

La formación de investigadores: oficio y conocimiento pertinente ante los avances de la ciencia y la tecnología

The Training of Researchers: Trade and Relevant Knowledge in the Face of Advances in Science and Technology

A formação de pesquisadores: comércio e conhecimento relevante diante dos avanços da ciência e da tecnologia

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Resumen

Este trabajo analiza la racionalidad científica del conocimiento que construye el sujeto que aspira a ser investigador y de cómo lo relaciona al interpretar la realidad. El objetivo es abordar la relación entre la ciencia y la investigación en el contexto del país. Y plantea que el investigador en construcción debe establecer una relación dialógica con saberes tradicionales y la ciencia formal e instituida para la atención de la problemática ambiental. El método que sirve de apoyo es el interaccionismo simbólico. Este permite alcanzar el propósito de dar cuenta de dónde y para qué son construidos los significados sociales en los que constantemente se da la relación entre pensamiento científico y el proceso de formación. En un ejercicio equiparable a la trasmisión de un oficio, la discusión gira en torno a la construcción colectiva al analizar realidades que se presentan complejas y que imposibilitan la fragmentación para su estudio; requiere de reflexión acerca del sustento epistémico del que se nutren los jóvenes investigadores en formación y de las aplicaciones de este conocimiento; un acto valorativo que recupere valores éticos en su aplicación, donde la multidisciplinaria y el trabajo interdisciplinar son el camino para desentrañar fenómenos en sí mismo complejos.



Asimismo, se incluye el análisis de la tecnociencia como instrumentalización del conocimiento científico, aplicado a la producción agropecuaria y su relación directa con los recursos de la naturaleza. Y se finaliza con la necesidad de reflexionar sobre el sustento epistémico y la incorporación de saberes comunitarios; superar la incorporación irreflexiva de tecnociencias en instituciones de educación superior, y la necesidad de replantearse principios éticos en su quehacer de investigación, en un ejercicio de abordaje de fenómenos que se manifiestan como complejos, sin posibilidad de fragmentación para comprenderlos completamente y donde la interdependencia obliga a un ejercicio transdisciplinar.

Palabras clave: complejidad, formación, oficio, relación dialógica, saberes.

Abstract

The present work examines the scientific rationality of the knowledge the aspiring researcher builds and how it is related when they interpret reality. The goal is to approach the relationship between science and research, in the national context. And it suggests that the researcher in training establish a dialogic relation between traditional knowledge and institutionalized formal science to attend the environmental problems. The supporting method is symbolic interactionism. This achieves the purpose of accounting for where and for what are the social meanings constructed in which often scientific thinking and training process relate. In a exercise comparable to trade training, the argument surrounds the collective construction when analyzing realities that present as complex and make impossible their fragmentation to be studied; it requires reflection about the epistemic foundation from which the young researchers in training draw, and the implementations of this knowledge; an evaluating action that recovers ethical values in its implementation, where multidisciplinary and interdisciplinary work are the way to unravel complex phenomena. Also, this work includes the analysis of techno-science as instrumentation of the scientific knowledge, applied to agricultural production and its direct relationship with natural resources. It is finished with approaches such as the need for consideration of the epistemic foundation and incorporation of communal knowledge. Overcome the irreflexive incorporation of techno-sciences in higher-education institutions, and the need to rethink ethical principles in their research activity, in an exercise of approach complex phenomena

without the possibility of fragmentation to be completely understood and where interdependence forces transdisciplinary approaches.

Keywords: complexity, training, trade, dialogic relation, knowledge.

Resumo

Este artigo analisa a racionalidade científica do conhecimento que o sujeito que aspira ser pesquisador constrói e como ele o relaciona na interpretação da realidade. O objetivo é abordar a relação entre ciência e pesquisa no contexto do país. E ele argumenta que o pesquisador em construção deve estabelecer uma relação dialógica com o conhecimento tradicional e a ciência formal e instituída para a atenção das questões ambientais. O método que serve de suporte é o interacionismo simbólico. Isso nos permite alcançar o objetivo de explicar onde e para que significados sociais são construídos, nos quais a relação entre o pensamento científico e o processo de formação ocorre constantemente. Em um exercício comparável à transmissão de uma negociação, a discussão gira em torno da construção coletiva, analisando realidades complexas e que tornam impossível a fragmentação para estudo; requer reflexão sobre o sustento epistêmico que os jovens pesquisadores em formação nutrem e as aplicações desse conhecimento; um ato avaliativo que recupera valores éticos em sua aplicação, onde o trabalho multidisciplinar e interdisciplinar é o caminho para desvendar fenômenos complexos. Inclui também a análise da tecnociência como instrumentalização do conhecimento científico, aplicado à produção agrícola e sua relação direta com os recursos da natureza. E termina com a necessidade de refletir sobre o sustento epistêmico e a incorporação do conhecimento da comunidade; superar a incorporação impensada das tecnociências nas instituições de ensino superior e a necessidade de repensar os princípios éticos em suas pesquisas, em um exercício de abordar fenômenos que se manifestam como complexos, sem a possibilidade de fragmentação para compreendê-los plenamente e onde a interdependência exige a um exercício transdisciplinar.

Palavras-chave: complexidade, treinamento, comércio, relacionamento dialógico, conhecimento.

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Introduction

In this work it was considered necessary to talk about the scientific rationality of the knowledge he builds and the type of scientific knowledge that the young man who ventures into research training processes will use. With the purpose of clarifying what knowledge this subject should conform and how he relates that knowledge in his interpretation of the reality of the world he investigates.

Specifically, reference will be made to issues such as environmental pollution and climate change that, although initiated some decades ago, remain emerging, with accumulated knowledge and an effect on a large number of inhabitants of Mexico and many more. According to the Ministry of Environment and Natural Resources [Semarnat] (2007), in the valley of Mexico, in the early 1970s, the problem of air quality was identified, but only the National Inventory System was implemented of Emissions from Fixed Sources and even these days we have measures to face contingencies caused by air pollution in the area. In a period of environmental crisis and scientific paradigms, these seem to be in question because they are insufficient to respond to the needs of the current emergency, which could be extended towards deforestation, loss of ecosystems or damage to biodiversity or water pollution. (Semarnat 2007).

Among the communities of researchers, in those who in the agricultural field will have to appeal to the incorporation of knowledge belonging to cultural groups that had no voice, the proposal of Velázquez and Mata (2008) is pertinent, who declare that in order to promote the durability of the Local development requires the promotion of endogenous initiatives and processes through the rescue of indigenous and peasant knowledge and the revaluation of rural, peasant and indigenous identity. And gradually generate recognition of the capacity of indigenous and peasant groups that, with the contribution of their traditional knowledge in conjunction with instituted science, are expected to give an assertive response to environmental degradation, which today seems uncontrollable in an interaction between society and nature. With the pretense that this allows the application to facilitate knowledge in a relationship between environmental culture and knowledge dialogue.

The proposed route is first manifested as an exercise of self-reflection, with the intention of considering elements of legitimized science in its adaptation to a practical aspect of the conformation of a young student as a cognitive subject that investigates. In the second

instance, it deals with a systematic description of some elements of science, of their methods and applications, without distantly trying to exhaust the possibilities.

The foregoing with the intention of provoking a discussion process, from the perspective of the philosophy of science on the relevance of the proposals presented here, that considers the following:

a) The minimum elements necessary to form a self-managing researcher in their research processes (learning, methodology, approach and application); self-manager of academic spaces, material and human support and the management of assertive relationships with the communities of researchers with which they interact, in an exercise that cannot be sustained without the participation of multi and transdiscipline.

b) That it recognizes that with exercises of use and abuse of certain power that gives knowledge, resources are devastated and the effects are potentiated due to lack of braking of environmental deterioration, which reveals a complexity where the sum of elements is more than just the enumeration of the parts.

And that it considers, in addition, an assessment of the social effect that results from its doing, where the implications of the communication of science and technology are recognized, in its application to scientific development; with the recognition of derivations in social relations and social organization as a result of applications where science and technology go hand in hand; with results that manifest political, economic and social positions of the exercise of science, seen from the context of environmental education and climate change.

The adventure of running on terrain that seems obvious was at least disturbing. In fact, by revealing some basic elements in the training of young researchers, there was a conviction that time and effort can be saved in these training processes.

The objective is to reveal some qualities of the training of researchers that are not always explained in the institutional formative discourse and to make it clear that their possible application is directly involved in research processes related to nature and climate change, from an educational perspective environmental that tries to migrate towards the formation of an environmental culture of sustainability.

And as a complementary objective is to describe in a clear and concrete way an intentional reflection in specific training processes, particularly its application in the use of

science that will be used, from a perspective that, without excluding the history of construction of science, values the approaches that respond in a special way to the context of the country in the study of environmental deterioration, considering multiple dimensions.

It should be noted that the training of researchers is considered as a necessary systematic process that allows landing on a specific topic processes that can undoubtedly be related to a multitude of topics. And that here only the problem of the environment and environmental education are used as social phenomena of incidence with the natural environment, where elements that complicate the problem are perceived, corresponding to specific research processes and make multidiscipline and the approach of the transdiscipline both in the coincidence and in the aspects of the problem where there are points of methodological, conceptual or operational contradiction.

Victorino (2016) It raises a conceptual revolution in which it conceives social and educational problems as complex and that have to be studied in their context, which are linked to the field of environmental education and management, help in the understanding of intercultural processes and that they recognize in all knowledge (including traditional knowledge and scientists): the subject that knows, the object that you want to know; the operation of the object to be known; the process of operation of that knowledge and the result obtained.

With a training process that has traits of transmission of a trade, part of an observable world only sporadically, which develops in spaces that are not accessible only to those who are interested, and that if used properly can influence a substantive aspect of the task of the Autonomous University of Chapingo (UACH) and some similar higher education institutions (this is part of a doctoral thesis work, The training of young researchers from secondary education, currently in process).

Methodologically, symbolic interactionism was a valuable element to support follow-up. Sense was considered not independent of interactions; interactions develop within their own dynamics; and is considered as action processes, as described by Bernard (2016).

Following Bernard (2016), actors (teachers and students) are perceived as competent and not driven by the structure or social system; these interact in processes of mutual influences that include elements such as place and instant. The purpose is to give an account of where the social meanings in which the relationship between scientific thinking and young

researchers in their training process are constantly being built. With the consideration of these elements, the organization of the material presented is structured and articulated to make sense of the proposal, together with the support of semi-structured interviews carried out in June 2019 to members belonging to the Department of Rural Sociology at the UACH (de ocho, cuatro forman parte del Sistema Nacional de Investigadores [SNI]).

Development and discussion

It is important to start by recognizing the irresponsibility of delaying reflection on the approaches to science that are used and built, which generate paradigm changes that modify perceptions in the field of social sciences. With the idea of a researcher who works alone versus the vision of a researcher who does it in groups, or at least that puts his work to others.

The collective construction of analysis of complex realities is inevitable. The possibilities of segmenting to improve understanding are difficult, at the risk of making biased or incomplete assessments, when an interdependence of forming elements and aspects related to the social and natural environment are manifested.

It is also worth having the following as a reference:

Environmental education has a great challenge: to turn climate change into a main focus of any socio-environmental problem, seeing its impact, integrating and interpreting the scientific research that is taking place and using more effective communication strategies (Gutiérrez, 2015, p. 213).

The environmental culture and knowledge dialogue

The training processes of researchers generate management capacities of very varied scopes. In this regard, the management of knowledge (or learning) stands out where the subject in training is an integrated part of a collegiate even when their legitimization process is ongoing. Undoubtedly, he must join his management capacity to that of the individuals who help him and allow him to have a vision capable of unraveling complex social phenomena, which, from their disclosure, will become another element of the culture environmental, and while giving voice, will recover community knowledge, which, in turn, will give greater self-management capacity to the community. However, it is necessary to avoid ethnocentric positions at all times that do not sufficiently value native groups.

Community management is understood here as follows:

The set of actions, processes, intersubjective links that allow the intellectual heritage of an entity or place as a sum of individual, collective and local capacities and values, to be significantly increased in correspondence with existing resources and strategic ideas that guide its development processes, and is aimed at identifying, acquiring, developing, disseminating, using and retaining relevant knowledge (Garcés, 2014, p. 62).

Young people integrated into research processes will also have to critically incorporate in their tasks the approach of Encina and Ávila (2012), who do not consider that the mere participation of the masses in decision-making processes determines that they are self-managing. For this, "only the structuring of the characteristics and conditions in the concrete social practice of participation can define its character and its tendencies" (Encina and Ávila, 2012, p. 11).

From the point of view assumed in this work, in addition to worrying about aspects of self-management with respect to the projects that it accounts for, it must ensure the permanence of these, be it continuity, confirmation or redirection. You should reflect deeply on what determines the efficiency at the end of the application and allows a use that gives meaning to the research process you perform.

However, the approach set out below must be carefully considered:

In the sense of doing in research practices and knowledge production, questioning from the researchers about the epistemic foundations underlying their research, or the socio-cultural relevance and validity of the research methodologies and techniques that use and the conceptual categories that they build (Nahuelpan, 2018, p. 170).

Emerging studies in the Mesoamerica region and perhaps throughout Latin America require serious and profound questioning of their work in science, an aspect that must be introjected by young researchers who aspire to be self-managed in their research processes, to avoid being distracted by false problems such as productive development or aspects of community folklore, which do not allow the resolution of substantial problems such as environmental degradation.

Leff (1998) questioned whether ethnociences have questioned the functioning of knowledge systems; if they have built a new interdisciplinary scientific object beyond articulating knowledge of different disciplines; if they address and apprehend situations where different material and symbolic processes influence and articulate.

Thus, these new researchers will not be far from the validity or socio-cultural relevance, and can clearly apprehend the situations where these material and symbolic processes are articulated, given the warning that we are obliged to raise questions, problematize those spaces and look for new ones. perspectives:

Feminist studies, postcolonial studies, junior studies, Latin Americanists and others have emerged from premises in which knowledge, research and its relationship with forms of power are problematized, although they are no stranger to contradictions. (Cumes, 2015, p. 145).

From a relationship with power where, according to Leff (2000), it is necessary to interrogate the origins of its presence in the present time and the projection towards a possible sustainable future, to be placed in environmentalism as a policy of knowledge, in the field of power in environmental knowledge, and thus be installed in a project of social reconstruction from the recognition of otherness.

Only when we recognize the value of community conservation practices and respect for nature can we carry out relevant studies of a reality; otherwise, the same type of research will continue to be produced, which, without incorporating the aforementioned knowledge, have so far been unable to respond to the environmental problem and have ignored capabilities that, according to Victorino and Carbonell (2017), although they have undergone changes over time, and despite the majority and inequality attacks in which they live, they provide a vision that is in force. This is because in their ancestral visions of nature and development an alternative spirituality predominates that limits the appropriation of resources. That is precisely why it is necessary to see these peoples in the political and economic context of the Western development model that undoubtedly affects them, but which, equally with full conviction, finds resilience.

Fonseca (2018) says that research should be considered an evaluative act that reincorporates ethical aspects in its actions, and always questions the social use of its actions.

Specifically, according to Nahuelpan (2015), collective rights and socio-political, cultural and territorial reconstruction processes must be considered, not without being cautious.

Above all, because the incorporation of indigenous knowledge in the curriculum of universities places in the debate the different representations and versions of truth and reality, the validity and complementarity between them (Walsh, 2001) (Nahuelpan, 2015, p. 172).

The school institution where future researchers are trained should consider both ethical aspects of their actions as well as the processes of socio-political cultural and territorial reconstruction so as not to leave the work of researchers only in general statements that do not address arid aspects and that comply in very strict terms. ambiguous with what should be the ultimate sense of environmental pedagogy: the protection of nature, characterized by considering interdisciplinarity, chain of causes and effects, global sense and a new ethic and action.

Transdiscipline and complexity

The interest of clarifying the position of the author of this text regarding how it is conceived that young researchers will incorporate complexity and transdiscipline into their work starts this section. The current situation characterized by hyperconnectivity and interdependence in environmental damage generate consequences that are difficult to predict and require novel forms of intervention.

Díaz (2010) presents a conceptual position that prioritizes history instead of logic. When dealing with the latter, he shows his genealogy and presents it as contingent and historical, not forced and timeless. Nor does he forget the real subjectivity of the researcher and proposes to analyze the strategies from which knowledge objects arise. Clarifies that we are facing a new chapter in the history of research, where the challenge is to think, discuss and build research diagrams with continuous forecasts of change, producing a predictable and orderly methodology, but also of chaos (comparable to the system instability that undergoes sudden and decisive changes) (Díaz, 2010).

Economic globalization requires an incessant search and increase productivity at the expense of the necessary resources, without seeking or meditating on the need for conservation. For Morín (2008) the challenge of globalization is a fairly complex one because

the parts that make up the whole are inseparable; dividing it limits the possibility of understanding and reflection, and eliminates the possibility of corrective judgment.

For its part, to clarify where complexity is headed, Maldonado (2003) suggests taking into account the following: the knowledge process happens correspondingly to the dynamics of non-linear systems, in a complex way, and complexity has to be understood here as a growth in multiple directions in which there is no central vector, but, on the contrary, it is possible to identify or ascribe several, different, vectors. Incompleteness, randomness and unchanging are the last stages — until now — where complex nonlinear systems lead us.

In the field of the peasantry in our country (as an example) we can include the need for a review of the local problem, contextualized; a forced disappearance of community knowledge and practices related to nature; the need for a humanist formation with the capacity for collective action; disappearance of the natural environment and constant degradation that they produce; market rules that direct productive practices and subsistence business relationships in a market that has dynamics and values that are alien to those prevailing in the community and many more elements that move in the same reality, in different directions and complexize a world that resists and Renew for your livelihood.

In a specific approach, when referring to environmental complexity, Leff (2000) says that this dominant rationality discovers complexity from its limits, from its negativity, from alienation and uncertainty from the economized world, dragged by an uncontrollable and unsustainable process of production. This social reconstruction is based on a new knowledge, based on the question about the origins of this rationality in crisis, about the knowledge of the world that has sustained the construction of an unsustainable world.

It is complemented and linked to the relationship between technoscience and cooperation in a social intertextuality. Coca and Pintos (2006) ensure that in today's social systems the level of complexity is high. And they talk about the existence of a social poly-textuality, where the relationship between technoscience and cooperation will only be possible when the monolithic conception of reality is broken and permeable to other contexts present in non-technical social systems.

We can better understand that relationship raised between technoscience and its effects on the formation of symbolic relationships built in the interaction if we look at the following fragment:

The great merit of the study of complex systems is to show that the systems are exactly the behaviors they exhibit, and that it is their behaviors that determine either their form or representation, or the logic of the very explanation of the system (Maldonado, 2003, p. 112).

What we see in an interrelation of socio-economic, technical, even academic, factors deeply embedded in traditional knowledge, which require a dialogic relationship, where mutual recognition is established and a rethinking of priorities directed towards sustainability.

Of these elements, the student who is integrated into research training programs will have to shake hands, with the need to address the reality that requires interpreting and interacting with it, helped by scientific tools, which are nourished by a vision that assumes that the multidisciplinary and interdisciplinary work, as the way to unravel mysteries that are themselves complex.

According to Rueda and Castro (2018), it is necessary to incorporate induction into training for research by promoting collective, inter and transdisciplinary research developed in situ and addressing specific problems, and modifying the models of their evaluation focused on the solution of environmental problems.

Research, ethics and technology

To explain how this relationship is conceived, we turn to Maldonado (2003), who says that beyond a description of the types of fields that they understand or derive, the most important feature of complexity is the assertion that the old division of knowledge between science and philosophy or between natural sciences and human sciences, or also between science, technology and art, it was always an artificial and unfounded division.

To avoid the error of marginalizing the social phenomena of their necessary political, economic, social and historical contextualization, which explain them and give them specificity, the vision of Piedracueva (2012) is shared, which considers science as a complex system of generation and application of knowledge in certain reality, whose conception is determined by different political, social and economic factors, and its application brings with it certain impacts that are part of the same object.

And it is to this application of knowledge and the consequences that it has to which we will refer, and to the impacts for communities that are not always part of the political and economic framework that decides but suffer the consequences of their actions.

Thus, in a vision that tends more to the local, unlike the last reference noted above, the relationship that the young researcher in training processes will establish with his community forces him to consider that, given the new social demands imposed by the Local development, endogenous capabilities are very important, according to Garcés (2014). This author emphasizes those related to the variety of knowledge that different actors have about their environment and other relevant elements, in addition to their abilities to provide essential criteria in decision-making, and highlights the ability to learn and intervene in processes local socio-economic

Only by using the two references in a complementary way can you understand the dynamics of the current economic system that insists on the exploitation of the resources of nature with the sole rationality of profit, taking advantage of technology of all kinds, including the potentialization that the digital era provides, with the use of advances in science and technology even at the cost of limiting the possibilities of sustainability.

For the purposes of this work, the long-distance proposal of Naredo (1996) on sustainability is resumed. For Naredo (1996), the reading of the objective of sustainability that can be done from the usual idea of an economic system is one that logically circumscribes the monetary field. It is emphatic to clarify that it is invalid that there is the possibility of extending the idea that the quality of the environment is able to improve from certain levels of production and income that allow more investment in environmental improvements.

What undermines the statement of Agenda 21 (United Nations Organization [UN], 2000) that sustainable development requires commitment to rational economic management and policies, where, in addition to an effective and predictable public administration, the integration of environmental issues into the decision-making process was necessary.

A valid alert comes from Morin (2008), who states that scientific culture is not capable of generating a reflection on the destiny of humanity or the future of science itself. And according to this author, both worlds look distrustful: while the world of science considers a luxury or adornment to the humanities, they see the world of science as an abstract and threatening world.

In the case at hand, which has to do with the training of young researchers and the elements of science that will support their research processes, technoscience as instrumentalization of scientific knowledge applied to agricultural production and production in direct relation to resources of nature, by fulfilling its objective of being commercially profitable in agricultural production. It has generated an activity that involves networks of researchers, with an instrumental function in which economic, political and market management values seem to prevail over legal, social or ecological ones, which can be interpreted as merchandise over social legitimacy, sustainability and community consensus.

Rivera (2018), on the other hand, says that technoscience is reflected as a relevant productive force at present given its influence on aspects of production and culture, which can generate problems of its use. It clarifies the fundamental role in bioethics as a discipline: regulatory agent for technoscientific society, since the transdisciplinary exercise and its effect on the consolidation of technological advances in the constant relationship between technique and society reveal the unique importance of bioethics.

At this point we cannot ignore Leisteme (2011), for whom technosciences operate legitimizing the social practices that are intended as rational and effective. Leisteme (2011) also proposes to open a line of research around the categories of biopower and biopolitics, with the foundation of scientific discourse and the practices of knowing to which it gives legitimacy.

The application of the ethical assessment of researchers in training is extended to previously unsuspected fields, such as those described by Vessuri (2008), who talks about “converging technologies”, which are part of the contemporary dynamics of scientific-technical development. Vessuri (2008) refers to the synergistic combination of different transforming technologies: nanoscience and nanotechnology; biotechnology and biomedicine, including genetic engineering; Information technology, advanced communication and computing and cognitive sciences, cognitive neuroscience (nano-bio-info-cogno [NBIC]).

It is also naive to think that there is an intrinsic self-regulation in these categories when the applications that technoscience generates are put into practice, which is why young people in training of researchers must be careful in the execution and make an ethical assessment of the uses they make of them. In this regard, Rivera (2018) acknowledges that

the “knowledge society” and economic forces (industry and commerce) have generated sophisms with confusing nuances that do not clearly allow us to elucidate at what point it is against natural ethics.

According to the approach of this proposal, the training institutions incorporated technosciences in the agricultural area to the detriment of traditional knowledge, leaving the latter, from indigenous or traditional peasant groups, a role of representatives of agronomy folklore In process of extinction.

As much as in Agenda 21 (UN, 2000) it is proposed that developed countries and competent international organizations should support research and development of equipment, programs and other aspects of information technology that are appropriate to their activities and needs and the environment, particularly in developing countries, what hides is that the prevailing market system privileges profit over the needs of disadvantaged countries or social groups.

We close this section remembering Piedracueva (2012), who reflects on the ethics corresponding to the scientific and professional community and reminds us of the vision that there are important extra-scientific factors involved in the process of generation, validation and use of knowledge.

The job of investigating

The possibility of titleholder in this way this section imposed a challenge, that of discussing the validity of using the term trade to define an intellectual exercise in the application of theories seeking to unravel a natural or social problem with the claim that science is done. And even more, a science that necessarily leads to specific actions:

To the point that the main value of the philosophy of the environment is to highlight and argue persuasively that the decisive actions in ecological matters are not only ethical in nature, but there are also political, economic, cultural, aesthetic, scientific imbrications. metaphorical and mythical among others (González, 2013, p. 203).

Bourdieu (1995) he already assured that "the historians and philosophers of the sciences - and, above all, the scientists themselves - have frequently observed that a very important part of the profession of scientist is acquired according to totally practical modes of acquisition" (p. 164) .

More than the literal definition, in this approach, when relating actions that have to do with the so-called scientific profession (the process of training a researcher with that of transmitting a trade), the possibility of making analogies in the training process was considered of both, scientist and craftsman (where accompaniment, instruction, orientation, example, etc.) are required; of the substantial role of the trainer in the molding of some aspects of the student with which he walks that interesting journey; to describe that centrifugal force that impels them (both in their respective fields).

In that sense, Puentes (2014) ensures that, in order to teach the job of researcher, in addition to the description and critical analysis of the task, it is necessary to participate in all operations of the realization of the hand of a person with more experience and in a space where the generation of scientific knowledge is promoted.

The work raised by Palomar (2016) is shared in this work when he warns that the center of importance should be in what occurs when occupying the position of science, not in the character that occupies it. Specifically, the student, being faithful to his formator and the theoretical or methodological current with which he was formed, contradicts the internal impulse to capture in the conclusions reached his vision and interpretation in search of legitimacy in the research circle where interacts.

In this tsunami of information, where young people are trained as researchers who are supposed to be self-managed at least in their learning, although with the mediation of a consolidated researcher who has his own point of view and personal interests that usually forge a personality overwhelming, we go to Chaves (2013), for whom the coherence between self-management of learning and informational competence is evident. This relationship, Chaves (2013) himself points out, becomes more notable with the skills involved in the competition: it searches for the information it needs, analyzes and selects the information efficiently. And this is complemented when the student organizes the information properly, uses and communicates the information effectively in an ethical and legal way, in order to build knowledge. In our opinion, this will be the purpose of the formation and ultimate

purpose of the research. This is the path that the young person in researcher training must follow and will be in the hands of one already consolidated, with meticulous supervision to avoid epistemic and methodological deviations.

In the UACH (2013), following the New Investigators Training Program (Profoni) in force, the training process requires the conduct of a consolidated researcher, a member of the SNI of the National Council of Science and Technology (Conacyt), the formal instance of legitimation of researchers. The SNI was created in 1984; At the beginning it had 1396 researchers; by 1990 there were 5704; already in the year 2000 it had 7466, and by 2010 with 16 598. At present, in 2019, it is considered that the figure should go for the 25,000 members in total. These consolidated researchers are given the training. According to the Regulations of the National System of Researchers (Conacyt, 2017):

Article 27. To be a member of the SNI it is required that the researcher:

I. Have a doctorate or equivalent doctoral studies in medicine. The equivalence will be carried out in accordance with what the specific evaluation criteria of area 3 indicate;

II. Regularly and systematically carry out scientific or technological research activities;

III. Present duly documented work products, through the mechanism indicated in the corresponding call;

IV. Work in Mexico, whatever your nationality, that is, a person of Mexican nationality who carries out research activities abroad;

V. In the case of Conacyt Chairs, it will be understood that they carry out their scientific or technological research activities in the beneficiary Institution to which they were commissioned under the terms established by the applicable regulations, and

VI. Comply with the selection criteria contained in this Regulation.

However, from semi-structured interviews conducted in June 2019 to members belonging to the Department of Rural Sociology at the UACH (of eight, four belonging to the SNI), in some of these members it was shown that although they coincide in To consider a major art the training of young researchers, it was also that they did not have time to follow-up and timely support in applied methodologies or in the review of their training processes

as researchers, leaving the regulation of those aspects for other moments of the academic training.

An interesting reflection is that “those who manage to be accepted in a PhD with a research orientation have the enormous challenge of transforming their vision of research and of responding with good quality to each of the demands that the program poses” (Moreno, 2016, p. 10).

Undoubtedly, this view of what is the duty to be coincides, although from a vision that recognizes the value of the mediation of consolidated researchers. Palomar (2016) distinguishes between the training process and the space that occurs with the director or thesis director, where the transmission of something more experiential than rational about the research favored by the proximity achieved with the teacher takes place. investigator; and in another sense, the research colloquies, considered by the young researcher a necessary evil that hurts, but that they form and that they usually live in solitude although surrounded by people.

It is the opinion of the author of this work, of the consolidated researchers, in the colloquiums, seminars and congresses, where it will be demonstrated what has been done with the conditions that create the lack of habit of communicating clearly and neatly their ideas, given the requirement of concretion that the times granted oblige, although in this step they usually find young people without the necessary support, fighting to dominate their fears and insufficiencies (with exceptions, which are usually the least).

It is in this sense that the lack of commitment to support and follow up the processes of young researchers in training becomes relevant, which is not demonstrated with facts because it is considered a major art, where young people in the process of training will lead their skills, skills and advice of qualified personnel, as stated in the interviews.

From the perspective of a systematic observer, the statement of considering a major art to the training of researchers seems to be not materialized. The young people in formation will build their representations from the interaction with others and the sense they give to what they know will be influenced by the exchanges with their tutors in the processes of intentional action represented by projects in which they participate.

Through the experienced capacity of tutors, the analysis of society and its problem is where young researchers will build their social imaginary, which Coca and Pintos (2006)

describe as socially constructed, and that allow us to perceive, explain and intervene in what each social system understands as reality; and if sufficient punctuations are not made, the final construction may not be assertive when drawing conclusions on the projects in which it participates.

Both teachers and students will give an account of social meanings in which they propose the relationship between scientific thought and the representations constructed in their training processes as researchers and will fulfill the purpose of the training programs to which they are integrated, as a formal step for the construction of the subject that investigates if it does so from any program; or give the mentoring relationship that is established informally, but valid in the sharing of the research profession.

Although it seems that you can not avoid what warns Palomar (2016), that in the current context, in which science is increasingly understood as a commodity and private property where the personality of the scientist is considered so relevant, He believes that it is this personality that gives value to work and not the opposite.

The relevance from our interpretation would be the risks of a training that is built, which leads to a subjectivity in the interpretation, search for projects that respond to fashions rather than priorities, lack of solidarity with the other subjects in training, difficulties in adapting to multidisciplinary work and, consequently, lack of depth in research, among others

Bourdieu (2003) stated that in the scientific profession the individual strategies to operate in the scientific field, as in other areas, and their chances of success, would depend on the subjective position occupied in the structure that makes up that field, with which refers to the structural determinations that it has in the actors, and the primacy of these determinations over the subjective capacities or learning.

Young people in their preparation path depend on the role assigned to them and the accumulation of subjectivities around their ability to investigate, their qualities and skills in the training process; the provision of time or the role that is granted as a subject with merits to share such specialized processes.

If there are those who assume that the new investigators only carry out serious research until the consolidation in the doctorate or even more, a space where only those validated as members of the SNI would do something valuable, it stands out that it is they who are forced to train new researchers since high school, which is contradictory; or a period

of up to eight years that delays the formative processes or during which human and material resources are used assertively, which generates in the long run a wear and tear that can cause attrition among students.

Therefore, the reflection raised in this section is pertinent: to run around the nature of scientific knowledge and scientific practice to which young researchers in training are gradually integrated; know how development, evolution and way in which they appreciate the changes in scientific theories are integrated into their cognitive structure, with which they are inserted in the discovery of laws and the processes of transformation of nature.

Conclusions

The training of young people who are integrated into research programs, in their scientific practice resulting from the knowledge shared by their tutors (consolidated researchers), in the way of accessing an understanding of the phenomena of nature and society, should consider the theories that are shown as dynamic.

A constant reflection on the epistemic support of their theoretical constructions will have to be raised and they need to incorporate community knowledge in creative ways that respond to the change of the environmental culture for a culture of sustainability. In addition, considering the training of young people as scientific novels in a process comparable to the transmission of a trade requires accompaniment, instruction, guidance, example, etc.

The discussion allows us to consider that the thoughtless incorporation of technoscience into higher education institutions forces young people in training to rethink ethical premises, where their research projects consider the consequences of their activity as researchers.

Researchers in training processes should consider that the rationality of the processes of complexity analysis, in the field of environmental education and the deterioration of the environment, leaves no room for addressing the problem from fragmentation, since there is risk of losing substantial aspects of the phenomenon being analyzed. The interdependence between aspects of the phenomenon forces young people to consider a transdisciplinary exercise in their work of research.

The development of self-management capabilities of their processes as a researcher will be considered as equivalent to the transmission of a trade, where the subjectivities around the ability to investigate, their qualities and skills in the training process depend on the role assigned in the training system. relations from which the scientific imaginary with which he will do science will be built to a large extent, at least in the first stage as a researcher, in addition to the provision of times or the role granted to share processes so specialized in an activity that , according to consolidated scientists, can be considered a major art.

It is pertinent to reflect on the nature of knowledge and scientific practice of young people in training researchers; to consider the integration and evolution of a science in its cognitive structure, which is in constant discussion and evolution of the scientific theories that support it, with which they, in the not too distant future, will seek to discover the laws and processes of transformation of nature and the relationship of society with it.

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