

## EXPERIMENTAL [media and computer art] TRANSDISCIPLINE

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### Abstract

The solution to complex problems is being explored, increasingly, from multi and interdisciplinary perspectives. However, those strategies are not enough in many cases and therefore developing a transdisciplinary approach becomes an essential tool. The traditional academic structure based on rigid disciplines has proven not to work well to face problems such as climate change or poverty, taking here only two among many multi-dimensional challenges we are facing. Can we really and effectively develop innovative, useful ways to do research and apply our findings to a creative approach? This is an introduction to some experiences and experimental strategies used in transdisciplinary projects focusing on research-creation, aiming others could benefit and eventually emulate some of the experiences carried out.

### Keywords

Transdiscipline; collaborative research; education; research-creation; training.

### Introduction

I was seeing a documentary where scientists from around the world were explaining that trees are connected, they have feelings, they take care of each other. Trees have families and friends, and they inform others when one is attacked.

Life is about communication and mutual understanding or disagreements. Nevertheless, humans have created systems and regulations in trying to understand how this world works, but we are far from finding answers to complex issues. The traditional academic structure based on rigid disciplines has proven not to work well to face problems such as climate change or poverty, naming here only two among many multi-dimensional challenges we are facing.

Can we really and effectively develop innovative and useful ways to do research and apply our findings having a creative approach? The solution to complex problems is being explored, increasingly, from multi and interdisciplinary perspectives. However, those strategies are not enough in many cases, and therefore developing a transdisciplinary approach becomes an essential tool.

There are different definitions about multi-, inter-, cross- and transdisciplinary research. The approach of considering transdisciplinary research as a way to create a unity of intellectual frameworks looking beyond a disciplinary

perspective seems to be appropriate and useful also from the arts perspective.

### Research, Creation, and Knowledge

Gian Giudice, Italian physicist and head of the Theory Department at CERN, the European Organization for Nuclear Research, has said in an interview that “the level of complexity of the different branches of theoretical physics is such that nobody can be an expert in everything” and that he believes that “the way science develops often follows paths that are much less logical and rational than most people think” adding that “only at the end of the process a clear picture emerges and then, in retrospect, everything looks simple and straightforward”. A doctor in physics too, Spanish professor and writer Jorge Wagensberg compared scientific with artistic knowledge: While for science communicability and intelligibility are fundamental, he understood art as a powerful way of communicating unintelligible complexities.

Can an anthropologist, a philosopher, an illusionist or an investment advisor not only participate but also to actively contribute with their personal experience and background to an electronic art class? Why did we decide to be a car’s mechanic, a composer, a historian, a baker or an astrophysicist? I am not only speaking here of the context and the circumstances that could have conditioned or inspired us, I am also considering the decisions that we take in our daily life and that are slowly taking us to follow a road and not a different one, finding us later as a flutist, a cardiologist or an engineer. Is it possible to integrate characteristic elements of architectural thought into structural processes of music creation? I am not thinking about the idea of a simple translation based on the geometry of the spaces, their dimensions or other aspects that could be measured and transposed in a relatively simple way. This is not about adapting and converting from one field to another (as for example: from space design to musical composition models) just to show a possible application. The motivation, intention, and goal here would be to find ways of integrating various methodologies, visions and overall values in a process that could help us to understand better how to collaborate and share, discuss, comprehend and -expectedly- apply our findings.

## Changing Glasses

This is not a proposal to dissolve disciplines. It took centuries to build the complex system we have today for the teaching and learning of the various fields of knowledge, as well as to support the research that has been allowing us “to advance”, at least in the terms that we understand it in our Western civilization. At the same time, it is necessary to recognize the different visions that people have of the world and how (human) life should be considered. And even if sometimes could be difficult for us to understand or accept it, most of those other perspectives can teach us something and the results of a wider analysis could be reflected in our academic or professional activity.

Art is not apart from anything, is part of everything. It is not part of a bubble of musings. It helps us to connect with the world or to isolate ourselves, to understand and embrace or to dissent, to make sense or to confuse, it can be an engine to free our creativity or to lock it. Art is linked to politics and the economy, it can convey feelings and emotions, can also lead us to think about human biology or complex mathematical equations; it can apply principles of fluid mechanics and key elements from game creation, and can open new spaces, make use of very simple or extremely complex techniques, be based on serendipity, and navigate between the accidental or casual and causal, too.

When we talk about multidisciplinary, we refer to join various disciplinary fields needed to reach a goal but considering experts coming from their individual disciplinary space. Interdisciplinarity can take us to another level of interaction, integrating methods or knowledge from different disciplines. The proposal to consider transdisciplinarity as an intellectual framework that goes beyond the vision imposed by independent disciplines is certainly a major challenge. We are usually looking (and acting) as a consequence of those “glasses” we have grown with, those that we used during our years of studies at school or in the university when we learned how to interpret the world, probably according to a traditional structure of education with clearly separated disciplines. We need to learn about crossing borders again and going beyond the limits, even if some of them are as strong as walls. We should be able to understand different perspectives about the world and generate knowledge from a broader apprehension of reality. The quest to create new conceptual and methodological frameworks, the pursuit of innovations that could allow us to capture and shape the knowledge of multiple disciplines could make possible to cross the usual barriers and create not just a simple mixture but an integration that goes beyond the parts. The result of the operation could be then more than the sum of the individual elements, an added value significant enough to enhance our understanding and clarifying that collaborative work has a relevant role in getting results. This could be the approach to consider when facing a complex problem that the traditional disciplinary way cannot solve, but it could also be a line to follow for looking again to the strict disciplines that molded our understanding, now from a broader perspective facilitating us to reach a better overall

comprehension and grasping the deeper meaning of what we do, how we do and why we do.

## Experimental Transdiscipline

The conceptual proposal of transdisciplinarity might be interesting to some but still too far from a possible practical implementation. These ideas have emerged from a long period of intellectual elaboration but are not intended to be merely an academic exercise or an offer of good intentions that cannot be applied in daily activities. Some examples of actions developed considering a transdisciplinary approach follows. Activities that have been bringing art and disciplines, apparently far from each other, close enough to work from a unified but large conceptual framework.

After some first cases having a multi- or interdisciplinary perspective, the latest transdisciplinary projects and programs emerge from those previous experiences, carried out in a diversity of places and contexts, and with people of different ages, educational levels, training, and expertise.

Starting in 1992, the Musical Production 3-years program was officially implemented in a technical high school of Buenos Aires (ORT Technical School). Students were studying classical Western music theory as well as contemporary composition and music history (not only from Europe and the Americas but also from India, China, Japan, different African cultures, and more), while also developing keyboard skills, and learning several languages as well as electronics, computer programming, mathematics, biology, literature, and physics, among other subjects.

In 1996, the National Ministry of Education, also in Argentina, started a renewal of the technical programs for high schools at the federal level. Among the new programs, the most innovative was the Multimedia Communication (Technical-Vocational Pathway), with a proposal based on competencies that challenged the traditional content-based approach. This program (with over 1,500 hours of study and practice required) was fully modular and allowed the students to obtain intermediate certifications of their achieved competencies (e.g., in image synthesis and digital animation, sound recording and music technology, desktop publishing, and audiovisual production) or a final degree in Multimedia Communication, focusing on digital media creation.

A few years later, in 1999, the National University of Tres de Febrero, with its main campus located in a mid/low-class neighborhood of Buenos Aires, launched another original initiative given the time and context, the first Electronic Arts (5.5-years long) Bachelor degree of Argentina. The educational structure proposed was different from most other models: students were able to choose a visual or sound-based orientation during the first 3.5 years and receive an intermediate certification, to then enter into the final 2-years stage, common to all of them, and focusing on media art creation.

Understanding Visual Music (also known as UVM) is an international project encompassing a conference series, full-dome oriented workshops, audiovisual concerts, and

curatorial activities focusing on the world of visual-music and exploring the potential of working on the intersections of art, science and new technologies using immersive collective environments, such as planetariums. UVM activities started in 2011 and have been held in Argentina, Brazil, Canada, Colombia, Germany, Mexico and the UK, among other countries, involving experts from many different artistic, scientific, and technological fields (e.g., video artists, composers, engineers, sound designers, physicists, 2D and 3D animators, astronomers, media artists, full-dome developers, audiovisual technology innovators, data scientists).

The Transdisciplinary Creation and Performance class originally proposed in 2009 to Concordia University, in Montreal, Canada, was finally offered to the Music Department students in 2015. In this class, open to composers and performers, music students were working with academics and professionals from fields as diverse as dance, philosophy, economics, anthropology, illusionism, space engineering, computer science, design, and more. This experimental class also allowed a truck-driver and a call-center supervisor to participate and contribute, and in most cases, the process was revealing and the results amazing (and useful).

With students from the Interactive Design and Creation Master program at the University of Caldas - Manizales, in Colombia, an intensive transdisciplinary workshop was done in 2016 with results beyond expectations. Participants of this media art program, with backgrounds in pedagogy, graphic design, history, visual arts, X-ray analysis, music, industrial design, programming, marketing, and more were producing projects focusing on the consequences of extreme mining activities, planning actions to be implemented in their university to reduce climate change effects, and proposing a mobile lab to be created after a short but thorough field study of the local actions to recycle wasted food. In 2018, two similar workshops were held in the same university, one mixing local (Colombian) students with a group of international students from Concordia University, Canada and the other with Master's and Ph.D. candidates from media art, music, and philosophy programs, including students with a wide range of professional experiences and educational backgrounds. Again, the results were surprisingly positive considering the short time to deliver specific plans, to develop activities, and to reach applicable conclusions focusing on actual, complex problems, that ask for urgent solutions.

Following a similar line of thought is the international symposia Balance-Unbalance that "bring artists together with scientists, economists, philosophers, politicians, management and policy experts, sociologists and engineers from across the world with the intent of engendering a deeper awareness and creating lasting intellectual working partnerships in solving our global environmental crisis". A spin-off of the Balance-Unbalance series is the sound miniatures '*art! ∞ climate*' international contest organized in partnership between the Red Cross / Red Crescent Climate Centre and the Electronic Arts Experimentation and Research Centre (CEIARTE-UNTREF) of the National University of Tres de Febrero, Argentina. The Red Cross Climate Centre's

mission is to help address the humanitarian consequences of climate change and extreme weather events. In its efforts to engage people at risk, government agencies, academic institutions, donors and other stakeholders, it has become clear for them that information is rarely sufficient to trigger behavior change. As a result, the Climate Centre has been designing and facilitating methods for learning and dialogue that involve not only brainpower but also the emotions of participants (such as collaborative workshops, participatory games and short educational films linking information, decisions, and consequences on disaster management). The '*art! ∞ climate*' contest has two main objectives: a) Provide the Climate Centre with sound-based art material that can support their actions; and b) Improve knowledge about the human dimensions of the environmental crisis and promote awareness about the effects of climate change, both among creative artists and among those exposed to their work. The contest has a double jury, one for artistic quality and another made up of experts from the Red Cross Climate Centre. For the Climate Centre, it is increasingly important to have artworks to help with preventive and remedial tasks. This is because the traditional ways of addressing many of the complex problems they face are not sufficiently effective. Thus, they have found in art an important factor that facilitates and improves the efficiency and effectiveness of its work and actions.

## Final Words

As the leader of most of the projects mentioned above (and co-leading the others), I have learned about the benefits and difficulties of collaboration. Also, I have had the opportunity to experiment and experience myself the excellent results of transdisciplinary processes and their amazing potential to solve complex problems. Each example given deserves an extensive discussion - beyond the possibilities of this short paper - to extract as much relevant information as possible to explore the possibilities to replicate, adapt or create new projects.

While disciplinary work can be the best way to approach many subjects, a transdisciplinary perspective could be the most suitable in many others, making possible to find better solutions to some of the complex problems that (the global) society is facing today.

Art as an engine of change, as a key element that adds and helps to build the web of life. Art, not isolated but united by force fields to the network (and to the many networks) helping to design the map of tensions that allow us to create, usually on the edge of understanding. A journey through uncharted territories, a search for signs to guide us in how to open new paths, or to stop us from move when this is needed. An exploration of new methodologies based on our experience, knowledge, and desires, but also following the way we see, we listen, we act and interact with the world. The collective construction done from individual effort, where the contours can be diluted, values are questioned, and frames are unraveled.

## References

- Attali, J. (1977). *Noise. The Political Economy of Music*. Translated by Brian Massumi, 1985. United States: University of Minnesota Press.
- Augsburg, T. (2014). Becoming Transdisciplinarity: The Emergence of the Transdisciplinary Individual. *World Futures: The Journal of New Paradigm Research*.
- Cockell, M., Billotte, J., et al. (Eds.) (2011). *Common Knowledge*. Switzerland: EPFL Press.
- Dal Farra, R. (2018). Balance-Unbalance: Transforming Paradigms (Art ↔ Environment). *Leonardo*, Vol. 51, No. 2, 176-177.
- Dal Farra, R. (2017). Investigación-creación transdisciplinar. Cuando la música está integrada a ...todo lo demás. *Sonic Ideas/Ideas Sónicas*, Year 10 no. 19.
- Dal Farra, R. (2015). Breaking Paradigms: Electronic Arts & Humanitarian Actions. Balance-Unbalance 2016 International Conference. Colombia. Retrieved from [http://www.balance-unbalance2016.org/docs/Dal\\_Farra\\_BunB\\_Breaking\\_Paradigms\\_2015.pdf](http://www.balance-unbalance2016.org/docs/Dal_Farra_BunB_Breaking_Paradigms_2015.pdf)
- Dal Farra, R., Suarez, P. (2014). Red Cross/Red Crescent Climate Centre and Balance-Unbalance: the art ∞ climate project. *Leonardo*, Vol. 47, No. 5, 493.
- Hirsch Hadorn, G., Hoffmann-Riem, H., et al. (Eds.) (2008). *Handbook of Transdisciplinary Research*. Germany: Springer.
- Jaeger, J., Scheringen, M. (2000). Transdisciplinarity - just a Buzzword? Overcoming some Popular Objections to Transdisciplinary Research. Proceedings of the International Transdisciplinarity 2000 Conference. Switzerland
- Jarlett, H. (2016). In Theory: Are theoreticians just football fanatics? Switzerland. Retrieved from <http://home.cern/about/updates/2016/03/theory-are-theoreticians-just-football-fanatics>
- Jensenius, A. (2012). Disciplinarity: intra, cross, multi, inter, trans. Retrieved from <http://www.arj.no/2012/03/12/disciplinarity-2/>
- Max-Neef, M. (2005). Foundations of transdisciplinarity. *Ecological Economics*, 53, 5-16.
- McGregor, S. (2004). The Nature of Transdisciplinary Research and Practice. Retrieved from <https://www.kon.org/hswp/archive/transdiscipl.pdf>
- Nicolescu, B. (2002). *Manifesto of Transdisciplinarity*. United States: State University of New York Press.
- Nicolescu, B. (2014). Methodology of Transdisciplinarity. *World Futures: The Journal of New Paradigm Research*.
- Nicolescu, B. (2015). How Can We Enter in Dialogue? Transdisciplinarity Methodology of the Dialogue Between People, Cultures, and Spirituality. Austria: ISIS Summit Vienna 2015 – The Information Society at the Crossroads.
- Wagensberg, J. (1985). *Ideas sobre la complejidad del mundo*. Spain: Tusquets.

## Author Biography

Dr. Ricardo Dal Farra (Buenos Aires, 1957) is a composer and new media artist, educator, historian, and curator. He is Associate Professor at the Music Department of Concordia University, Canada and founder-director of the Electronic Arts Experimentation and Research Centre (CEIArtE) of UNTREF University, Argentina.

He has been researcher and consultant on media arts history for UNESCO, France; director of the Hexagram Centre for Research-Creation in Media Arts and Technologies, Canada; coordinator of the international research alliance DOCAM - Documentation and Conservation of the Media Arts Heritage; senior consultant of the Amauta - Andean Media Arts Centre in Cusco, Peru; associated researcher of the Music, Technology and Innovation Research Centre at De Montfort University, UK; and director of the Multimedia Communication federal program at the National Ministry of Education, Argentina.

Dal Farra has presented his electroacoustic and visual-music works in more than 40 countries, and recordings of his pieces are published in 23 international editions (including CDs by Computer Music Journal and Leonardo Music Journal, on MIT Press).

Funded by The Daniel Langlois Foundation for Art, Science and Technology of Montreal, he created the largest collection publicly available of Latin American Electroacoustic Music.

Dr. Dal Farra is founder-director of the international conference series Understanding Visual Music - UVM (held in Canada, Argentina, and Brazil); and Balance-Unbalance - on how the media arts could contribute to solving the environmental crisis (held in Argentina, Canada, Australia, United States, Colombia, the UK, and The Netherlands). He also has been leading art-science projects like the three editions of the sound-art international contest organized with the Red Cross Climate Centre, designed several art-science-technology educational programs for high-school, college and universities, and has been director of the Fulldome UVM Workshop held in the Planetarium of Buenos Aires during 2016-2017. Dr. Dal Farra was in 2015 the artistic director of the Mexican electronic arts biennale *Transitio\_MX*.