Complex thinking, planetary ethics and social transformation in teacher education

Juan Martín López-Calva

[1] http://orcid.org/0000-0002-6948-8556, Universidad Popular Autónoma del Estado de Puebla, México

Abstract

Introduction: The crisis that the world is experiencing today is demanding attention to the ethical training of the new generations. An essential element to attend it is the ethical training of teachers. **Objective:** To present the results of an exploratory research that investigated the opinion of teachers and experts in teacher training programs, on the ethical training of teachers from the loop: complex thinking-planetary ethics-social transformation. **Method:** A sample of 22 experts in teacher training and 222 teachers of different educational levels were surveyed, applying an exploratory questionnaire on the ethical training of teachers, constructed with a Likert scale of seven options. The results of the questions related to the loop described in the objective, which is part of the constructed theoretical proposal, are presented descriptively and comparatively. **Results:** show that there is not enough attention to the ethical training of teachers from the dimensions: complex thought-planetary ethics-social transformation. **Discussion:** the opinion of the teachers is slightly more positive than that of the experts, although both groups show the insufficiency of teacher training in these areas. Being an exploratory study, it provides a first comparative look. It will be necessary to complement it with a qualitative study.
Keywords: thinking; teacher responsibility; social change; teacher education.

Pensamiento complejo, ética planetaria y transformación social en la formación del profesorados

Resumen

Introducción: La crisis que vive el mundo actual demanda la atención a la formación ética de las nuevas generaciones. Un elemento indispensable para atenderla es la formación ética de los docentes. **Objetivo:** Presentar los resultados de una investigación exploratoria que analizó la opinión de profesores y expertos en programas de capacitación docente sobre la formación ética del profesorado desde el bucle: pensamiento complejo-ética planetaria-transformación social. **Método:** Se encuestó a un grupo de 22 expertos en formación del profesorado y a 222 docentes de distintos niveles educativos, se les aplicó un cuestionario exploratorio sobre la formación ética del profesorado, construido con una escala Likert de siete opciones. Se presentan descriptiva y comparativamente los resultados de las preguntas relativas al bucle descrito en el objetivo, que es parte de la propuesta teórica construida. **Resultados:** muestran que no hay suficiente atención a la formación ética del profesorado desde las dimensiones: pensamiento complejo-ética planetaria- transformación social. **Discusión:** la opinión de los profesores es ligeramente más positiva que la de los expertos, aunque ambos grupos muestran la insuficiencia de la formación de los docentes en estos rubros. Al ser un estudio exploratorio, aporta una primera mirada comparativa. Será

***Correspondence:**
Juan Martín López-Calva
juanmartin.lopez@upaep.mx

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Palabras clave: pensamiento; responsabilidad del docente; cambio social; formación de docentes.

Introducción

The global pandemic due to COVID-19, an infectious disease caused by the SARS-CoV-2 virus, which emerged in the city of Wuhan, China at the end of 2019 and spread rapidly around the world during the first months of 2020, has been an urgent wake-up call to humanity that needs a transformation if people are to survive the risks posed by climate change and the systematic destruction of nature, which has been increasing since the origin of modernity, despite its promise of progress without return.

However, far from fulfilling this promise, the pandemic has amplified the enormous structural problems that have been pointed out by many contemporary thinkers (Morin, 1993, 2020; Gore, 2006; Gorostiaga, 2000; Touraine, 1994, Wallerstein, 2007), who have defined them with various concepts such as crisis of the world system, structural crisis of capitalism, crisis of modernity, planetary iron age or epochal change.

As Morin (2020) states, today's world faces enormous challenges that are expressed in a political and economic crisis that seems to herald a global food crisis, in addition to a social crisis of unpredictable proportions, which is visible through the large movements of migrants trying to move from poor countries to nations with strong economies. All these challenges are interdependent and must be addressed systemically.

In short, today we are experiencing a crisis of humanity that is basically an ethical crisis, since ethics studies the permanent, historical and sociocultural process of promoting human welfare in its particular, structural-social, and value or cultural levels (Lonergan, 1998).

The 2030 Agenda of the United Nations (UN) seeks to address this ethical crisis, through the Sustainable Development Goals (SDGs) (UN, 2015), whose progress was recently evaluated (UN, 2020). The goal directly related to education is number 4, which "aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all[1]." It has a clear ethical position in its wording, but all the SDGs essentially seek to respond to the crisis of human religation (Morin, 2005) and the ethical crisis that the world has been experiencing in the first decades of the 21st[2] century.

One of the indispensable conditions for responding to the ethical challenge that the changing times are posing to humanity and that is reflected in practically all fields of human activity is the ethical training of teachers, since they are responsible for the comprehensive education of the citizens of the future, which includes the ethical education of future citizens as a fundamental dimension.

The relevance of this ethical training of teachers at all levels has been the subject of several research studies, such as the ones conducted by Hirsch (2009; 2013; 2021), Pérez-Castro & Piña (2021), Belavi & Murillo (2020), and Meirieu (2022). Regarding the methodological aspects of these and other works on the subject, we found many that use questionnaires with Likert scales of opinion to discover the values and unethical behaviors that teachers and students consider relevant and present in teaching practice. As for the theoretical approaches, such as the examples systematized by Hirsch (2009) within the Inter-university Project on Professional Ethics and many other works on ethical teacher training (Jover & Ruiz, 2013; Ramos & López, 2019), the most common are those based on the ethics of principles that does not initially assume the uncertainty and complexity of ethical phenomena, nor the relationship between thinking, ethics, and social transformation.

In this context, this work constitutes a novel theoretical contribution on ethical teacher training based on the complex thinking-planetary ethics-social transformation loop, and involves an

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1   Cfr. https://www.un.org/sustainabledevelopment/es/education/

2   Cfr. https://www.un.org/sustainabledevelopment/es/

exploratory empirical inquiry methodologically similar to that of other works carried out on the subject of teachers' ethics, as a first empirical look at this theoretical approach based on the paradigm of complexity (Morin, 2006) and the humanist philosophical proposal of the Canadian philosopher Bernard Lonergan (1999).

The purpose of this article is to present the results of this exploratory research that explored the opinion of teachers and experts in teacher training programs on ethical teachers' training from the complex thinking-planetary ethics-social transformation loop.

Theoretical Framework.

The original theoretical proposal on which this article is based focused on the articulation of three elements that are considered fundamental for the good ethical training of teachers. It is the dialogic union between complex thinking, planetary ethics, and social transformation, which is part of a broader philosophical research on humanistic education that articulates Morin's complexity paradigm with Lonergan's humanistic vision (López-Calva, 2009).

"Thought transformation leads to a reform of life absolutely necessary for the well-being...," states Morin (2016, p. 102) in order to highlight the structural relationship between thinking and ethics that, in these times of interconnected challenges in all fields of human activity, translate into a need to transform thinking which can lead us to a change of life that makes the main goal of all ethics a reality: the well-being or the good human life, which—in these times of globalization— aims to be understood as planetary ethics (Morin, 2005). This perspective assumes that the good human life cannot be conceived or constructed from a merely individual perspective, because human beings are intersubjectively linked in a "...primary us which is vital and functional..." (Lonergan, 1988, p. 61), and which poses the challenge of building human societies structured around the common good, fair societies where the simultaneous humanization of each person and of the whole is possible.

The following is a synthetic review of these three elements that make up the loop which

supports the theoretical proposal that was researched in an exploratory manner in the section of the questionnaire that was administered to the subjects of this study: complex thinking - planetary ethics - social transformation.

Complex thinking, according to Morin (2016), "... is the thinking that wants to overcome confusion [...] and the difficulty of thinking, by means of an organizing thought: a thought that separates and connects..." (p. 87). It is a thought capable of always looking at the parts and the whole in order to build more comprehensive approaches to phenomena and to provide more comprehensive and integrating answers to the challenges of reality.

When one thinks in a complex way, we can overcome the views of linear causality and assume that in every vital reality the cause generates the effect, but the effect regenerates the cause; one transcends the exclusionary view, which does not admit that two opposing truths can often be both true, and the different phenomena of reality are understood in the relationships between their parts and of the parts with the whole, assuming that the whole is in each of the parts, just as the parts are in the whole, and logical thinking and mythological thinking arise, as different but complementary for a knowledge that is truly human (Morin, 1999).

This paradigm proposes seven major principles governing complex thinking. These are the systemic or organizational principle, the hologrammatic principle, the dialogic principle, the principle of retroactivity, the principle of recursion, the principle of autonomy dependence, and the principle of reintroduction of the subject cognizant of his/her knowledge (Morin et al., 2006).

These principles describe, with greater accuracy and distinction of elements, the characteristics of complex thinking that have been raised in the previous paragraphs. There is also another principle called the ecology of action, which, together with that of autonomy-dependence, is more directly related to the ethical dimension of the human being (Morin, 2005).

Two of these constitutive principles of complex thinking underpin the relationship between thinking well and building well or contributing to the development of human well-being. First, the principle of autonomy-dependence suggests that

all parts of a system are relatively autonomous and capable of self-determination, but at the same time are dependent on that system with which they need to remain connected in order to survive, learn, build, and grow. This notion is related to Morin's (2003) vision of human freedom, which is autonomous, yet always subject to certain dependencies.

The principle of action ecology states that each human being is relatively responsible for his or her decisions and actions but that, when these decisions and actions come into play within the ecosystem of decisions and actions of other human beings or groups and the role of chance, they can have effects that are beyond the control of the person who made a decision or acted in a certain way and with certain intentions. The consequences of this interplay of decisions and actions combined in a system can even cause decisions and actions to have contrary effects and even turn against the person who executed them. This principle breaks with the individualistic idea of freedom. From the ecology of action, it is clear that individual freedom is always systemically interrelated with the freedom of other individuals and that every decision and action affects and is affected by those of others.

The second element in the loop of the theoretical framework is planetary ethics, which is a complex notion based on the different duties of religation experienced by human beings: the egocentric duty that makes them seek to reconcile with themselves, the gene-centric duty that leads them to seek to reconcile with their kind, those of their race or culture; the sociocentric duty that moves them to work for reconciliation with society; and, finally, the anthropocentric duty that leads them to seek to reconcile with the human species of which they are part.

These duties translate into a self-ethics, socio-ethics, and anthropo-ethics, which are interrelated. The starting point is the conception of the human being as individual society species, both simultaneously and structurally. Planetary ethics or the ethics of humankind emphasizes the individual-species relationship manifested in the anthropo-ethics, while socio-ethics emphasizes the individual-society relationship. Socio-ethics is reached through the constant regeneration of democracy, while anthropo ethics is realized through the search for solidarity, fraternity, and equality among all human beings, fighting against exclusion so as not to leave any human being out of the humanity to which they belong (Morin, 2005).

Just as it is important to train teachers in complex thinking, which seems to be absent due to the weight of a hyper-specialized and fragmented training tradition of knowledge based on disjunction, so teacher training within planetary ethics is fundamental in these times of interconnected challenges, which call for commitment and international solidarity.

The third element of the loop that constitutes the theoretical basis of this work is that of social transformation. In the same way that thinking and ethics are structurally linked, planetary ethics in its ternary character has an inseparable social implication. On one hand, this double condition raises the need, in the relationship between the individual and society, of education for a democratic citizenship in which learners grow in the full awareness that a mutual control of the individual by society and of society by the individual is required for a true democracy to exist.

On the other hand, it requires training in the individual-species relationship that today calls for an earthly citizenship, in which students develop awareness of their earthly identity and, while they feel fully part of the country in which they were born and live, also assume themselves profoundly as members of the Earth-Homeland (Morin, 1993).

Ethical teacher training today must respond to the paradigm shift that includes the relationship between complex thinking, planetary ethics, and social transformation as the core of teachers' work.

This training implies a deep transformation of the conception of the teacher as a transmitter of content or as an instructor of abstract values and modeler of the character of students, from ideal visions and perfection towards the perspective raised by Morin (2016) of orchestra director who coordinates the efforts and imprints a frame of mind to the autonomous training of each of the learners, letting them to be the ones who seek the information, but also to become a promoter of analysis, synthesis, processing, and, above all, critical reflection and ethical deliberation.

In order to achieve this paradigmatic change in teacher training, a central step would be the one proposed by Morin (2005) for the ethical training of students, which consists of what he calls working to think well. The education of the dominant paradigm, both in the case of learners and educators, has many more elements of what Morin (2005) considers as thinking badly: it is a training that teaches to fragment knowledge into separate subjects and topics, which tends to ignore the contexts of knowledge and only sees unity or diversity in data, but is not able to see unity in diversity and diversity in unity. It is, especially in this current context that Nussbaum (2010) calls education for income, an education that only sees the immediate, ignores the past, and sees only the short-term future; an education that leaves aside the recursive relationship between past-present-future because it looks only at the present moment. It is an education that privileges the quantifiable and disregards or minimizes what cannot be measured or observed, so that humanities and arts are sacrificed instead of being magnified as they should be, according to Morin (2000), Nussbaum (2010), and Lonergan (1999).

What is required in teacher training to enable teachers to become orchestra directors is, on the contrary, to educate in a working environment in order to think well, which—according to Morin (2005)—consists in finding reconciliation, freeing knowledge from fixations, abandoning the mutilated point of view of separate disciplines and subjects, and seeking a pluridisciplinary, multidisciplinary, interdisciplinary, or transdisciplinary knowledge. Teachers need to be trained to deal with the complexities of today's world, to develop their abilities to distinguish and integrate, to separate reductionism from holism through the ability to link the parts with the whole in each phenomenon studied and in the understanding of the educational process.

It is about a type of teacher training that teaches to consider contexts, that develops an open rationality, and that can include current realities in the past-present-future circle in order to have an integrated understanding of knowledge and of human well-being under construction, recognizing uncertainties.

Method

As indicated in the introduction, this article presents the results of a first exploratory empirical research on the original theoretical proposal about ethical teacher training based on the loop that dialogically articulates three central elements: complex thinking - planetary ethics - social transformation. This paper presents the results of a survey, in the section related to these three elements.

Participants

An opportunity sample was obtained consisting of two types of participants: on the one hand, teachers from different educational levels and; on the other hand, academic experts in the field of teacher training, including officials and former officials of the Mexican educational system, directors of teacher training institutions, educational researchers in the area of teacher training, and teacher trainers, in order to contrast the vision of those who have experienced the training programs and those who have participated in the design, implementation, or research on these programs.

In the case of the experts, the survey was applied to an opportunity sample of 22 scholars of recognized prestige in the field of teacher training and educational policy. The sample of experts consisted of 13 men and nine women, some of whose data are presented in Table 1.

Most respondents have a major in Education or Pedagogy (19), although several of them also have training in the field of Sociology (2), Philosophy (1), and Educational Technology (1).

Regarding their fields of activity, most of them are primarily committed to teaching and research—16 and 15, respectively,—10 have been or are program directors, and five more have held positions as public officers, one of them as Secretary of Public Education in the federal sector and another at the state level.

In the case of the sample of teachers, a total of 222 male and female teachers responded to the instrument, of whom 163 were women and 59 were men. A master's degree is prevalent in their educational profiles with 110 teachers, followed by an undergraduate degree, with 57; and doctoral

degrees, with 55 participants. Some data of these teachers are presented in Table 2 below.

Instrument

For this research study, an original instrument entitled "Teacher Training in Ibero-America: A View From Professional Ethics" was designed.

This questionnaire consists of six sections: demographic data, agency, intellectual transformation, ethical transformation—from the point of view of ethics of principles and planetary ethics,—educational pact, and future. The total number of items in the instrument was 20 closed-ended questions structured on a Likert

Table 1

Data from the 22 Expert Participants

Academic Degree	
PhD	86.4%
Master's Degree	13.6%
Years of Experience in the Educational Field	
More than 30 years	77.3%
Between 30 and 25	4.5%
Between 25 and 21	9.1%
Between 20 and 16	9.1%
Nationality	
Mexican	82%
Argentinian	4.5%
Uruguayan	4.5%
Venezuelan	4.5%
Colombian	4.5%

Table 2

Data from the 222 Teaching Participants

Educational Level of Work	
Bachelor's degree	40.1%
Preschool	23.0%
Postgraduate	21.2%
Basic Education	19.4%
Baccalaureate	13.5%
Normal schools	13.5%
Educational Sector of Work	
Public	55.4%
Private	51.8%
Nationality	
Mexican	98.2%
Argentinian	0.9%
Colombian	0.9%

Note: In the items Educational level of work and Educational sector, the sum is greater than 100% because some of them work in several educational levels and in both sectors.

scale of seven options ranging from Strongly Disagree to Strongly Agree, and four open-ended questions in the last two sections: educational pact and future.

The purpose of the questionnaire was to analyze, in an exploratory way, the opinion of experts in the field of teacher training and of active teachers on different aspects of ethical teacher training that correspond to each of the six sections mentioned in the previous paragraph. As mentioned above, the selection of both groups was based on the experience from the perspective of those who have been trained in the programs and those who have participated in their design and implementation, or in their research. The instrument was submitted to expert judgment by two scholars who are members of the National System of Researchers (SNI) of the National Council of Science and Technology (Conacyt) of Mexico. Both researchers are experts in research methodology, have more than five years of experience as directors of master's and doctoral theses, and as reviewers of articles in national and international journals. One of them is also a regular lecturer in research seminars.

This article reports the results obtained from the questions related to complex thinking, social transformation, and planetary ethics, which correspond to numbers 2.5, 3.4, and 3.11, respectively, within the questionnaire.

Procedure

The invitation to the participants was made using two different strategies. In the case of the experts, it was sent by e-mail and, in the case of teachers, this was done in a public and open manner.

In the case of the experts, a personal invitation was sent to a large group of experts—about 35;—the researcher had already known most of them, while he had only read about some others while doing research on the subject. The invitation was sent in a personalized way through the e-mail of each expert, with a text that synthetically explained the purpose of the questionnaire and included the link to the Google Forms format where it could be answered. The selection of experts was limited to the Latin American region, and out of this large group, 22 experts responded to the questionnaire.

For teachers of different educational levels, the invitation was made openly through the personal page of the social network Facebook, which has a list of almost 4,000 followers, among which approximately 60% are currently active teachers, undergraduate and graduate students of education, or educational researchers.

The instrument was applied in the 2020 fall semester, with a three-week period allowed to receive the responses in. Once the collection time was over, we proceeded to obtain the data using the Excel sheet that is automatically obtained from Google Forms.

In both cases, no informed consent letter was requested since the instrument was open to those who wished to respond, and the Google Forms survey guarantees the anonymity of the respondents. This element of data confidentiality was specified in the invitation text sent to the experts by e-mail and to the teachers via the Facebook page.

Análisis de Datos

As it has already been explained, this is a first exploratory empirical approach to know the opinion of experts and teachers about the ethical training of teachers, from the humanistic and complex theoretical contribution synthesized in this work in the complex thinking - planetary ethics - social transformation loop. The data analysis presented in this work is exclusively descriptive.

Thus, the percentages of responses in each option of the Likert scale in the three questions addressed in the study are presented, both in the group of experts and in the group of teachers, in order to compare and contrast their opinions regarding each of the three core concepts of the theoretical proposal. As part of this descriptive analysis, the mode and trends towards the agreement or disagreement levels in both groups of participants in the three items considered are shown.

This descriptive analysis fulfills the objective of an exploratory inquiry into the opinions of

experts and teachers on ethical teacher training seen from the complex thinking - planetary ethics - social transformation loop, although it obviously provides only a first look that needs to be further studied through the analysis of the open-ended questions of the questionnaire and, in order to obtain an explanatory view that goes beyond the opinions and explores the meaning and analysis of the participants' responses of both groups, a second stage that should be qualitative in nature could be carried out through semi-structured interviews or focus groups, as to mention two possible methodological strategies for the further development of this work.

Results

This section presents the results of the exploratory survey on teacher training in the questions related to the complex thinking - planetary ethics - social transformation loop. Each figure shows the seven Likert scale response options that are represented on the horizontal axis (x) as follows: 1 (Strongly Disagree), 2 (Disagree), 3 (Partially Disagree), 4 (Indifferent), 5 (Partially Agree), 6 (Agree), 7 (Strongly Agree). The vertical axis shows the number of responses obtained for each item in bars, and the text

description of each item shows the percentages that these numbers represent compared to the total of the sample.

Complex Thinking in Teacher Education

Item 2.5 assesses the opinion on complex thinking. Although two ideas are apparently shown in one item, it was written in such a way that the term complex thinking was broken down in more concrete terms as thinking that integrates the various disciplines that make up the training rather than separating and isolating them.

As shown in Figure 1, the teachers' responses are more oriented towards the opinion that teacher training programs moderately develop complex thinking and an integrating vision of the different disciplines that explain the educational phenomenon. The mode of the responses is found in the Partially Agree response, which was chosen by 31.5% of the teachers.

If we add the responses of this option with those of the Agree response, we find almost half of the teachers surveyed (49.5%). The kurtosis of the curve has a moderate trend towards the positive side of the responses, which seems to indicate that, although a good percentage of the teachers consider that the area of complex thinking and its integrating vision is addressed, they do not have a strong perception that this formative axis receives enough attention.

Figure 1
Complex Thinking (Teachers' Vision)

2.5 Teacher training promotes complex thinking and the
integration of the different disciplines that explain the educational phenomenon.
222 answers

Figure 2 shows a kurtosis more oriented towards the negative side of the curve, with a mode in the Disagree response, which has 27.3% of the responses—almost one third,—and if added to the options of Strongly Disagree and Partially Disagree, the number goes up to 59.1%, which indicates that former public officers— former secretaries of state and one federal Public Education officer—, former program directors, or teacher trainers and educational researchers specialized in the subject of teacher training tend to think that there is a lack of training in complex thinking and an integrating vision of the disciplines within teacher training programs in Latin America.
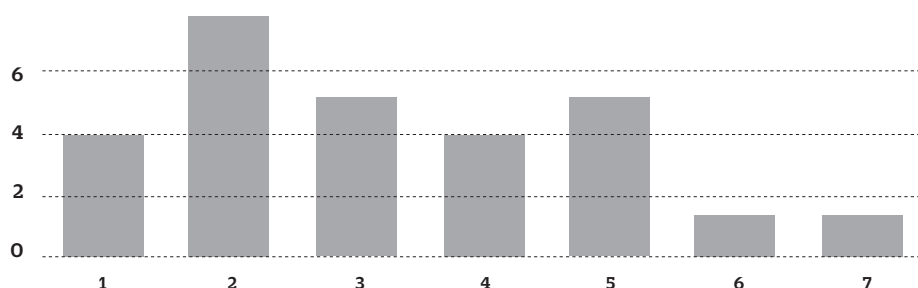
Social Transformation

The question that probed the opinion of both participating groups on social transformation is question 3.4 of the questionnaire, which is formulated as follows: Teacher training programs develop an operational awareness of the teacher's ethical commitment to social transformation.

In this component of social transformation in teacher training, understood as an ethical commitment of all educators, the trends are again mixed, with a moderately positive view of teachers (Figure 3)—a little higher than in the item of complex thinking,—while the experts (Figure 4) again show a more critical view of the programs
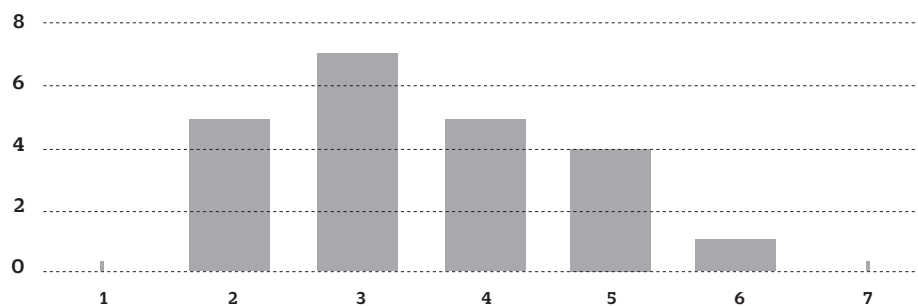
Figure 2
Complex Thinking (Experts' Vision)

2.5 Teacher training promotes complex thinking and the integration of the different disciplines that explain the educational phenomenon.
222 answers


Figure 3
Social Transformation (Experts' Vision)

3.4 Teacher training programs develop an operational awareness of the teacher's ethical commitment to social transformation.
22 answers

Figure 4
Social Transformation (Teachers' Vision)

3.4 Teacher training programs develop an operational awareness of the teacher's ethical commitment to social transformation.
22 answers
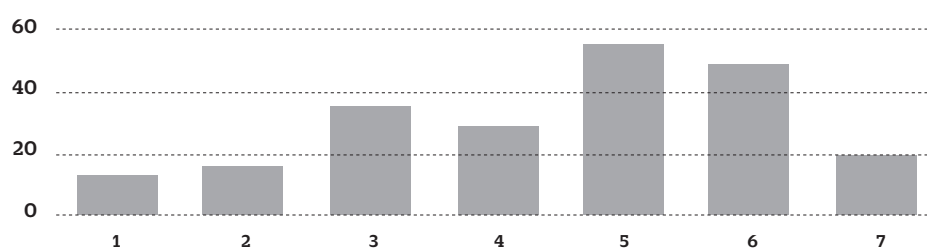
regarding the ethical commitment oriented towards social transformation from teaching.

In the case of teachers, kurtosis of the curve is towards the positive side, and the mode is found in the Partially Agree response, with practically a quarter of the responses (24.8%), and if we add the responses ranging from Partially Agree to Strongly Agree to Agree, we find 53.9% of the responses obtained.

In the responses provided by the experts, the curve has a kurtosis towards the negative side with no responses at point 1 of the scale that represented the Strongly Disagree response. The mode is found in the Partially Disagree response with 31.8%, and if this response and those of Disagree and Indifferent are added, 77.2% of the total responses are obtained. As it can be inferred, although the negative response is also a little more moderate than in the complex thinking category, the experts generally consider that the training of the teacher's ethical commitment oriented towards social transformation through his or her educational work is insufficient.

If we consider that the relationship between ethical commitment and social transformation at national and planetary level is fundamental from the vision of complexity that this research assumes as a necessary foundation for a teacher training that responds to the deep and

interconnected challenges that characterize the world in this civilizational crisis,

it can be seen that, although teachers are more likely to think that this component is being developed in teacher training, this trend is not sufficient, especially considering the evident contradiction with what experts on the subject state.

Planetary Ethics

The item aimed at obtaining the opinion of both groups of participants on teacher training in a vision of planetary ethics is item 3.11 of the questionnaire, which was formulated as follows: Teacher training develops planetary consciousness and a sense of commitment to humanity as an ethical notion. In the same way as in the case of complex thinking, the wording apparently contains two different ideas; however, the second part of the item is only an explicit explanation of the first, that is, a planetary consciousness consists of a commitment to humanity as an ethical notion, as explained by Morin (2001).

In this third component of the complex thinking - social transformation - planetary ethics loop, we find again the same pattern in which teachers in general are oriented, though not strongly, towards a more positive view of the

teachers' training, while the experts again show a more critical trend.

Figure 5, which presents the teachers' responses, has a kurtosis clearly oriented towards the positive side of the curve, although the responses are evenly distributed among the various options on the scale. The mode of this figure is divided in practically equal parts between the options of Partially Agree (23.4%) and Agree (23.9%), which sets out a moderately positive trend of 47.3%, which added to the Strongly Agree option (6.3%) represents 53.6%, that is, almost half of the teachers surveyed. Nevertheless, it should not be forgotten that nearly one third of the teachers who responded

to the instrument (33.3%) chose the Disagree, Partially Disagree, or Strongly Disagree options.

In Figure 6, which shows the results of the experts' responses, there is a clearly negative trend in relation to teacher training programs working on the development of a planetary conscience and on the sense of commitment to humanity as an ethical notion, according to Morin (2001). The mode is found in the Disagree response, with 36.4% of the responses which, added to those of 'Strongly Disagree,' represent 59.1% of the responses, close to two thirds of the individuals surveyed.

On the other hand, the responses on the positive side of the graph are found in the Partially Agree

Figure 5
Planetary Ethics (Teachers' Vision)

*2.5 Teacher training promotes complex thinking and the
integration of the different disciplines that explain the educational phenomenon.
222 answers*
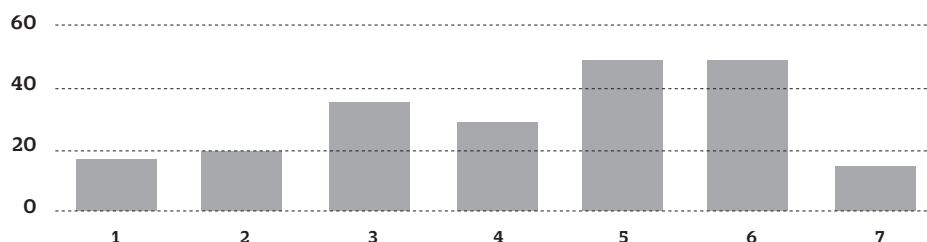
Figure 6
Planetary Ethics (Experts' Vision)

*2.5 Teacher training promotes complex thinking and the
integration of the different disciplines that explain the educational phenomenon.
222 answers*
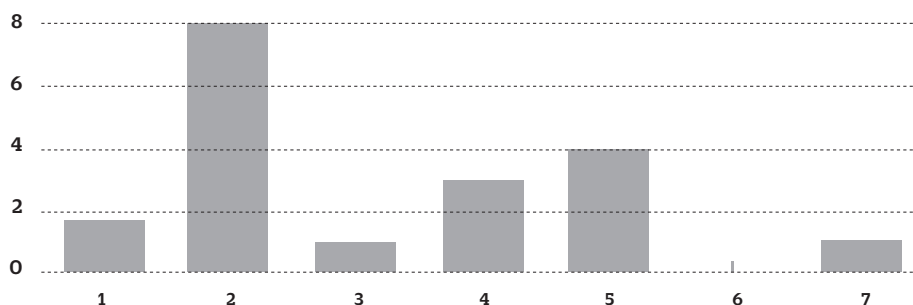
option with 18.2% of the responses, and there was only one response that showed total agreement with the formulation of this item.

These results show that most experts consider that this area of planetary ethics is the one that is most absent in teacher training programs in the Latin American region, which is understandable, because planetary ethics or ethics of the humankind is a relatively recent concept in philosophical thinking—although it dates from the end of the last century;—it is alarming since, in the fragmented and excluding world that we live in today, it is urgent that we have ethical training with an inclusive vision and focused on the construction of an earthly citizenship and on an awareness that humans are structurally defined from the individual-society-species set of three, according to Morin in his anthropological vision (2003).

Discussion

The world is experiencing a very deep crisis that poses interconnected environmental, economic, social, political, and cultural challenges that are placing national societies and global market structures in a real dilemma, which have not been compensated by the development of a policy of humanity that fosters responsibility and planetary solidarity. It is a systemic crisis that many authors have named in different ways, but which is basically a crisis of humanity that requires ethics in order to be resolved.

From the paradigm of complexity, this need for the development of ethics to face the serious problems of this epochal change is not separate but structurally articulated with the development of thinking: moral transformation and the transformation of thought are inseparably linked, forming a recursive and retroactive loop.

A necessary condition for developing this transformation is the training of teachers, who are the central subjects in the education of future citizens. The central contribution of this article is to affirm that this training must be based on the complex thinking - planetary ethics -

social transformation loop and to present a first empirical approach to this perspective.

In order to explore the opinion of teachers at different educational levels and of experts in teacher training on the extent to which this loop is present or not in teacher training programs, this article presents the results of an exploratory survey applied to a sample of both groups.

The results show that, although teachers have a more positive opinion than experts, the complex thinking - planetary ethics - social transformation loop is not sufficiently present in teacher training programs, according to the opinion of both groups.

Since this is a first empirical approach and it is an exploratory and exclusively descriptive study, these results have limitations and should be complemented with a subsequent stage of qualitative research in which the meanings and theoretical and experiential elements that support the vision of teachers and experts in teacher training on the subject of ethical training from this humanistic and complex viewpoint are investigated, beyond opinion. Faced with the crisis of humanity that the world is experiencing today, it is urgent to emphasize ethical teacher training.

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