

University Path to Open Knowledge to the Complexity of Life Through a Transdisciplinary Chair

*“How should I go?
Shall I leave nothing after me on earth?
How should my heart act?
Do we come to live in vain, to sprout on the earth?
Let's at least leave flowers.
Let's at least leave songs!”
(Nezahualcōyotl)*

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Please cite this article as:

Espinosa Martínez, Ana Cecilia, „University Path to Open Knowledge to the Complexity of Life Through a Transdisciplinary Chair”, in Popa Tache, Cristina Elena, Hubert Landier, Leonardo da S.G. Martins da Costa & Mariana Thieriot Loisel (eds.), *For an International Transdisciplinary Chair. About the Dialogue Between Culture and Technoscience*, ADJURIS – International Academic Publisher, Bucharest, Paris, Calgary, 2024, p. 17-36, <https://doi.org/10.62768/ADJURIS/2024/2/01>

Abstract: Write the abstract in English first if the original article is in The research takes place in the field of Higher Education and Research-Action. It presents the experience and research results of Centro de Estudios Universitarios Arkos (CEUArkos) of Puerto Vallarta, Jalisco, Mexico, to implement transdisciplinarity in the university as well as some of the processes and learning achieved with such an experience, based on seven major university strategies created for a transdisciplinary and complex education. The contribution is given by the presentation of a real experience in a university and on a global scale in a specific Higher Education Institution: CEU-Arkos, which since the year 2006 has been exploring and experimenting with the members of its community (teachers, students, managers, directors) the ways to guide the transition from disciplinary to transdisciplinary university education in all its educational programs. Those strategies are proposed as a basis to inspire an International Transdisciplinary Chair.

Keywords: *transdisciplinarity, complexity, research action, eco-formation, higher education, transdisciplinary chair.*

DOI: <https://doi.org/10.62768/ADJURIS/2024/2/01>

1. Introduction

In the following lines, we make a proposal, for a transdisciplinary (TD) chair, based on the strategies carried out in the last 18 years of the Research-Action Transdisciplinary experiences developed to ‘*Open Knowledge to Complexity of Life*’ at a Mexican university. Strategies that we have built since 2006 until now, on higher education, complexity and transdisciplinarity at *Centro de Estudios Universitarios Arkos* in Puerto Vallarta, Jalisco, Mexico, explaining the processes of auto-eco-reorganization, experienced in this university based on a Research-Action that led us, collectively with various actors from the CEUArkos community (students, teachers, administrators, directors), to the construction of strategies and scenarios aimed at evolving our university practices (of learning, teaching and research) from a disciplinary and fragmenting vision of education towards an integral and transdisciplinary (TD) perspective of education, in all university programs.

The experience is based, epistemologically and theoretically, on the proposals of transdisciplinarity (by Nicolescu), complexity (Morin) and eco-formation (in the sense proposed by Ubiratan D’Ambrosio¹ and Gaston Pineau²). It is the product of a problem, experienced by the university actors of CEUArkos, who noticed a fracture between their university practices and the institutional philosophy, with which they feel identified with – a philosophy that postulates a comprehensive-integral view of education of the person. It is, therefore, a theoretical and practical experience, that assumes the characteristics of research action (R-A) and incorporates the reflection and collaboration of the participants at all times during its implementation. We suggest these experiences can inspire a transdisciplinary chair.

2. The Context of the Research at CEUArkos

As we explained, the research takes place at CEUArkos, located in Puerto Vallarta, Jalisco, Mexico. The institution was founded in 1990 as the first Higher Education Institution in the city and its area of influence (Bandera’s Bay). It was founded by educators with many years of experience in the education of young people and adults in the field of popular public education. It is a private institution, with official recognition from the Ministry of Public Education that offers degree programs in the areas of: Tourism Business Administration, Accounting, Law, Communication Sciences, Marketing and a Master degree on Human Rights, Protection and Constitutional Law. Four hundred to five hundred

¹ See: D’ambrosio, Ubiratan. «Conocimiento y valores humanos» *Revista Visión Docente Conciencia-CEUArkos*, no. 35 (2007) 6–18.

² Pineau, Gaston. ‘Knowledge: Freeing knowledge! Life, school and action’ in: *The Merging of Knowledge. People in poverty and academics thinking together*, edited by Fourth World University Research Group, 215–306. The United States: University Press of America, 2007.

students study there, most of them are working people. The teaching staff has seventy professors who are also distinguished for being practicing professionals in various areas of knowledge. The University has a philosophy related to a social perspective and develops a humanistic educational practice, evidenced by its interest in a comprehensive education of the individual and its philosophy: 'To educate is to form free human beings.' Encouraged by this vision, the university management became interested very early in the transdisciplinary approach.

3. The Reflective Paradigm and the Change from Disciplinarity to Transdisciplinarity Perspective

To build this experience at CEUArkos, we asked ourselves: How can we confront the multiple crises of mondialization through education? Economic, ecological, health crises, symbolic crises, at the same time of rupture and re-encounters between cultures. We consider that the crises (or poly-crisis, to use the words of Morin³, are all linked to a mode of reductive thinking⁴ that separates the subject from its environment and tends to reduce reality to only one of its levels⁵ – particularly material and mercantile in the contemporary world –. Without a doubt, the damage caused by the disruption of the ecological balance calls for urgent action to reform thinking, and education must contribute to that reform.

In this context, education and '*formateurs*' are ethically called to prepare the reform of thought and to accompany the transformation of the dominant cultural paradigm to an ecologization – greening – of knowledge⁶. But how to do it if, as Morin suggests, in order to reform education, a change in the paradigm of thought is needed and for the change in the paradigm of thought, a change in the paradigm of education is required? ... How can we carry out this change of paradigm from education and in the practices of training of trainers/'*formateurs*'? How can we create strategies that allow us to accompany this reform and open knowledge to the complexity of life?

We propose, from – university – education, to search for the paradigmatic step to go from disciplinarity to transdisciplinarity perspective, seeking to operationalize the notions of complex thinking – Morin – , Transdisciplinarity – Nicolescu – and Eco-formation – D'Ambrosio – in order to build the paradigm shift in practices of education, based on the works of Donald Schön⁷, Pascal

³ Morin, Edgar. *La vía para el futuro de la humanidad*. España: Paidós Estado y sociedad, 297p. 2011.

⁴ Morin, Edgar. *Introducción al pensamiento complejo*. España: Editorial Gedisa. 167p. 2005.

⁵ Nicolescu, Basarab. 'Transdisciplinarietà: presente, pasado y futuro. 1ª parte.' *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 31 (2006):15–31.

⁶ Santos, Boaventura De Sousa. *Decolonizar el saber, reinventar el poder*. Uruguay: Ediciones Trilce, 2010.

⁷ Schön, Donald. *The reflective practitioner: how professionals think in action*. England: Ashgate. 374. 2006.

Galvani⁸ and Gaston Pineau⁹:

- Transforming practices, through reflexivity about practices
- Move from the applied science paradigm to the reflective/reflexive paradigm
- Move from the ‘expert’ model to the reflective practitioner model.

For which it is vital: a) the reflexive return to personal experience; b) to develop intercomprehension by putting interpretations of experience into dialogue and c) to cultivate transdisciplinary cross-fertilization of knowledges (*savoirs*).¹⁰

The above can be done, from the experience of CEUARKOS, through Research-Action processes, creating a *cooperative production of knowledge with university actors* (students, teachers, administrators, directors) of new scenarios and strategies for university education¹¹ that are respectful of the triangle of life: individual-society-nature, as D’Ambrosio¹² suggested, that encourage a planetary vision and link knowledges to the complexity of life.

It is about building strategies through a joint inquiry with university actors¹³, starting with the training of those actors (teachers, managers, directors) in these perspectives (transdisciplinarity, complexity and eco-formation), improving their pedagogical and professional qualification. With them and with the students, we seek to create and experiment transdisciplinary practices and strategies for university education.

4. Strategies for a Transdisciplinary Chair

Based on the experience of CEUArkos (which we will explain in the following lines), we propose seven strategies that can inspire a Transdisciplinary Chair. Those strategies include:

⁸ Galvani, Pascal. ‘Methodology’ in: *The Merging of Knowledge. People in poverty and academics thinking together*, edited by Fourth World University Research Group, 9–30. The United States: University Press of America, 2007.

⁹ Pineau, Gaston. ‘Knowledge: Freeing knowledge! Life, school and action’ in: *The Merging of Knowledge. People in poverty and academics thinking together*, edited by Fourth World University Research Group, 215–306. The United States: University Press of America, 2007.

¹⁰ Galvani, Pascal. ‘Auto-formación, eco-formación y transdisciplinarietà: El diálogo de los saberes con la vida.’ In: *Congreso internacional de transdisciplinarietà, complejidad y eco-formación*. 4., Anales, Barranquilla, Colombia: Universidad Simón Bolívar, 93–12, 2012.

¹¹ Espinosa Martínez, Ana Cecilia and Pascal Galvani (Coord.) *Transdisciplinarietà y formación universitaria: teorías y prácticas emergentes*. México: Centro de Estudios Universitarios Arkos, 2014.

¹² D’ambrosio, Ubiratan. «Conocimiento y valores humanos» *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 35 (2007) 6–18.

¹³ Espinosa Martínez, Ana Cecilia. *Abrir los saberes a la complejidad de la vida : nuevas prácticas transdisciplinarias en la universidad*. México: Centro de Estudios Universitarios Arkos, 2014.

4.1. To incorporate as a basic triad of university education: Transdisciplinarity (Nicolescu), Complexity (Morin) and Eco-formation (D'Ambrosio)

As we noted, the theoretical foundation of the research was based on transdisciplinarity and complexity and its implications in higher education. Transdisciplinarity and complexity appear as two current forms of thought that add to the search for an integrative perspective of knowledge and reality in reaction to an atomizing and fragmenting vision of it. Perhaps it is more appropriate to say that these represent two ways of calling the new paradigm of science. The most important theorists are Nicolescu and Morin. The relationship between both theories is unavoidable, since transdisciplinarity conceives complexity as one of its guiding principles. For reasons of space, we will not delve into conceptual questions about these perspectives, we will only frame them in the context of the research we carried out.

Transdisciplinarity. Transdisciplinarity is understood, according to Nicolescu¹⁴, as that which is at the same time between disciplines, across different disciplines and beyond any discipline. It was born to address the need to deal with the unprecedented challenges of the problematized world in which we live and that requires a multi-referential treatment, given that they are complex. Its purpose is the understanding of the world and the articulation of the different areas of knowledge and *savoirs*. It is based on the pillars of complexity, levels of reality and the logic of the included third, which define its methodology and new vision of nature and the human being¹⁵.

Complexity. Complexity (what is woven between) is a perspective animated by a permanent tension between the aspiration for undivided, non-reductionist knowledge and the recognition of the unfinished and incompleteness of all knowledge. For this current, reality is complex, it implies both: the one and the multiple, it is *unitas multiplex*¹⁶. To address the problems posed by reality, complexity proposes a revolution in thought that allows the advent of complex thinking, capable of associating what is disunited and conceiving the multidimensionality of all anthropo-social reality¹⁷ through the application of seven principles: systemic-organizational, hologrammatic, retroactivity, recursivity, autonomy/dependence, dialogic, the reintroduction of the subject in all knowledge.

Eco-Formation. Although Edgar Morin and Basarab Nicolescu are the

¹⁴ Nicolescu, Basarab. *La transdisciplinariedad, una nueva visión del mundo. Manifiesto*. C.I.R.E.T. Francia: Ediciones Du Rocher, 125p. 1998.

¹⁵ Nicolescu, Basarab. 'Transdisciplinariedad: presente, pasado y futuro. 1ª parte.' *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 31 (2006):15-31.

¹⁶ Morin, Edgar. *Los siete saberes necesarios para la educación del futuro*. México: UNESCO. 67p. 2001.

¹⁷ Morin, Edgar. *Introducción al pensamiento complejo*. España: Editorial Gedisa. 167p. 2005.

main theorists, more and more researchers immersed in transdisciplinary themes discover in their interests and in their practice relationships with this perspective, among them: Ubiratan D'Ambrosio and Gaston Pineau who make important contributions in relation to the topic of eco-formation. Eco-formation would be, from the perspective of the participants of the Barcelona Transdisciplinarity Congress held in 2007¹⁸, ecological educational action, that is, rooted in the relational dynamics between human beings, society and nature in a way that is sustainable in space and time. It seeks development and inner growth, starting from respect for nature (ecology), taking into consideration others (otherness) and transcending sensible reality.

Thus, for the research experience at CEUArkos we take advantage of the new vision of the world and reality provided by both the transdisciplinary pillars, as well as the principles for complex thinking and the eco-formative vision, which we use to found and co-create. University strategies towards a more comprehensive perspective of education.

These three currents: transdisciplinarity, complexity and eco-formative vision, become then a basic triad for university education (and for an international transdisciplinary chair).

Transdisciplinarity, Complexity and Higher Education. As is known, in the educational field, transdisciplinary and complex perspectives have inspired various university proposals such as those of CIRET-UNESCO-Delors¹⁹ and the Jantsch Model²⁰. Also noteworthy on a theoretical level is Morin's proposals on '*The 7 knowledges for the education of the future*'²¹, '*Educating in the planetary era*' and '*About the seven knowledges*'²², which synthesize the principles of his theory of complexity. We also have the research of Espinosa and Tamariz²³ on a Transdisciplinary Education Model for the University; and the Reynaga Model²⁴

¹⁸ Congreso Transdisciplinaria y Eco-formación. Hacia una ciudadanía planetaria. España: Universidad de Barcelona, 2007. Available at: <http://encuentros-multidisciplinares.org/Congreso-Transdisciplinaria.pdf>.

¹⁹ Nicolescu, Basarab y Camus, Michael. "El proyecto CIRET-UNESCO. Evolución transdisciplinar de la universidad." In: *La transdisciplinaria, una nueva visión del mundo. Manifiesto*. Centro Internacional para la Investigación Transdisciplinaria (CIRET). Francia: Ediciones Du Rocher. 125p. 1997. Available at: <http://perso.club-internet.fr/nicol/ciret/>.

²⁰ Jantsch, E. «Hacia la interdisciplinaria y la transdisciplinaria en la enseñanza y la innovación» In: A. Leo, G. Berger, A. Briggs y G. Michaud (Coord.), *Interdisciplinaria: Problemas de la enseñanza y de la investigación en las universidades*. México: Biblioteca de la Educación Superior, ANUIES, 110–143, 1979.

²¹ Morin, Edgar. *Los siete saberes necesarios para la educación del futuro*. México: UNESCO. 67p. 2001.

²² See: Morin, Edgar. *A propósito de los siete saberes*. Francia: Pleins Feux. 53p. 2000.

Also see: Morin, Edgar, Ciurana, R. y Motta, R. *Educación en la era planetaria*. España: Editorial Gedisa, 140p. 2003.

²³ Espinosa Martínez, Ana Cecilia y Claudia Tamariz. '*Un modelo transdisciplinario de educación para la Universidad*.' Master diss., Universidad de Valle de México, 2001.

²⁴ Reynaga, Rubén. «Una aproximación axiológica de transdisciplina y pensamiento complejo». México: Multiversidad Mundo Real, 2006. Obtained 4/08/2007, from: <http://www.multiversidad>

that summarizes the work of Morin.

At the level of praxis, the research of Pineau²⁵ on eco-formation and the work of Galvani²⁶ on auto-formation, inspired by Research-Action-training processes, stand out. In the field of learning and knowledge, the perspectives closest to the transdisciplinary ideal come from the visions of authors such as Piaget²⁷, Maturana and Varela²⁸ and Galvani²⁹, identified with the emerging paradigm. We also have important contributions from Brazilian authors such as Ubiratan D'Ambrosio,³⁰ Almeida,³¹ Moraes,³² as well as the members of the Group of Complexity Studies-GRECOM (with Almeida and Knobbe³³), among others.

However, the analysis of the state of the art (from 1979 to date) on transdisciplinarity and education at a higher level, reveals that life experiences in educational institutions and specifically at the university are still very scarce. We have epistemological principles but not yet the steps for implementation. Hence, we considered that one of the main difficulties in putting into practice this more integrative vision of education offered by transdisciplinarity was found in the lack of methodological proposals that would allow the epistemological principles of this perspective to be operationalized in university tasks and that the paradigmatic step in the university had to begin precisely with the transdisciplinary training of the various actors of the educational community in question.

real.org/.

²⁵ Pineau, Gaston. 'Knowledge: Freeing knowledge! Life, school and action' in: *The Merging of Knowledge. People in poverty and academics thinking together*, edited by Fourth World University Research Group, 215–306. The United States: University Press of America, 2007.

²⁶ Galvani, Pascal. 'Methodology' in: *The Merging of Knowledge. People in poverty and academics thinking together*, edited by Fourth World University Research Group, 9–30. The United States: University Press of America, 2007.

²⁷ Piaget, J. *Biología y conocimiento. Ensayo sobre las relaciones entre las regulaciones orgánicas y los procesos cognoscitivos*. México: Editorial Siglo XXI, 338p. 1980.

²⁸ See: Maturana, H. y Varela, F. *El árbol del conocimiento. Las bases biológicas del entendimiento humano*. Argentina: Lumen, 172 p. 2003. Also, see: Maturana, H. y Varela, F. *De máquinas y seres vivos: Autopoiesis, la organización de lo vivo*. Chile: Editorial Universitaria, 137 p. 1998.

²⁹ Galvani, Pascal. 'Los kairós, momentos creadores y niveles de realidad de la autoformación.' in Saturnino de la Torre y Maria-Antonia Pujol. *Educación con otra conciencia: una mirada ecoformadora y creativa de la enseñanza*. (pp. 49–61). España: Davinci Continental, 2009. Available at: http://81.25.120.212/trikypam/davincicontinental.com/datos/web/product_info.php?products_id=312.

³⁰ D'Ambrosio, Ubiratan. «Conocimiento y valores humanos» *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 35 (2007) 6–18.

³¹ Almeida, Maria Da Conciência. 'La complejidad y el vuelo incierto de la mariposa'. *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 47 (2009): 5-20. Available at: https://www.ceuarkos.edu.mx/vision_docente/revistas/No.%2047.pdf.

³² Moraes, Maria Cândida. *Ecología dos saberes. Complexidade, transdisciplinaridade e educação. Novos fundamentos para iluminar Novas práticas educacionais*. Brasil: Editorial Willis Harman House & Porolíbera, 301p. 2008.

³³ Almeida, Maria Conceição and Knobbe, Margarida Maria *Ciclos de Metamorfosis. Una experiencia de reforma universitaria*. Brasil: Editora Sulina, GRECOM, 213p. 2003.

4.2. To carry out Research-Action Workshops focused on identifying and experimenting the processes for a more comprehensive/integral education based on a transdisciplinary vision

The need to overcome the fragmentation of knowledge and education at CEUArkos at an institutional level, led us to consider that it was the conception of educational practices and the way in which they are carried out that was at the center (practices underlying a vision of the world and reality), so building paths on how to operationalize transdisciplinarity and complexity had to occur through a joint inquiry with university actors. To do this, it was essential to start with the training of these actors themselves. Thus, one of the main purposes was to train professors and directors in these perspectives, improving their pedagogical and professional qualifications. With them and with the students, we have sought to create and experiment with transdisciplinary practices and strategies for university education. We carry out this task through Research-Action workshops focused on identifying and experimenting with the processes for a more comprehensive education based on a transdisciplinary vision. It is there that we address how to translate transdisciplinarity and complexity into methodological steps to adapt them to the CEUArkos educational practices (of teaching, learning and research), trying to free them from fragmentation.

The objective is also to embody the new currents by the actors based on reflective Research-Action practices where each one contributes to the conception, construction and evaluation of the paths explored³⁴, as evolution as important as going from a disciplinary logic to a transdisciplinary approach in the university cannot be developed abruptly and totally, without the participation of the actors and under a scheme of only transmission and not action research, since wanting to understand the new perspectives without experiencing them is an epistemological contradiction.

The workshops focused on identifying and experimenting the processes for a more comprehensive/integral education based on a transdisciplinary vision are inspired by the CIRET-UNESCO³⁵ proposals, the pillars of transdisciplinarity, the principles of complexity, the works of Pascal Galvani, Gaston Pineau, as well as our own proposal Espinosa-Tamariz³⁶, born in previous research. The workshops have been running since 2007, and are made up of directors, professors, and students (who volunteer) from the different spheres of

³⁴ Nicolescu, Basarab. *La transdisciplinarietà, una nuova visione del mondo. Manifesto*. C.I.R.E.T. Francia: Ediciones Du Rocher, 125p. 1998.

³⁵ Nicolescu, Basarab y Camus, Michael. "El proyecto CIRET-UNESCO. Evolución transdisciplinar de la universidad." In: *La transdisciplinarietà, una nuova visione del mondo. Manifesto*. Centro Internacional para la Investigación Transdisciplinaria (CIRET). Francia: Ediciones Du Rocher. 125p. 1997. Available at: <http://perso.club-internet.fr/nicol/ciret/>.

³⁶ See Espinosa Martínez, Ana Cecilia y Claudia Tamariz. *Un modelo transdisciplinario de educación para la Universidad*. Master diss., Universidad de Valle de México, 2001.

CEUArkos.

4.3. To encourage a Pedagogy based on Three Levels of Reality of the Person, for university education

The workshops are aimed at participants developing three types of learning linked to three large dimensions or levels of reality of the subject:

a) Theoretical-Epistemic Level: *learning to think*, through research and through the three pillars of transdisciplinarity and the seven principles of complexity, trying to generate complex thinking;

b) Practical Level: *learning to dialogue, distinguish and link* disciplines, assume their limits and complements;

c) Ethical or Existential Level (reintroduction of the sensitive and ethical dimensions), *learning to learn* about oneself, one's own prejudices, social, historical and personal conditioning of our beliefs and certainties, our inspiration and vocation, affinities, limits and possibilities, but also generate reflections on knowledge and knowledge of knowledge.

These three types of learning, interlinked in turn at three levels of reality of the subject's actions, constitute what we can call the learning and forms of construction of transdisciplinary knowledge for university education that we explore in the CEUArkos Project.

Encouraging a pedagogy based on these three levels of reality of the person should be part of the program for a transdisciplinary chair.

4.4. Create, on the Transdisciplinary-Research-Action workshops, processes of

As we have explained, for the transition to a transdisciplinary vision on the university practices (of learning, teaching and doing research) we created the Transdisciplinary Research-Action Workshops. The processes that have facilitated work in these workshops are processes of:

a) *Awareness and familiarization towards transdisciplinarity and complexity*, because almost none of the members were used to them;

b) *Identification of **questions of research** of interest of the participants;*

c) *Consolidation of the group, through auto-formation and co-formation* processes based on a common problematic that concerns all participants and is co-constructed³⁷;

d) *Intersubjective dialogue for the opening and reconnection/linking of knowledges and people;*

e) *Exploration, appropriation and deepening of the transdisciplinary*

³⁷ Desroche, Henry. «Les auteurs et les acteurs. La recherche coopérative comme recherche-action» *Communautés: Archives de Sciences sociales et de la Coopération et du Développement*, no. 59 (1982): 36–94.

pillars and complex principles: to approach problematics experienced by the actors and to exercise in the *management of the tools of complex thinking*, for they became aware that they were not accustomed to thinking complexly;

f) Processes of auto-reflection and reflection on the inter-experience.

The workshop method. We have pointed out, training in the transdisciplinary process should not be carried out under a model of expertise and transmission but under a reflective model. The workshop method consists of starting from specific problems experienced by the participants, which are analyzed collectively in transdisciplinary dialogue groups. This process allows us to re-ligate knowledges and life in inclusion to the relationship of the knowing subject with the object of knowledge. It is an emerging logic where each actor (whether a teacher, student or administrator) must participate in the conception and critical analysis of the experienced processes.

The workshops are constituted by a reflective, dialogic and transdisciplinary exploration of problems experienced by members of the educational community.

Considering that life experience is already transdisciplinary, the option is taken to always start from specific situations and problems (social, environmental, human...), analyzed dialogically between the different authors, according to the following process:

a) Each participant, teacher or student, is invited to present to the group a problem that he/she has observed in his environment and that he/she thinks should be resolved for the new generations.

b) These problems are then addressed by groups of five people from different disciplinary backgrounds.

c) In the sub-groups, each person can pursue their own reflection that will generate personal research. But the dialogic method implies that each participant must build all the stages of the research (problems, data collection and analysis) in dialogue with the various disciplines present in their group, but also with experts in the domains of knowledge relevant to the study, which may be outside the university, such as traditional or artistic, or popular knowledge.

For example, if we try to analyze the problem of development of boutiques for artists on the ‘Isla del Río Cuale’ – an area that runs through Puerto Vallarta –, it is not enough to question the law, the economy, tourism and communication disciplines; it is also necessary to take into account the representatives of traditional popular knowledge that make this island a fundamental place of local culture.

d) In each presentation of a problem situation, the members of the transdisciplinary workshop are trained to identify the elucidations that the different disciplines can provide but also the blind spots of each discipline. Reflective learning contributes both to the object of knowledge but also to the relationship of the knowing subject with his/her object of knowledge.

e) Dialogue groups are followed by integration, reflective, collective and

individual times.

For the transdisciplinary thesis seminar (created in the Research-Action workshops, as we will see later) the same fundamental method is used by bringing together students from all degrees in a lively course coordinated by a transdisciplinary team of six professors.

4.5. To build Processes of Individual and Collective Production of Knowledge: Creation of Transdisciplinary and Complex courses

We refer to the creation of transdisciplinary and complex courses in all undergraduate, graduate and postgraduate programs of the university, validated by the Ministry of Public Education, with a work dynamic based on dialogic, intersubjectivity and transdisciplinary crossing of knowledges. That is, returns to the TD title proposed by Morin³⁸: [...] give space for an epistemological or transdisciplinary title that would preserve 10% of the course, time for a common teaching dedicated to the knowledge of the determinations and presuppositions of knowledge, rationality, scientificness, objectivity, interpretation and the problems of complexity and interdependence between the sciences.

Courses that in our case represent 5% of the university training and that, starting in 2006, became part of the curriculum of all the university's degree programs, which was essential to provide transdisciplinary training, within of the institution, an academic value also of a formal nature.

Transdisciplinary Thesis Seminars. For example, we created: **Transdisciplinary Thesis Seminars**, mixing students from all majors under a vision that allows everyone to appreciate and respect their contributions, based on a dialogue between participants (from different disciplines) to address (social, environmental and human) problems in their theses that emerge from their relationship with the community and the environment in which they are enrolled and to produce individual and collective knowledge about them; knowledge that is created in collaboration and co-participation. We mean that university students approach through study, reflection and research, to problems that *exceed/outside* of the domain of the technical fields of their professions, and return to problems that recognize the richness and complexity of reality, and that demand the linking and re-ligation of disciplinary knowledge.

The seminars are worked with mixed groups of students from different disciplines and are accompanied by a transdisciplinary teaching team (made up of members of the Research-Action workshops) that, based on transdisciplinarity, help students to exercise in a new way of thinking (complex thinking) to address the research work and produce their bachelor's theses. The work dynamic allows us to appreciate and respect the contributions of everyone, based on a dialogue between the participants (from different disciplines) to address problems in their

³⁸ Morin, Edgar. *La cabeza bien puesta*. (Argentina: Nueva vision, 2002), 89.

theses that concern them as part of society and the planet. The investigations are rooted in the daily social and environmental problems that the students know and that touch them personally or familiarly. These are no longer abstract or specialized theoretical problems that raise the internal logic of the discipline, but rather problems rooted in life that require the linking of disciplinary knowledge to address, elucidate, understand and treat complex realities. The quality of the involvement and the use of dialogue steps experienced in the transdisciplinary seminar gives a very particular tone to these thesis works. The environmental dimension appears much more frequently and, above all, we find it in all disciplines.³⁹

³⁹ Within the work carried out by the students we see that the researches addresses not only specific issues of the profession, but also situations that put in the first place the social and community order. Particularly, appears important the treatment of social problems that surround the community (and nearby places) in which students live and also to treat the problems linked to the care of natural and cultural heritage. For example, a thesis refers to the relationship between the indigenous cultural history of the state of Nayarit and the development of alternative tourism (bachelor's degree in accounting – BA –, bachelor's degree on tourism business administration – BTBA). Another work addresses the social and nature implications that arise with large construction projects in the city. We also see emerging works that question the current model of economic and social development of the town, which centers all its dependencies on the tourism system that it is dedicated to serve, despite the fact that this produces great effects on the environment in terms of predation of nature and social disparity. In many cases (from the BTBA, Law, Communication Sciences, BA and Marketing majors) the students build projects to protect natural areas, they make proposals based on sustainability and of ecotourism and community vision. The disparity between the quality of life of visitors versus that of inhabitants linked to the issue of tourism and the problem of the demographic explosion, generated in the area is also contrasted. In addition, social and environmental problems linked to the process of transformation of rural, peasants and ejido areas into urban areas are addressed, as well as their relationship with tourism developers and large investors. We are talking about theses that refer to the legal notions of urban areas and protected natural areas, which question the positive and negative effects of this notion on the use of land and the quality of the environment (Law, BTBA). Other works question the exercise of power, inefficiency and corruption in the political and government system and its links to the problem of drug trafficking and money laundering (Law, BA). Regarding the economic system, we see works that analyze tax evasion as a social problem and its relationship with the so-called tax havens, it is an analysis of the imposition and payment of taxes by declarations and the perverse effects of tax evasion (BA). Some theses address the issue of tax legislation on street commerce from the point of view of its health impact for workers and clients (BA, BTBA). Accounting (BA) researches thus opens up to complex problems such as the retirement crisis, informal commerce, money laundering or even tourism, social precariousness and the possibilities of sustainable development. Another research addresses failure in social readaptation and criminal recidivism, highlighting the stigma that is created around these people and ends up serving as exclusion (Law). Related to the problem of discrimination, works emerge that analyze 'Discrimination against homosexuals', 'The oversexualization of the image of women in tourism workplaces' (BTBA, Law, B.C.S.-Bachelor in Communication Sciences). There are theses that expose the concerns caused by the emigration of professionals to other areas of the country, as well as the problems of unemployment and underemployment for university students (BTBA, BCS, Bachelor in Marketing-BM). The students question in their theses common practices in companies such as staff turnover in hospitality and the social, legal and economic effects at different levels (BTBA), while others study the socio-economic and political impact in Puerto Vallarta of organizations such as the Catholic Church

Starting in 2018, students also socialize the results of their research in **Transdisciplinary Research Colloquia** where they open themselves to the participation not only of other specialists but also of the general public to share their findings.

Transdisciplinary workshops for students. We also created the **courses** named: **Transdisciplinary workshops for students** of all majors.

Derived from the transdisciplinary thesis seminars, the courses called transdisciplinary workshops for students were built, with mixed groups from all degrees. Workshops that, at the same time, support the seminars to address human, social, and environmental problems that affect the community of which the students are part of. The courses share the same pedagogical orientations as the thesis seminar, but seek the appropriation of the principles of complexity, the transdisciplinary vision and its pillars in a more ludic way, through the crossing of the knowledge of experience, artistic knowledge and popular knowledge (without neglecting theoretical knowledge) and that tends to build collective transdisciplinary projects of service to the community guided by the triad: individuals \leftrightarrow society \leftrightarrow nature and the *Seven knowledges for the education of the future* of Morin.

For example, the social, environmental and human problems, investigated in the theses and the application of the principles of complexity to them, are addressed in transdisciplinary groups of students through theatrical performances, essays, stories, painting, poetry, music, audiovisual media... Field work is carried out in various areas of the city to revalue experiential knowledge and oral history, through the practice of the life story method. Likewise, projects are generated to address the needs of various social groups, particularly vulnerable (older adults, homeless or orphaned children, people deprived of their liberty, sick people) through workshops, gatherings and activities in which the *Seven knowledges* proposed by Morin are exercised. There are projects for reforestation of the communities in which the students live or for the care of the environment. Some projects work on the construction of traveling libraries. Other projects provide free advisory activities (in their training areas) for the community in public squares. Projects for the rehabilitation of schools in rural areas have taken place. Re-use and recycling workshops have also been carried out, among others. We mean projects that address the challenges of daily actions to care for the triangle of life.

(BCS). The investigations also take up topics such as ‘The use of social networks to increase citizen participation’, ‘Exploitation of workers (minors and older adults) in the workplace of supermarkets’, ‘Influence of technical of marketing in the sale of medicines, what the advertising media hides’ (Law, BA, BM), ‘Child sexual exploitation’ (BTBA, Law), ‘Pedophilia in Puerto Vallarta, links with tourism and the law’ (Law, BTBA), ‘Limitations on access to information in electoral processes in the town of Sayulita, Nayarit’ (BCS), among others.

4.6. Create strategies that link the university with the community such as: Transdisciplinary Round Tables and Transdisciplinary Fairs

During the research, **Transdisciplinary Round Tables** and **Transdisciplinary Fairs** were created as a means to link the university with the community. They constitute an opportunity for transdisciplinary praxis by becoming an experience for intersubjective dialogue and the re-linking of knowledges, given that they take up as their axis, problems what concerns us as human beings, part of a society and an environment, which are discussed in transdisciplinary groups and are held at public spaces. It is an open and liberated public space to share and reflect on social problems in a ludic way. The round tables bring together the entire Arkos community and are open to the public. They are a meeting point for individuals, groups, organizations and institutions that seek to influence the problems of our community and wish to strengthen bonds for collective life. It is also about opening the dialogue to art and non-disciplinary knowledge such as that of experience, of what is lived phenomenologically, and of intersubjective and intercultural understanding⁴⁰.

The *Transdisciplinary Fairs* include, in addition to the dialogue tables, simultaneous workshops that aim to raise awareness among participants about the planetary problems that humanity faces, through art and popular culture (poetry workshops, singing, theater, sculpture, Huichol crafts, film forums, photographic exhibitions, painting exhibitions). To date we have held twenty round tables and sixteen Transdisciplinary Fairs inspired by the *Seven knowledges for the education of the future*.⁴¹ The last Fair was called 'Triangle of Life: Individual \leftrightarrow Society \leftrightarrow Nature's and it addressed various local and global problems linked to auto-formation, co-formation, and eco-formation.

Create strategies that link the university with the community such as: Transdisciplinary Round Tables and Transdisciplinary Fairs could enrich the activities and program of a Transdisciplinary Chair.

4.7. Diversify research experience, forms and products: Creating calls for the Development of Various Transdisciplinary Research Products

Mobilized by the pandemic, starting in 2021, with the purpose of opening, promoting and diversifying horizontal Transdisciplinary research processes between students and professors at the university, we created calls,

⁴⁰ Galvani, Pascal. 'Los kairós, momentos creadores y niveles de realidad de la autoformación.' In: Saturnino de la Torre y María-Antonia Pujol. *Educación con otra conciencia: una mirada ecoformadora y creativa de la enseñanza*. (pp. 49–61). España: Davinci Continental, 2009. Available at: http://81.25.120.212/trikypam/davincicontinental.com/datos/web/product_info.php?products_id=312.

⁴¹ Morin, Edgar. *Los siete saberes necesarios para la educación del futuro*. México: UNESCO. 67p. 2001.

open to the educational community for the Development of various TD-Research Products, including scientific dissemination podcast, documentaries, research projects, scientific dissemination video capsules, science with comics, scientific dissemination miniseries, teachers' workbooks. These products had to be framed in the needs of the region of Puerto Vallarta, Jalisco, and Bandera's Bay, Nayarit (area in which CEUArkos is located) along lines such as: History and local identity; Regional development: Social, environmental, health, artistic and human problems of the region; Transdisciplinarity, complexity and ecoformation; Human rights; Gender equality and prevention of violence against women, adolescents and children; Organized civil society, groups, activists, their work; Urban Planning, Real Estate Development and Environment; Tourism and sustainable development; Circular Economy, Humanistic Economies.

From these calls, nineteen research products linked to the TD vision have been developed, those products give prominence to mixed research, research action, applied research and promote collective work between students and research professors; among them the project: 'Society, education, gender and economy. Transdisciplinary studies on Puerto Vallarta, Jalisco'⁴², which compiles three researches.

With these research products, four Transdisciplinary Scientific Dissemination Conferences open to the community have been carried out to show the obtained results.

5. Conclusion

We believe the seven strategies explained above could be part of/or inspire the actions of an International Transdisciplinary Chair, which could well be itinerant and fed with the scenarios and Research-Actions put into practice in each country or university.

The above entails encouraging, from the Transdisciplinary Chair⁴³:

Go Towards the Auto-Eco-Re-Organization of the University. In the implementation on a transdisciplinary chair, it is important to understand that transdisciplinarity and complexity, more than a comfortable scenario, represent a questioning scenario for people at their different levels of reality, since they lead to the breaking of paradigms. Transdisciplinarity and complexity question habits and customs rooted in our ways of being, acting, thinking, which is why they generate processes of approach/distancing to new currents. It is about understanding that the path to transdisciplinarity is not free of contradictions, it follows not a linear but a **discontinuous process of uncertainty** $\leftarrow \rightarrow$ **resistance**

⁴² Muñoz, Dalia Berenice y Angélica Martínez Ortega, María José Rolón, Índira Montes. (Coord.) *Sociedad, Educación, Género y economía: Estudios transdisciplinarios sobre Puerto Vallarta, Jalisco*. México: Ediciones de La Noche-CEUArkos, 268p. 2021.

⁴³ Espinosa Martínez, Ana Cecilia. *Abrir los saberes a la complejidad de la vida : nuevas prácticas transdisciplinarias en la universidad*. México: Centro de Estudios Universitarios Arkos, 2014.

↔tolerance ↔openness of the actors and their practices.

However, transdisciplinarity in the university is possible as long as it and its members are assumed as an open system, as a learning community that renounces the certainty of having achieved the truth and assumes the notion of constantly regenerating itself.

It involves auto-eco-organizing processes of the relationships between – university – actors and their practices.

A New Concept of Training of Trainers/‘Formation of *formateurs*’.

For a Transdisciplinary Chair, a new concept of training or trainers is needed. The emerging paradigm permeates institutions such as UNESCO, with the training of trainers appearing to be transcendental, however, it continues to be built under notions of linearity, reductionism, the model of applied science and the separation between subject and object, where the teacher appears as a transmitter of knowledge. In addition to this, schools appear to be subject to economic thinking tending to reduce education to the acquisition of professional skills that the trainer must transfer⁴⁴.

It is then necessary to leave the paradigm of transmission, to re-conceive the role of *formateur*/trainer: not only aimed at acquiring knowledge and transmitting it, but also at building knowledge and working under a model that combines at a time research-reflection-in action. *We also refer to transforming training processes, turning training itself into a transdisciplinary and complex practice.*

Work on Transdisciplinary Triads for an Auto-Co-Eco-Formation in University Education. With the research we were able to see a triadic relationship between elements, concepts and processes that, although they appear to be antagonistic, actually nourish each other and support the development of transdisciplinary training. The notion of a triad offers us the possibility of leaving classic binary thinking and incorporating a new logic of contradictory antagonism.

In our experience, the series of triads – open and unfinished –, which guide the strategies for transdisciplinary education, are:

- a) *research ↔ action ↔ reflexivity,*
- b) *theory ↔ practice ↔ ethics,*
- c) *learning ↔ teaching ↔ research,*
- d) *crossing of knowledge ↔ dialogical and intersubjective dialogue ↔ reflexivity,*
- e) *academic knowledges ↔ artistic ↔ popular,*
- f) *rationality ↔ emotivity ↔ corporeality,*
- g) *individual ↔ society ↔ species/auto-formation ↔ co-formation ↔ eco-formation.*

⁴⁴ Galvani, Pascal. ‘Transdisciplinariedad y ecologización de los saberes. 1ª parte.’ *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 40, (2008): 4–13.

They represent the transdisciplinary pedagogy of CEUArkos and allow Auto-Co-Eco-formation for an action committed to individual, collective and anthropological metamorphosis. We suggest these triads could be taken into account as a pedagogy for a transdisciplinary chair.

To consider dialogic alternations: disciplinarity/transdisciplinarity; a balance: contents/processes according to the needs of each program/context. It is key to observe in practice something that we had already elucidated in theory⁴⁵: that disciplinarity and transdisciplinarity must appear, in a dialogic way, in university (education) processes, as cooperating and complementary. Therefore, the alternation between these is presented as necessary. Particularly at the undergraduate level, we observe the importance of the university's education in a discipline, but also leaving spaces to transcend it by living education processes and transdisciplinary collaboration. Likewise, it is important to strike a balance between content and processes, which transdisciplinary education must conceive as elements of a dialectical process.

Transdisciplinary education is more focused on the processes of reflection, dialogue and production of knowledge than on content. *Thus, every training program must assume continuous balance, dialogic dialogue and alternation between disciplinarity-transdisciplinarity/content processes, according to the context and educational objectives.*

To accompany the reform of thought until an ecologization of knowledges and university education. A Transdisciplinary Chair must accompany the reform of thought until an ecologization of knowledges and university education.

With the experience acquired at CEUArkos (still evolving) to move towards a transdisciplinary education, we learned that disciplines apparently foreign to environmental education such as law, accounting, administration, communication or marketing, becomes greening from a transdisciplinary position that puts academic knowledge in dialogue with the knowledge of the social, artistic, popular, and political environment and introduces environmental concern as an ethical dimension in the production of university knowledge. In other words, the transdisciplinary vision tends to ecologize/greening knowledge. 'That is, it puts knowledges in dialogue with those of the environment, while introducing the environment as the major concern of the knowledge and learning produced'⁴⁶. Therefore, the move from a disciplinary paradigm (technical, reductionist simplifying) to a complex and transdisciplinary paradigm implies a critical and self-critical questioning of the different disciplines on environmental imbalances. It invites to open knowledge to the complexity of life.

To update our anthropological reserves and become artisans of the

⁴⁵ Espinosa Martínez, Ana Cecilia y Claudia Tamariz. 'Un modelo transdisciplinario de educación para la Universidad.' Master diss., Universidad de Valle de México, 2001.

⁴⁶ Galvani, Pascal. «Transdisciplinarietà y ecologización de los saberes. 1ª parte» *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 40, (2008): 4.

eighth day. To recognize, from the Transdisciplinary Chair, the call to update our anthropological reserves in the direction of a planetary vision of education and life, to become builders of good dreams and artisans of the eighth day, in the sense of Almeida⁴⁷.

The artisan is someone who: transforms matter into a utilitarian, aesthetic or good object for thinking. Reconnect's fragments into an open whole. Manages what surrounds him/her, removes the dead parts and actively interferes in its transformation. Recognizes the distinction, but not the opposition, between imagination and reality, because he/she knows that his/her material work is a product of imagination and dream... The artisan is, above all, someone who knows how to see the world around him/her well; who realizes what needs to be transformed, what is in a state of necrosis and needs regeneration? Patience, boldness, persistence, awareness of imperfection and self-criticism seem to be the tools and materials of the artisan of knowledge, the educator, the builders of good dreams and the artisans of the eighth day of creation, which are all of us.

Acknowledgment and Conflicts of Interest

The authors declare that she has no conflicts of interest with respect to the research, authorship, and/or publication of this article. Any errors or omissions are her own.

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⁴⁷Almeida, Maria Da Conciencção. 'La construcción nuestra de cada día.' *Revista Visión Docente Con-Ciencia-CEUArkos*, no. 89 (2021): 5–9. Available at: http://www.ceuarkos.edu.mx/vision_docente/2%20La%20Constr.pdf.

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