Chapter 1

Methodology[3]

In order to develop the activities proposed to address the question of the importance of training for the generation and appropriation of a culture of Research Ethics, Bioethics and Scientific Integrity, a subgroup of the Training roundtable in 2021 was organized as a conceptual development group, with the aim of reflecting on the importance of training for the appropriation of a culture of Research Ethics, Bioethics and Scientific Integrity.

The working route to address the question was based on the identification of common aspects of all research, technological development, and innovation processes, and of the cognitive biases associated with these processes. These common aspects also made it possible to find similarities and differences between the areas of knowledge, which facilitated the identification of some cognitive biases that influence the attitudes and behaviors present in the processes of research, technological development and innovation, and which could represent a factor of ethical risk, i.e. affect the reflective capacity and capacity for action of individuals, as well as institutions, in the face of the consequences of their decisions in the field of science, technology and innovation activities.

This group started its activities in February 2021 with this objective in mind, for which it developed the following activities.

1.1 Initial literature review

A review of the state of the art and documents resulting from the work of the Training Committee was conducted, such as the Diagnosis of training capacities in Research Ethics, Bioethics and Scientific Integrity and the *Diagnosis of training needs in Research Ethics, Bioethics and Scientific Integrity.* As a result of this initial phase, some basic authors and relevant aspects were identified.

[3] Prepared by the Conceptual Development group, a work team of the Training Roundtable Discussion for the implementation of the Research Ethics, Bioethics and Scientific Integrity Policy.

1.2 Expert consultation

Given the shortage of specific bibliography on the impact of training for the appropriation of a culture of Research Ethics, Bioethics and Scientific Integrity, especially in some areas, and the need to define an integrated route for the development of the exercise, it was considered necessary to consult experts in order to define basic aspects that would guide the reflection.

Therefore, an event was organized on the topic: Importance of training for culture change in Research Ethics, Bioethics and Scientific Integrity, with the support of the PhD in Bioethics of the Universidad Militar Nueva Granada, which included two sessions:

1. **April 16, 2021:** Socialization of the results of the Diagnosis of training needs in Research Ethics, Bioethics and Scientific Integrity, and socialization of the progress of the discussion (review) on the importance of training for the fulfillment of the objective of the policy. This event was in charge of the Training Roundtable Discussion group and Minciencias.

2. **April 26, 2021:** Based on what was socialized in the first session, the invited expert PhD.[4] proposed some minimum aspects to be considered for the development of the reflexive proposal. For this first exercise, the Conceptual Development group designed some questions to clarify the expert's approach to the topic.

The expert's input highlighted six aspects:

Outrage: Considered the gateway to identify that biases exist and become aware that "something is going wrong".

Responsibility: Addresses awareness, as the individual perceives him/herself as an agent of change, and autonomy, inasmuch as the individual acts in response to the situation.

Culture: It is built from everyday behaviors, in which several autonomous agents perform exemplary actions and reproduce them to develop patterns of behaviors from which culture emerges.

Ethics: From culture there is not only agreement on certain actions, but there is a general awareness of a norm of action of what is right and wrong.

[4] Invited expert who was familiar with the progress of the Training Roundtable Discussion's work and was the prologue author of the book resulting from the research on training needs in this area.

Imagination: Allows ethics to transcend into more general aspects, projecting courses of action in probable future contexts, guiding how one should act.

Education and training: Includes the institutional rules that provide feedback and give structure to what is generated by the culture.

Additionally, the members of the Roundtable discussion agreed that it was necessary to identify common aspects for the different actors of the National System of Science, Technology, and Innovation (SNCTeI). This allows, on the one hand, to assume that there are shared cognitive biases, attitudes, and behaviors, and, therefore, susceptible to be addressed under similar parameters, and, on the other hand, to generate a complementary view from the different sectors and areas of knowledge. Likewise, the importance of a fluid feedback between the different actors of the system is highlighted, which allows to generate a dynamic balance, where the whole and the parts converge towards the same objective, in this case, the appropriation of a culture in Research Ethics, Bioethics and Scientific Integrity. Finally, we consider the question of the methodological path for the initial identification of what is common to the actors: cognitive biases.

1.3 Inclusion of cognitive biases, attitudes, and behaviors

In May 2021, based on the results of the initial discussion carried out by the group, the guidance of the expert and the review on the topic of attitudes and behaviors and their impact on the generation of culture, which one of the members of the group had been conducting in parallel, a researcher joined the work team and contributed to the identification of the importance of addressing the issue of cognitive biases as the basis of the conceptual proposal. Thus, the group decided to direct the discussion towards the identification of cognitive biases (recognition) and the importance of training in the transformation or elimination of cognitive biases that affect attitudes and behaviors, since they have an impact on the Research Ethics, Bioethics and Scientific Integrity culture of the SNCTeI.

1.4 Cognitive Bias Identification

In order to generate the discussion object of the proposal, on the one hand, the group focused on defining aspects common to the various areas of knowledge, identifying similarities in the stages of development of research, technological development and

innovation processes, and, on the other hand, addressing possible cognitive biases that affect behaviors that affect ethics, bioethics and scientific integrity in each area. This verification helped to establish that the processes of science, technology and innovation share common aspects in their development, and that, in this sense, it would also be possible to infer that, regardless of the area of knowledge, they share some cognitive biases.

1.5 Cognitive Bias Classification

Once the initial identification of cognitive biases in each area had been conducted, a classification of the cognitive biases identified was made according to the typology defined from the theoretical review on the subject. The classification was socialized with the group to adjust it and identify aspects common to all areas of knowledge.

1.6 Consultation

Considering the decisive role of the participation of the various SNCTeI actors in the implementation of the EIBIC Policy, representatives of the various areas of knowledge were consulted on the relevance of the cognitive biases identified, consultations made by roundtable discussions according to areas of knowledge in the framework of the IX National Dialogue on Research Ethics (2021), organized by Minciencias.

From culture there is not only agreement on certain actions, but there is a general awareness of a norm of action of what is right and wrong.

Table 1. Roundtable Discussion of the Conceptual Development Group at the 9th National Dialogue on Research Ethics

Execution date	Friday, October 1, 2021
Time	10:45 a. m.–12:30 p. m.
Event title	Advancement of the conceptual development proposal on "Importance of training for the appropriation of a culture in Research Ethics, Bioethics and Scientific Integrity".
Purpose of the roundtable discussion	Socialize the progress of the conceptual development and obtain feedback on the proposal. To broaden the view on the cognitive biases identified in relation to the theoretical-conceptual development on the importance of training in the appropriation of a culture in Research Ethics, Bioethics and Scientific Integrity.
Modality	Virtual | Zoom platform
Methodology	Discussion by areas of knowledge based on guiding questions: • Which of the identified cognitive biases do you consider relevant in relation to research, technological development, and innovation activities? • Which emerging cognitive biases related to scientific research, technological development and innovation activities do you consider that can or should be included?
Social sciences, humanities, arts, and education attendees	80, approximately
Environmental and basic sciences	60, approximately
Biomedical sciences and engineering	100, approximately

Source: Author's preparation

Cognitive Bias Refinement

The consultation made it possible to identify the need to define minimum criteria for classifying cognitive biases that would allow for their refinement by area of knowledge, as well as to identify cross-cutting biases in all areas. As a result of this phase, criteria were defined that made it possible to have greater clarity on when we are talking about cognitive bias, and thus select only those that met these criteria, and the respective actors had identified as relevant for the area of knowledge. Additionally, a comparison was made between areas of knowledge to select those cross-cutting biases and those specific to each area of knowledge. A comparison matrix was used for this activity. This refinement work was conducted by the same knowledge areas that have been working on the implementation of the policy in question.

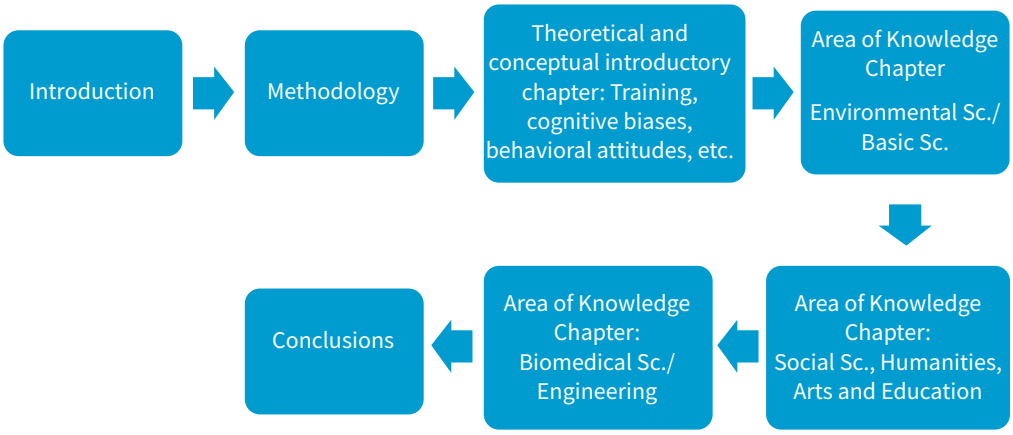
1.7 Conceptualization

The previous work guaranteed the structuring of a document that could give evidence of the path followed on how the formative processes in topics related to Research Ethics, Bioethics and Scientific Integrity cooperate in the modification or elimination of these cognitive biases and attitudes, as well as in the generation of behaviors, coherent with the generation and appropriation of a culture in the subject. The guiding question of the reflection was the following: How can training modify the cognitive biases (of the areas of knowledge) that impact on attitudes and behaviors in Research Ethics, Bioethics and Scientific Integrity?

This document gathers the result of this process, which deepens in each of the defined aspects and areas of knowledge. Once the group's work was reviewed and consolidated, the following route was structured:

We are invisible to ourselves, and only careful reflection can allow us to unveil our own presuppositions.

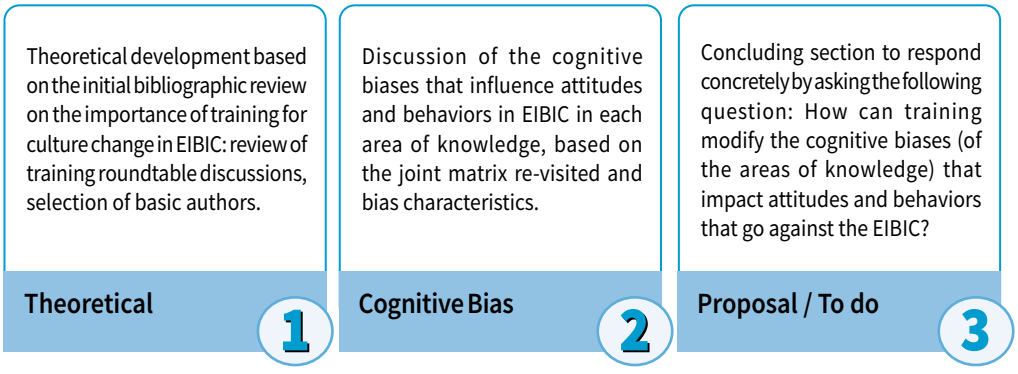
Figure 1. Document structuring path



Source: Author's preparation

Likewise, in order to unify the approach to the subject in the different areas of knowledge, agreements were reached on the structure of these chapters:

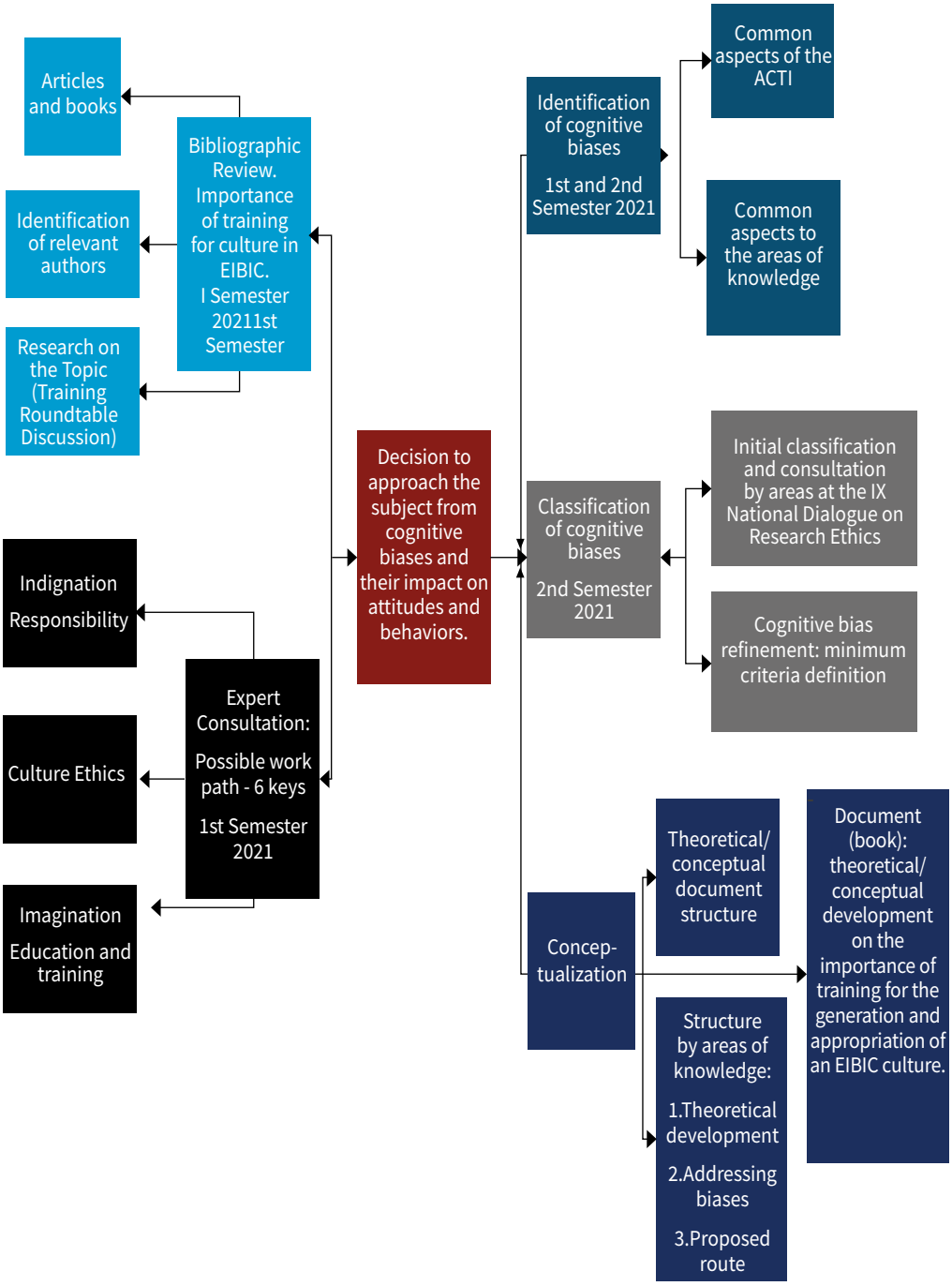
Figure 2. Agreements on the approach structure by areas of knowledge



Source: Author's preparation

The following is a summary of the process conducted by the Conceptual Development Group of the Training Roundtable Discussion to address this topic:

Figure 3. Summary of the 2021-2022 Conceptual Development Group Methodology



Source: Author's preparation