems, made methodological decisions, produced empirical data, and advanced in their analytical organization. At the end of the course, each team produced a narrative-reflective essay about their inquiry experience, and students again responded to the instrument individually, allowing for the observation of descriptive variations between the two time points.

## Data analysis

Qualitative analysis was conducted using reflexive thematic analysis, following the phases proposed by Braun and Clarke (2021). The corpus consisted of the 13 narrative-reflective essays and the open-ended responses from the administered instrument. Initial reading allowed for familiarization with the material and the recognition of recurrences related to the experience of learning to research.

An inductive, open coding process followed. This process yielded 47 preliminary codes, which were reviewed and reorganized until three narrative-formative axes were constructed. These axes allowed for interpreting the most relevant shifts in the teams' experiences: from task to meaning, from instrument to relationship, and from fear to agency.

To strengthen interpretive consistency, the coding performed by the lead researcher was cross-checked by an external academic peer from the field of education. This review covered 40% of the narrative corpus, corresponding to five essays and 39 codable fragments. Disagreements were discussed until interpretive agreements were reached.

For the quantitative component, pretest and posttest means were calculated from individual student responses. Subsequently, these results were aggregated by team using averages to relate them to the 13 group narratives analyzed qualitatively. The data were interpreted for descriptive-complementary purposes, without being assumed as independent statistical evidence.

**Table 1**

*Synthesis of the reflexive thematic analysis process*

Narrative-formative axis	Interpretive core	Examples of identified patterns
From task to meaning	Reconstruction of the research process as a coherently articulated journey	Shift from activity completion to process understanding; connection between problem, method, and results; recognition of the purpose behind each methodological decision.
From instrument to relationship	Shift from a technical logic toward a relational understanding of fieldwork	The interview as conversation; emphasis on listening; attention to the participant's experience; recognition of ethical implications in interaction.
From fear to agency	Transformation in the student's stance toward research and their interpretive capacity	Decrease in insecurity; greater initiative in decision-making; appropriation of the research process; willingness to interpret and argue.

Source: Authors' own elaboration based on reflexive thematic analysis of student narratives.

**Note.** The axes were constructed from an inductive coding process that identified regularities in the narratives, subsequently organized into interpretive cores condensing transformations in the formative experience.

### Rigor criteria and ethical considerations

The rigor of the study was addressed through decisions aimed at sustaining the coherence of the analytical process and transparency in interpretation. Source triangulation was used, articulating student narratives, open-ended responses, and quantitative information produced throughout the course. This cross-referencing allowed findings to be situated in relation to different types of evidence and avoided isolated readings of the material.

Interpretive consistency was strengthened through inter-researcher review. An external academic peer examined a portion of the corpus and compared the

coding performed, allowing for discussion of differences and refinement of interpretive criteria. Concurrently, an analytical record was maintained, documenting decisions, methodological tensions, and potential biases associated with the dual role of instructor and researcher.

Student participation was voluntary and had no impact on academic evaluation. Information confidentiality was safeguarded by anonymizing the narratives prior to analysis.

## Results and discussion

Analysis of the student narratives and open-ended responses allowed for the recognition of three narrative-formative axes that condensed relevant changes in the experience of methodological learning. These axes were termed: from task to meaning, from instrument to relationship, and from fear to agency. Together, they showed shifts in how students understood the research process, related to fieldwork, and assumed their own capacity to conduct research.

This qualitative reading was accompanied by favorable descriptive variations in the self-perception of research competencies between pretest and posttest. As shown in Table 2, all evaluated dimensions registered increases in their means, with larger differences in theoretical framework construction, information searching and critical analysis, handling of data collection tools, and application of ethical norms in research.

**Table 2**

*Pretest-posttest variation in dimensions and action components of research competence*

Research competence dimension	Action component of research competence	M Pre	M Post	$\Delta$
Cognitive	Research problem formulation	2.46	4.12	1.65
Cognitive	Information searching and critical analysis	2.12	4.27	2.15
Cognitive	Theoretical framework construction	2.08	4.35	2.27
Methodological	Methodological design	2.42	4.12	1.69
Methodological	Handling of data collection tools	2.31	4.31	2
Methodological	Application of ethical norms in research	2.19	4.19	2
Methodological	Data analysis and interpretation	2.35	4.31	1.96
Communicative	Academic and scientific writing	2.42	4.23	1.81
Collaborative	Digital collaboration and teamwork	2.54	4.42	1.88
Transversal	Research autonomy	2.69	4.27	1.58

Source: Authors' own elaboration based on the instrument administered individually to students and aggregated by team for descriptive purposes.

**Note.** M = arithmetic mean on a Likert scale from 1 to 5, calculated from individual responses and aggregated by team for descriptive purposes.  $\Delta$  = difference between posttest and pretest.

### From task to meaning

The first observed shift related to how teams began to understand research as an articulated process. Initially, several accounts situated methodological work at the level of task completion. Activities appeared as successive submissions, and the primary concern seemed focused on meeting course requirements. At that point, formulating the problem or preparing instruments was not always narrated as part of the same inquiry logic but as steps to be completed to move forward.

This view began to change when students narratively reconstructed their lived experience. Writing allowed them to revisit decisions that, during the course, had been experienced fragmentedly. One team expressed this by noting, "At the beginning, we just did what was asked, but later we understood why we did each part" (E3). Another group stated, "It was no longer just about completing the assignment, but about understanding what we were researching" (E7). In both cases, the difference does not appear as simple technical improvement. What becomes visible is a change in how the parts of the process are related and the possibility of recognizing meaning in what was previously experienced as mere task.

This transformation is also reflected in the instrument dimensions linked to organizing research work. Problem formulation increased from 2.46 to 4.12, and data analysis and interpretation advanced from 2.35 to 4.31. Theoretical framework construction showed a similar movement, from 2.08 to 4.35. These data have a descriptive scope but accompany the qualitative reading by showing a favorable trend in aspects related to understanding methodological structure.

Recent discussions on teaching research help situate this finding. Studies conducted in higher education have indicated that methodological learning acquires greater consistency when the experience is articulated with active inquiry processes, participation, and reflection on investigative practice (González Calleros & Torres Gastelú, 2024; Matos et al., 2023a; Seabra et al., 2023). Likewise, current research has reinforced the idea that appropriating a method requires more than applying procedures, as it involves building understanding of methodological decisions and the formative meaning of researching (Arosio, 2025; George-Reyes et al., 2023; Mori et al., 2025). In the analyzed case, reflection and narrative writing as formative mediation appears to operate precisely at this point, allowing teams to revisit the experience and recognize research as a journey with internal coherence.

### From instrument to relationship

The interview occupied a particularly revealing place in the narratives. In initial approaches to the field, several teams understood it primarily as an instrument to be applied correctly. Attention was focused on fulfilling the planned activity and obtaining sufficient information to continue the work. In this initial way of approaching the technique, the relationship with the participant remained

somewhat in the background.

Subsequent writing allowed for the recognition of another dimension of the experience. In one group narrative, it was noted that "it wasn't just about asking questions, but truly listening to what the person was telling us" (E5). Another team stated that "the interview became a conversation where we had to pay attention to what the person was saying" (E9). Both expressions show that fieldwork began to be understood through encounter and was no longer absorbed by format.

This shift introduced a more concrete ethical concern. Recognizing that research involves receiving another's experience led students to pay greater attention to the care of what was said and how that information would be treated afterward. This reading aligns with recent studies that have questioned research methodology teaching focused on the correct application of techniques and have highlighted the value of active participation, reflection, and student engagement in inquiry processes (Gardner, 2024; Jensen et al., 2025; Lederer, 2025; Nind & Lewthwaite, 2023). Recent studies on active methodologies and scientific training broaden this reading by situating learning as a practice that demands participation and responsibility toward what is produced (Guarda et al., 2023; Seabra et al., 2023).

The descriptive comparison from the instrument accompanies this interpretation. The application of ethical norms in research increased from 2.19 to 4.19. A favorable change was also observed in digital collaboration and teamwork, which advanced from 2.54 to 4.42. These data do not replace the narrative evidence, although they are consistent with increased attention to the responsibility inherent in fieldwork. From this perspective, the contribution of Santos (2010) and Santos and Meneses (2014) allows reading the relationship as part of the knowing process, to the extent that researching involves situating oneself in relation to other knowledges and experiences.

### **From fear to agency**

The third axis showed that learning to research also involved modifying the student's relationship with their own academic voice. In initial narratives, the difficulty of progressing with the work mixed with the feeling of being faced with a practice that did not yet feel like one's own. The expression "at the beginning, I thought I wouldn't be able to do research" (E2), recorded in a group narrative, condenses that distance. Something similar occurred with data interpretation, experienced by some teams as a particularly uncertain moment. "I was afraid to interpret the data because I felt I might do it wrong" (E6) expresses that tension when faced with the need to produce one's own reading.

The most relevant change appears when this insecurity begins to be narrated from another place. "Now I feel that I can understand what I'm researching and say something about it" (E11) does not announce full mastery of the research craft. Rather, it shows a different way of inhabiting the process. Students begin to recognize themselves as capable of intervening in the production of meaning, even when doubt remains. This variation also appeared in the descriptive comparison of the instrument, where research autonomy increased from 2.69 to 4.27 and methodological design from 2.42 to 4.12. Academic and scientific writing advanced

from 2.42 to 4.23, data that accompany the narrative reading of the progressive construction of one's own voice.

Read from the perspective of research training, this shift allows for nuancing the idea that simply participating in a research project suffices to appropriate the process. The analyzed experience suggests that participation needs spaces for elaboration, especially when the student must interpret what was produced and take responsibility for what they assert. At this point, the finding connects with studies that have pointed to the formative value of reflective writing in inquiry and collaboration processes in higher education (Gardner, 2024; Harvey et al., 2025; Hosein & Rao, 2017; Schürmann et al., 2025). In this study, such writing appears to have opened room for initial fear to gradually transform into a more active stance toward knowledge.

Considering the three axes together, the formative experience did not produce isolated changes but a broader shift in how research learning occurs. Understanding of the method became more integrated, fieldwork acquired relational meaning, and students began to recognize themselves with greater agency within the research process. These variations were expressed interwovenly in the narratives and were accompanied by favorable descriptive changes in the self-perception of competencies.

This finding allows for nuancing a frequent idea in research methodology teaching. Active participation in inquiry processes is necessary but does not itself explain the appropriation of methodological learning. In the analyzed experience, reflection and narrative writing provided specific mediation by allowing teams to revisit their lived experience, organize it, and recognize the meaning of decisions made. At this point, the results align with approaches to experiential learning, research-based teaching, and reflective interventions in higher education, where experience requires elaboration to become formative understanding (Festas et al., 2023; Zhai et al., 2023).

From this perspective, reflection and narrative writing as formative mediation acquire a more precise pedagogical value. It does not operate merely as a closing resource but as a way to make visible the logic of the research process and the position the student constructs toward knowledge. This reading dialogues with Freire (1996), for whom educational practice demands critical reflection on one's own action, and it approximates the systematization of experiences, where practice needs to be reconstructed and interpreted to produce learning (Vásquez, 2024). It can also be linked to Bourdieu (1986), to the extent that learning research involves progressively appropriating dispositions proper to academic work. At the level of university pedagogy, Gonçalves and Alves (2024) reinforce this interpretation by showing that the transformation of higher education requires spaces where practice becomes an object of review and formative experimentation.

The scope of these results is understood in relation to the study's conditions. The research was developed within a specific course and with a limited number of teams, which guides the type of interpretations that can be sustained. Within this framework, the findings allow for clearer recognition of how reflection and narrative writing as formative mediation intervenes in the way students understand their own research process, opening a field of analysis on the mediations that make such

learning possible in higher education.

## Conclusions

The study supports the idea that teaching research methodology involves creating conditions for students to understand the meaning of what they do during the investigative process. In the analyzed experience, reflection and narrative writing functioned as a formative mediation that helped reconstruct lived experience, recognize the logic of decisions made, and strengthen how students perceive their research competencies.

The contribution of the study lies in showing that participation in research processes, although necessary, does not by itself guarantee understanding of the method. Methodological learning requires spaces for elaboration that allow the experience of researching to become an object of pedagogical reflection.

This reading invites a revision of how research training is typically understood in higher education. Teaching research methodology gains relevance when it fosters students' progressive appropriation of the research craft, their understanding of the relationship between problem, method, and evidence, and their recognition of greater agency in relation to knowledge.

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### Declaration of author responsibility

**Luis Napoleón Quintanilla López 1:** Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Resources, Software, Supervision, Validation/Verification, Visualization, Writing/Original Draft, and Writing/Review & Editing.

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