PEL

Pensamiento Educativo. Revista de Investigación Educacional Latinoamericana
2021, 58(1), 1-19

Pontificia Universidad Católica de Chile
Facultad de Educación

Transdisciplinary University in the Framework of the Knowledge Society. Discursive Tensions Within Universidad de Chile

Universidad transdisciplinaria en el marco de la sociedad del conocimiento. Tensiones discursivas en la Universidad de Chile

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Abstract

Amidst contemporary social transformations, including the new role adopted by universities, transdisciplinarity has been gaining increasing recognition as an approach to understanding phenomena that cannot be addressed by the traditional model of disciplinary specialization: these include climate change, inequality, or, more recently, pandemics. However, there is little study of specific experiences that help to understand the implications, purpose, and challenges of adopting a transdisciplinary approach in universities. In order to reduce this gap, this article analyses the results of a participatory dialogue carried out in Universidad de Chile, examining different narratives regarding the emergence of transdisciplinarity and the associated opportunities and obstacles. These, in turn, relate to the historical, organizational, and cultural dynamics of the trajectory adopted by this institution, and the higher education sector in general, in the country: i) the social commitment, inscribed in the tradition and academic mission of the public university; ii) a promise of novelty, innovation, and transformation of scientific and academic work, associated with the emerging model of an entrepreneurial university; and, iii) the growing demand for a profound reform of the higher education system in the country.

Keywords: transdiscipline, knowledge society, Universidad de Chile, higher education, innovation.

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Este artículo fue financiado por la Vicerrectoría de Investigación y Desarrollo, Universidad de Chile; Proyecto PFUE UCH-1799l, Ministerio de Educación; Fondecyt n° 11200429; FONDAP n° 15110009. Además, se agradece a los académicos y funcionarios que participaron del workshop ilustrado en el artículo.

ISSN:0719-0409 DDI:203.262, Santiago, Chile doi: 10.7764/PEL.58.1.2021.10

Resumen

En el marco de las transformaciones sociales contemporáneas, y del nuevo rol adoptado por las universidades, la transdisciplina ha ido ganando un reconocimiento creciente como aproximación para comprender fenómenos que no pueden ser abordados por el modelo tradicional de especialización disciplinar, como el cambio climático, la desigualdad o, recientemente, las pandemias. Sin embargo, existe escaso estudio de experiencias específicas que ayuden a entender qué implica, qué finalidad tiene y cómo puede lograrse una mayor focalización transdisciplinaria en las universidades. Para reducir esta brecha, este artículo analiza los resultados de un diálogo participativo realizado al interior de la Universidad de Chile, examinando distintas narrativas respecto de la emergencia, oportunidades y obstáculos de la transdisciplina; los que, a su vez, dicen relación con las dinámicas históricas, organizacionales y culturales propias de la trayectoria adoptada por esta institución, y la educación superior en general, en el país: i) el compromiso social, inscrito en la tradición y misión académica de la universidad pública; ii) una promesa de novedad, innovación y transformación del quehacer científico y académico, asociada al modelo emergente de universidad emprendedora; y iii) la creciente demanda avanzada para una reforma profunda del sistema de educación superior en el país.

Palabras clave: transdisciplina, sociedad del conocimiento, Universidad de Chile, educación superior, innovación.

Introduction

In recent decades, universities and research centers, which are historically the most important actors in the process of generating and disseminating scientific knowledge, have undergone significant transformations as a consequence of various global trends (Etzkowitz, Webster, Gebhardt, & Terra, 2000). In this context, transdiscipline (TD) has gained increasing space in the academic world, questioning the traditional boundaries of science, transgressing the disciplinary focus, and including non-scientific actors in the generation of knowledge (Stokols et al., 2003; Wang, Aenis, & Siew, 2019). Its appeal has been in highlighting the multidimensional and systemic nature of contemporary problems, pushing towards collaborative dialogue based on questions that, due to their scope, require us to go beyond the Newtonian model of science (Stokols et al., 2003), promoting a shift from research *for society* to research *with society* (Knapp, Reid, Fernández-Giménez, Klein, & Galvin, 2019).

The emergence and development of TD should be understood in relation to the concept of complexity (Rosenfield, 1992), which characterizes phenomena where many processes and components interact with the ability to generate a new quality of collective behavior, the manifestations of which are the spontaneous and emergent formation of distinctive temporal, spatial, or functional structures, which oblige scientific knowledge to seek new paths in order to understand them (Cilliers, 1992; Daudé et al., 2009; Goldstein, 2013). This has led to a substantial shift away from traditional models of scientific production and reproduction, where the definition, representation, and solution of research problems are addressed within disciplinary boundaries (Scholz, 2017).

In order to achieve this, TD emphasizes its orientation to the research problem by crossing disciplinary boundaries, innovating in methodologies to reveal complexity and fostering collaboration between the scientific and extra-scientific community (Russell, Wickson, & Carew 2008). In the same vein, particularly since the mid-1990s, there have been multiple attempts to incorporate transdisciplinary approaches into universities as a

response to the increasing complexity and urgency of the challenges in research and higher education, especially in the fields of health and environmental sustainability (Aneas, 2015; Dlouha, Huisingh, & Barton, 2013; Krainer & Winiwarter, 2016; Mauser et al., 2013; Scholz, 2017).

Although production of knowledge has had an essential role for the survival and perpetuation of the human race since its origin (David & Foray, 2002), the last 30 years have seen radical transformations, where the ability to create, distribute, and exploit knowledge has become a crucial factor to improve people's wellbeing (Holm-nielsen & Agapitova, 2002) and as the main driver of countries' development (Carayannis, 2013; Leydesdorff, 1996).

At the same time, it should be considered that the productive importance of knowledge is part of a larger process of globalization that began in the United States with the promotion of applied research in the context of Cold War competition and which has subsequently been driven by various international organizations since the 1990s (Slaughter & Leslie, 1997). This new post-industrial *knowledge society* (de Weert, 1999) is characterized by an acceleration in knowledge production, the emergence of new technologies (Powell & Snellman, 2004), the centrality of innovation (David & Foray, 2002), and a growing relationship between university and industry for the generation and exploitation of research, development, and innovation (R + D + I) as an economic resource (Lundvall, 1996). In this regard, TD emerges in a context of growing global transformation, where knowledge has a central status for society.

Along these lines, the Bologna Declaration states that knowledge is becoming an "irreplaceable factor for social and human growth" in an increasingly interconnected world (Bologna Process, 1999, p.1). Similarly, the Lisbon Strategy backed by the European Union (Lisbon European Council, 2000, p.1) seeks to make the continent the "most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". Comparable transformations can be found in the Asian context, particularly in Japan, which, in the wake of the Second World War, turned from a higher education system focused on training government officials towards one centered on the relationships between industry and academia as a driver of the country's economic growth (Etzkowitz et al., 2000).

Meanwhile, for Latin America this has meant a change in the role of higher education, which until the mid-1970s was conceived as an expression of the will of the state, implying that its activities were mainly tied to meeting objectives in the national interest (Levy, 1986; Etzkowitz et al., 2000). Although many public universities still retain this role, a profound change can be observed in making universities instruments for human capital formation and generation of knowledge, leading to a significant alteration of their identity (Mollis, 2006; Tünnermann, 2003).

More specifically, the Chilean higher education system has undergone radical transformations since 1980 that have gone hand in hand with changes in state funding (Brunner, 1986), the establishment of quality assurance systems (Bernasconi & Rojas, 2004; Maríñez, Labraña, & Matus, 2019), and the provision of funds that are dependent on the results of teaching and research (Labraña & Rodríguez, 2017). Subsequent reforms have pursued the stated objective of promoting a transition towards a knowledge economy, establishing various funds to encourage universities to incorporate interdisciplinary and transdisciplinary approaches and assume greater social commitments in their activities (Ministerio de Educación, 1997; Salazar & Leihy, 2013).

In spite of this, the majority of the specialized literature on the subject chooses to argue about the benefits of these changes or to criticize their ideological premises (Brunner, 2009; Brunner, Labraña, Ganga, & Rodríguez-Ponce, 2019), meaning that important gaps persist in understanding how these transformations are perceived, valued, and integrated by academics and administrators. In turn, the lack of studies analyzing the possibilities, challenges, and specific experiences aimed at reorienting universities towards greater transdisciplinarity has prevented adequate assessment of the opportunities and obstacles faced in practice by such organizational transformation processes, or sufficient attention being paid to the expectations based on TD in higher education contexts. The latter take

on particular importance considering the discursive tensions with which TD is constitutively associated and which, as Nicolescu (2010) argues, demonstrate that it is a field that is still under construction but which is also essential for the future development of countries (Jahn, Bergmann, & Keil, 2012).

This paper seeks to bridge this gap by examining the narratives and discursive tensions in the discussion of TD and the purposes of science, education, and outreach at Universidad de Chile, examining how they are interpreted and the opportunities and obstacles that they entail for the transformation of knowledge management systems in Chile. In order to do this, these narratives and tensions will be placed in the context of the historical, organizational, and cultural dynamics that have shaped the development of the country.

In line with this approach, the paper is divided into five sections. It begins by describing how Chilean public policy in the last few decades has sought to strengthen basic and applied research with the express purpose of promoting a knowledge-based economy, and how Universidad de Chile, one of the most important research institutions in the country, has incorporated these requirements into its guidelines. Subsequently, we present the research methodology (case study), the information generation mechanism (metalogue), and the method of analysis (discourse analysis). This is followed by the results of the study, focusing on highlighting the main discursive poles articulated in the narratives about TD in the context of Universidad de Chile, before we go on to discuss their meanings in the context of organizational, national, and global transformations. The paper concludes with a summary, future lines of research, and policy suggestions.

Chile's transition towards the knowledge society and Universidad de Chile

In recent decades, various Chilean governments have emphasized the importance of universities as a key factor for the nation's competitiveness. This new orientation, diverging from the classic understanding of cultural institutions that was dominant between the 19th and 20th centuries (Labraña, 2018; Ruiz-Schneider, 2010), has been reflected in multiple initiatives aimed at encouraging the creation of links between universities, civil society organizations, and private companies. According to the Organisation for Economic Co-operation and Development (OECD, 2017), investment in science and technology in Chile increased by only 13% between 2005 and 2017. A large proportion of these new funds have been aimed at promoting knowledge production in higher education institutions in association with industries and communities (FONDEF, 2018). One example of this trend is the Regional Scientific Research Program, a fund that was created in 2010 to improve science, technology, and innovation capacities in regions of the country. The main focus of this program has been the creation and consolidation of associative scientific and technological centers, including active interrelation with various local actors in an interdisciplinary context (Programa Regional de Investigación Científica y Tecnológica, 2018).

This transformation in public policy priorities regarding higher education has led to new challenges for Chilean universities, particularly in terms of research, reflecting global trends that promote the allocation of both public and private funds, conditional on the creation of links with non-university actors (Clark, 2004; Slaughter & Leslie, 1997, 2001; Slaughter & Rhoades, 2004), and the growing appreciation of the notion of the university as a socially active organization (Brunner et al., 2019; Krücken, 2003; Ramírez, 2006). This requires that universities advance with processes of internal reform in order to enhance their interdisciplinary capacities (Bernasconi, 2006; Pineda, 2014, 2015).

The case of state universities is particularly interesting. In contrast to private universities, which face fewer bureaucratic obstacles to make reforms based on market criteria (Bernasconi, 2011) due to their diversified income structure (Brunner, Labraña, & Álvarez, 2019), state institutions have to expand and differentiate the research platform in their academic units, increase productivity to respond to private and state challenges, strengthen the

relationships between their faculties and departments, and compete both in and outside the country, all without abandoning their traditional missions associated with the common good at the risk of losing their legitimacy among students, academics, and staff members, even affecting their public image with economic and political actors (Matus & Núñez, 2002; Grandón & Vargas, 2002; Koch & Vanderstraeten, 2018).

As we hope to demonstrate in this paper, this tension between global challenges and local responses to social demands based on a transdisciplinary approach is reflected in the profound and recent processes of reform at Universidad de Chile, shown in its institutional development plans over the last decade. Following the path outlined by the 2006 Institutional Development Project, the strategic objectives of which included moving towards interdisciplinary and transdisciplinary teaching and research, the Institutional Development Plan 2017-2026 (PDI 2017-2026) defined "the promotion of necessary interdisciplinary and transdisciplinary dialogues both within the University and with external actors" (Universidad de Chile, 2006) as one of the main values of the institution and its different units.

The PDI 2017-2026 establishes the need for the university to adapt to the knowledge society, particularly in terms of incorporating transdisciplinary approaches to address social, scientific, and cultural problems. It also outlines the main challenge of university research as being "to create conditions that lead to interactions between the sciences, humanities, and the arts with society—relevant country problems and global challenges—through interdisciplinary and transdisciplinary initiatives that allow the improvement of institutional activity, the strengthening of the State Higher Education System, and contribute to the development of public policies" (Universidad de Chile, 2018, p. 31). In this research strategy, transdisciplinary collaboration emerges as a central criterion to evaluate the relevance of academics' activities, as shown by the various internal funding initiatives at Universidad de Chile. For example, the Competition for the Creation of Transdisciplinary Research Networks for Global Challenges (Concurso Generación de Redes de Investigación Interdisciplinaria para Desafíos Globales), created by the university Vice-Rector's Office for Research and Development (VID) in 2018, is intended to promote the establishment of transdisciplinary research networks among academics from Universidad de Chile, other national and international higher education institutions, and civil society organizations. The internationalization projects for research and doctorates, UCH-1566 and UCH-1866, have also had the same emphasis.

Rather than assessing the success or failure of these initiatives—which lies beyond the scope of this study—it is of the utmost interest to examine to what extent these new expectations about the nature of knowledge production and use are incorporated into the reflections of staff members of Universidad de Chile. As we will see below, this process does not automatically reflect the definitions of TD that are contained in the specialized literature or the intentions of legislators to reorient universities towards a knowledge-based economy, but instead combines these expectations with specific emphases of the institutional trajectory of Universidad de Chile, thus resulting in an idiosyncratic variation of the notion of TD itself.

Methodology

In order to reconstruct the discursive tensions regarding TD and the aims of science, the article uses a transdisciplinary research approach, called a *metalogue*. This notion was coined by the anthropologist Gregory Bateson as a form of dialogue in which the participants simultaneously discuss an object or problem (communication) and how this object or problem is understood (metacommunication).

> A metalogue is a conversation about some problematic subject. This conversation should be such that not only do the participants discuss the problem but the structure of the conversation as a whole is also relevant to the same subject (Bateson, 1972, p. 17).

In keeping with this idea, we used a version of the metalogue specifically designed for the social sciences (Urquiza, Amigo, Billi, Brandão, & Morales, 2018) as a transdisciplinary technique aimed at simultaneously fulfilling two functions. On a first level, the metalogue encourages the reflexivity of the participants and the co-construction of a *boundary object*: a symbolized and consensual *object* (usually in the form of a record, a working document, or similar) that can later serve as a common reference for the different perspectives involved, promoting future collaboration and coordination regarding the problems and concepts articulated in the *boundary object* (Star & Griesemer, 1989). On a second level, the metalogue mobilizes signifiers and signified in relation to the object of the dialogue, revealing overlapping consensuses and possible discursive tensions, which can be displayed by subjecting the metalogue itself to a discourse analysis.

Application of the metalogue to the case under study involved the following steps (Figure 1):

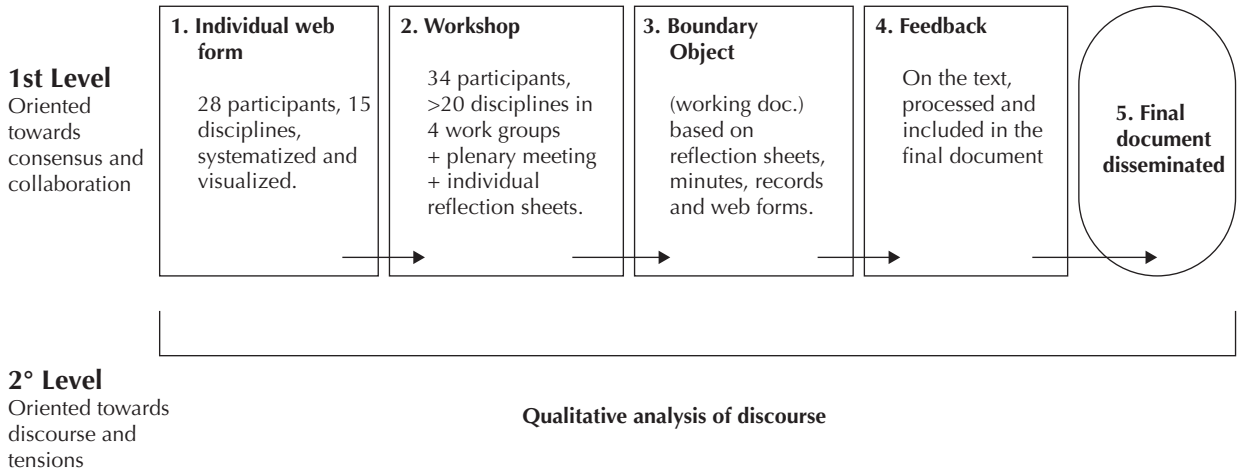

Figure 1. *Methodological flowchart of m*etalogu*e (1st level) and of paper (2nd level).*
Source: prepared by the authors.

A. We applied an individual web form, collecting contributions from 28 participants in 15 disciplines on the definition of TD, the conditions needed to apply it successfully in research and teaching, and existing experiences in this respect at Universidad de Chile. The participants were selected by snowball sampling (Berg & Lune 2017) based on their experience on the subject at the university. The responses were systematized in the form of word clouds and concept maps for use in the subsequent stage.

B. An interdisciplinary and transdisciplinary research workshop was carried out during which, stimulated by the responses systematized in stage 1 and facilitated by trained professionals, the participants discussed and reflected on the understandings and interpretations of TD, as well as the opportunities, challenges, strategies, and requirements involved to put it into practice in Universidad de Chile. A total of 34 people from more than 20 disciplines took part in the workshop, initially divided into four working groups and then reunited in a plenary meeting including everyone. The participants were also invited to fill out a personal reflection sheet.

C. The reflection sheets, notes, audiovisual records and web forms were subsequently analyzed, leading to the creation of a *boundary object* that was intended to reflect the consensual result of the co-construction carried out through the metalogue. This was then submitted to discussion among the participants, who made comments, observations, and suggestions in the text, which we used to refine the document in order to disseminate it at the university and among its key institutional actors.

The information obtained in the previous stages was subsequently processed using discourse analysis, specifically through the inductive approach to content analysis. This enables the identification of patterns and themes that are implicit in the discourse in an inductive manner, with the aim of comprehensively characterizing the phenomenon under study (Berg & Lune, 2017). In the case of this research, the purpose of using this technique was to reveal narratives and divergences regarding the understanding of TD, as well as the opportunities and challenges involved in its implementation.

Results

The study shows that the narratives about TD within Universidad de Chile are organized around three organizational focuses: i) a promise of novelty, innovation, and transformation of scientific and academic work, ii) social engagement, inscribed in the tradition and academic mission of Universidad de Chile, and iii) the opportunity and need for reform of both the university and its environment (Figure 2). Each of these, as we will argue in the following section, catalyzes the narratives reproduced in the space of Universidad de Chile itself, as well as the interpretations and discourses implemented in the relevant context of the university, both locally and nationally, as well as globally.

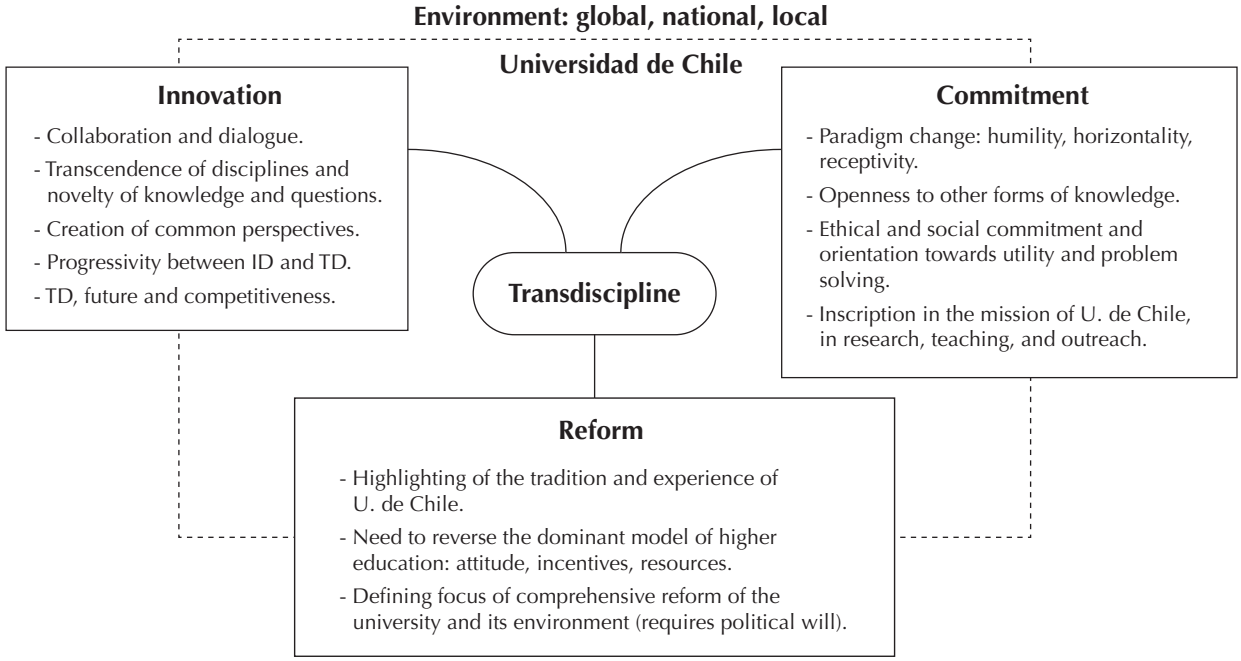

Figure 2. *Results, organized according to discursive pole.*
Source: prepared by the authors

Next, we will look more closely at each point, describing the main narratives with which they are associated. By way of example, certain fragments of the actors' discourses will be shown, identified depending on where the discourse arose (form, workshop, reflection sheet), and the disciplinary field to which they are assigned.

Transdiscipline and academic innovation

According to the participants, the basis of TD is a commitment to overcome the perceived fragmentation that affects disciplinary or multidisciplinary modalities of knowledge, providing a more appropriate platform to address complexity. It is argued that TD should seek to promote collaboration and dialogue between different areas of knowledge and perspectives in reference to complex problems and phenomena, generating more comprehensive and complete understandings of them.

> "[Transdiscipline means] approaching a problem or area with a common perspective, not with the views that each discipline contributes in a separate manner" (Questionnaire, health sciences).

> "[Transdiscipline is based on] the conviction that partial solutions are insufficient to solve complex problems, and it is essential to think together to adapt more appropriate responses" (Questionnaire, biological and environmental sciences).

Despite the importance of the concepts of *collaboration* and *dialogue* to this perspective, they are rarely mentioned as individually distinctive elements of TD, and they seem to be positioned as elements of continuity between TD and interdiscipline. The characteristic of TD that tends to be pointed out as being most distinctive is instead the *novelty* of the knowledge it produces. According to the informants, although interdiscipline also requires collaboration and dialogue, and can promote reciprocal interpretations and learning between disciplines, it is generally limited to a combination or *summation* of disciplinary perspectives, maintaining the boundaries, identities, and assumptions of each of them. In contrast, TD questions and transcends these boundaries, identities, and assumptions, generating new knowledge according to new problems, that is, problems that are not inherited from the disciplines of origin.

> "The main characteristic of transdisciplinary research lies in the disposition to question the limits of the knowledge acquired and to incorporate the knowledge of the different areas, seeking to build a new explanatory scheme" (Questionnaire, social sciences).

> "[Transdiscipline] has to do with the creation of new, frontier fields, where different epistemologies, methodologies, and knowledge are combined and merged to create a new form of research, which is hybrid by definition" (Questionnaire, engineering and architecture).

Indeed, as the discourse shows, the ultimate *telos* of TD lies in creating a new scientific device that is capable of *integrating* and *unifying* all knowledge in a universally accessible way, regardless of the disciplinary origin. Therefore, the success of TD would be measured, at least in part, by its ability to promote the creation of *integrative languages*, *comprehensive theoretical frameworks*, or even *transdisciplinary disciplines*.

> "Transdiscipline occurs when the joint work of two or more disciplines leads to the creation of a new discipline, which addresses problems that go beyond the initial scope of the constituent disciplines" (Questionnaire, physical-mathematical sciences).

> "It is aimed at the formation of a new discipline at the border between two or more disciplines, based on a holistic approach (such as Marxism or cultural or gender studies, for example). It is aimed at the unification of knowledge that goes beyond disciplines" (Questionnaire, social sciences).

Therefore, for various informants, there is a progressive relationship between interdiscipline and TD, with the latter being depicted as a successive, more radical and ambitious step in the effort to transcend disciplinary divisions to create new and more comprehensive knowledge and paradigms.

> "Multidisciplinarity, interdisciplinarity, and transdisciplinarity are successive (or progressive) stages in surmounting disciplinary restriction and in the integration of different forms of knowledge" (Questionnaire, social sciences).

In this vein, on the one hand, the participants describe the commitment of Universidad de Chile to a transdisciplinary perspective as a timely and even necessary response to the current transformations of knowledge systems and society, including the emergence of more complex and multidimensional problems and phenomena, and, on the other, as a strategic opportunity to put the university at the forefront of the national and international scene, demonstrating and highlighting the relevance of its training offer, making it more competitive with respect to other higher education institutions.

> "It's the new way of doing university" (Workshop, health sciences).

> "It would put us at the forefront of the knowledge necessary for the society of the future" (Reflection sheet, social sciences).

However, there is not full agreement regarding the scope of the transformation that TD offers in comparison with the traditional way of thinking about research and the university. Indeed, for some this should be understood as a *residual* approach, that is to say, justifiable only considering particularly complex situations that are impossible to approach using the traditional tools that are available at the disciplinary level.

> "If the complexity of the problem does not require it, transdiscipline is not necessary" (Workshop, biological and environmental sciences).

However, other informants emphasize the need to position TD in a more transversal way regarding all scientific and academic work.

> "It should be understood as a permanent effort, not just considering critical objects or complex situations or events" (Reflection sheet, social sciences).

Transdiscipline and social engagement

If the first discursive pole mainly emphasizes the creative and integrative potential of TD as a new way of conducting science and producing knowledge, the second instead emphasizes the transformational capacity of science, questioning its traditional position with respect to other social spheres. In the discourse, TD is emphasized as a response to the established way of delimiting and validating *problems* and *scientific knowledge*. In the opinion of the participants, this would direct TD towards the promotion of awareness regarding the epistemological limits of science and the consequent need to embrace a more *humble*, horizontal, and receptive attitude towards diversity.

> "A non-hierarchical, horizontal contribution from various disciplines" (Questionnaire, biological and environmental sciences).

Some contend that this process should be completed through significant opening of transdisciplinary research towards other forms of *traditional*, *local*, or *non-formal* forms of knowledge that are extraneous to those usually implemented in academic settings. The articulation of these forms of knowledge would be one of the most important contributions of TD.

> "Transdiscipline is a process of co-construction of knowledge between different transformational agents: including experts, community, and public and private agents" (Reflection sheet, social sciences).

> "Integrating different knowledge, not only disciplinary, but also political, everyday, religious, etc. It goes beyond the discipline" (Questionnaire, social sciences).

Other participants disagree on these positions, emphasizing the dilemma of reconciling this openness with the non-scientific, with the preservation of the inherently epistemic value of science, as well as the additional challenges that this would represent regarding the strictly scientific difficulties produced by TD. Many of them warn of the need to differentiate TD, understood by them as an internal operation of science, from efforts to build a closer interface between science, politics, and society.

> "Co-construction of scientific knowledge is confused with co-construction of knowledge for decision-making, where local knowledge is effectively key" (Questionnaire, social sciences).

> "[The interface] implies popular/local knowledge and points to uncharted epistemological seas, which are not essential in interdiscipline" (Reflection sheet, social sciences).

In contrast, there is much greater consensus on the view of TD as a response to the established way of justifying the relevance of problems and research fields. According to the informants, while disciplinary knowledge begins with concerns and problems that are defined as being relevant based on the intertextuality of scientific communication itself, TD incorporates a predilection for socially relevant and *useful* problems.

> "Transdiscipline, meanwhile, is an approach to research that generates new useful knowledge for society" (Questionnaire, biological and environmental sciences).

> "[Transdiscipline operates] by creating, defining an object not only of study, but of intervention (action) or interaction between knowledge and the problem" (Reflection sheet, social sciences).

In accordance with this conceptualization, transdiscipline should not be limited to producing knowledge; on the contrary, it should assume an ethical and social commitment, which would make it necessary not only in the presence of complex problems, but also in light of situations or dilemmas that are controversial in value-based or political terms.

> "When something affects people (not operational decisions), we have to resort to transdiscipline" (Workshop, staff member).

> "[Transdiscipline] is an Archimedean lever to begin to think big about innovation, at the service of transforming society" (Reflection sheets, social sciences).

This interpretation also supports an alternative way of justifying and valuing the commitment of Universidad de Chile to a transdisciplinary perspective. As described in the preceding section, in addition to emphasizing the capability of transdiscipline to project organization and innovation into the future, the participants also link TD to the past, tradition, and mission of the university. In this respect, the participants consider that the identity of Universidad de Chile is based on its character as a public institution, with a strong social and political commitment. TD is therefore seen as a key tool for the transformation of society and the solution of contemporary problems that affect people, and thus becomes an essential tool for it to fulfill its public commitment.

> "[Transdiscipline] enables us to respond and realize the social function of the university and its commitment, not only to science but also to Chilean society and the rest of the world" (Reflection sheet, social sciences).

> "It has to do with the depiction of the institutional mission of the university, the need to position itself in a space. We're a public university" (Workshop, engineering and architecture).

To achieve this, it is not considered sufficient to merely adopt TD as an approach to research, but it should instead play an essential role in guiding the training and outreach strategies of the university. Developing forms of transdisciplinary teaching, in particular, is seen as a compelling need, both in light of the growing complexity of the problems that future professionals will face and in order to ensure that they fully adopt the same social engagement that is ascribed to the university.

> "Current problems are interdisciplinary and transdisciplinary, and teaching tends to be monodisciplinary: there is a *gap*" (Reflection sheet, engineering and architecture).

> "It is important to train professionals with the ability to take charge of the country's problems and with tools to work with others" (Reflection sheet, social sciences).

Transdiscipline and institutional reform

The third and final discursive pole is based on the consequences and challenges associated with adopting a transdisciplinary approach. In line with the emphasis placed on highlighting the links of TD to the tradition of Universidad de Chile, the participants underline how essential it is to view existing experiences in and around the organization, and to create networks between academics and their units.

> "Make a registry of … forms of local organization that academics have created to accommodate transdiscipline" (Reflection sheet, social sciences).

> "First of all, know who we are and what we do. There is a terrible internal ignorance about the potential that the Uni has in this subject" (Reflection sheet, biological and environmental sciences).

At the same time, the informants underline that TD faces a certain institutional *rigidity*, due to the resistance exerted by the dominant model in which higher education still exists in the country. This is the case even though TD appears to be rooted in the institutional mission of the university.

Moving past this model, which, depending on the case, is called *positivism*, *neoliberalism*, *productivism*, or *academic extractivism*, is therefore closely linked to the use of transdisciplinary approaches.

> "[There is] an historical trend in the Uni … towards monodisciplinary academic training … associated with a commercial society model" (Reflection sheet, engineering and architecture).

> "[It is necessary] to break the logic of generation of individual and solely disciplinary knowledge" (Reflection sheet, social sciences).

In this respect, TD, would require a change in the way in which the university has traditionally operated. This change should come from the academics themselves: indeed, as mentioned above, the participants emphasize how TD requires the utilization of human skills and attitudes associated with values such as humility, receptivity, and horizontality, which are not necessarily present in the established profile of the university staff.

> "The receptivity to different perspectives, an inclusive and innovative attitude to expand the known and proven limits, as well as rigor and creativity so that this innovation makes sense and is coherent" (Reflection sheet, engineering and architecture).

> "The participation of subjects that are open to dialogue and genuine cooperation, with the ability to go beyond the conceptual limits of their discipline" (Questionnaire, social sciences).

In addition to cultural resistance to change, the participants identify the lack of recognition of the activities carried out, both in career terms and the hours of dedication required from academics, as an obstacle to TD. They argue that it is necessary to provide new incentives and a sufficient degree of *protection* to the teacher and researcher so that they can go beyond their disciplinary *boundaries*.

> "The most efficient thing is to remain monodisciplinary. We have to create incentives other than productivism" (Reflection sheet, biological and environmental sciences).

> "The working day, recognize the working day. While transdiscipline doesn't fit into the working day, which is the small field of each individual, it's not going to work" (Workshop, staff member).

Along with the disposition of individuals, the correct incentives, and the work time, according to the informants, the change would also require adequate resources, either in terms of infrastructure, meeting spaces, or dedicated funding for transdisciplinary projects.

> "Training spaces aimed at collaboration, interdisciplinary teamwork and the co-creation of knowledge" (Questionnaire, biological and environmental sciences).

> "The Uni is required to obtain funds that guarantee independence for these efforts" (Reflection sheet, health sciences).

In this respect, the participants agree that adopting TD cannot be limited to incorporating alternative ways of carrying out science, teaching, or outreach; instead, it should become the inspiration for an institutional reform, involving all areas of the university, and based on a strong commitment by the university authorities.

> "Transdiscipline changes the whole university. Therefore, it doesn't count as another activity, but could be the nucleus of a great reform" (Reflection sheet, social sciences).

Indeed, specifically because of the radical nature of the changes that TD requires, and because it is so dependent on the existence of serious and persistent political will, achieving a complete and comprehensive adoption of this principle will only be possible on the condition that the stakeholders themselves manage to organize themselves *to make themselves heard,* exert pressure, and propose the requirements to make TD a state priority, according to the participants.

> "The problem is the university, but there are structural problems beyond that. The first corrections were made by FONDAP [Fund for Financing Research Centers in Priority Areas]" (Workshop, engineering and architecture).

Discussion and Conclusions

The results confirm the initial hypothesis of this paper: although the narratives produced within Universidad de Chile regarding TD highlight factors that are usually associated with the concept in the international debate, as expected, the specific configuration that they adopt within the discursive construction of the institution is an idiosyncratic assemblage of the factors that are made available in various dominant traditions in specialized literature on TD. Therefore, as previous studies have suggested (Marginson, 2004), the appropriation of the concept is influenced by both global and national dynamics and semantic references, and even specific to the singular historic trajectory of the context under study.

Indeed, as we will show below, the three discursive poles identified connect TD with semantic-ideological references that are typical of the historical trajectory of Universidad de Chile.

More accurately, the first two poles refer to the expectations and descriptions of two alternative higher education models: on the one hand, they are positioned in what Burton Clark (1998, 2004) would call an entrepreneurial university, that is, an institution capable of responding to the demands of the different actors located in its environment and thus contributing to the progress of society as a whole (see also Slaughter & Leslie, 1997). This model has gained importance worldwide in recent years, within the framework of changes in the objectives attributed to university research and teaching due to the emergence of the knowledge society (Steinbicker, 2011). It has also become more consolidated at the national level, thanks to regulatory and financing policies, particularly dominant since the second half of the 1990s, which give special importance to the capacity of institutions to convert their research and teaching into activities with practical relevance (Brunner, 2015; Labraña & Rodríguez, 2017).

However, the entrepreneurial university model has been the target of criticism because of its tendency to *denature* the public role of the university in favor of an economistic and individualistic rationale, centered on the pursuit of objectives related to the accumulation of prestige and capital, without much focus on its traditional public commitment (Peters, 1992; Giroux, 2014; Olssen, 2015). Along these lines, the entrepreneurial university is in contrast to the traditional public university model that has historically existed in Chile (Mellafe, Rebolledo, & Cárdenas 1992; Serrano, 1994; Ruiz-Schneider, 2010). In this respect, it should be noted that, although the traditional public university model has started competing with that of the entrepreneurial university in recent decades, it still remains valid in a national and international institutional framework that promotes social reform through education (Schofer & Meyer, 2005). It should be highlighted that there have been a series of strong appeals, both globally and locally, to rethink the structure and mission of universities considering the urgency and complexity of contemporary environmental problems and the importance of transdisciplinary research and education within the scope of efforts to implement sustainable development paradigms (Labraña et al., 2019; O'Brien et al., 2013; Yarime et al., 2012).

TD responds to the challenge of the entrepreneurial university model to the extent that, as has been observed previously, the innovative potential of TD and its orientation to produce more comprehensive responses to complex problems is discursively associated with expectations of competitiveness and the strategic positioning of the university in the national and international landscape of higher education. Therefore, embracing TD is presented as a possible response to the growing pressures exerted on the institution, both by legislators and by its own socioeconomic environment: that is, to promote its conversion into a driver of scientific, technological, and economic development within an increasingly knowledge-based economy.

On the other hand, the discourse also emphasizes the transformative aspirations of TD and its ethical, political, and social commitment, which is done explicitly as a self-description of the tradition and institutional mission of Universidad de Chile as a public institution dedicated to promoting the common good, equity, and social cohesion, and active criticism and mobilization regarding the country's political activity. That is to say, in line with the traditional public university model. Indeed, TD is represented not only as the logical continuation of the university's own values and priorities, but also as a necessity to ensure that it can fulfill its mission and as a tool to enhance its capacity for intervention and social change, without altering the fundamental elements of its own self-understanding.

Both higher education models (public university and entrepreneurial university) therefore find common ground in TD, which becomes a priority and a means to simultaneously promote both sets of aims and, at the same time, provide a discursive reconciliation for the expectations and priorities associated with each of the two models. The notion of TD thus functions as a traveling concept (Said, 1983); a concept that circulates between institutions, acquiring new meanings in accordance with their contexts of enunciation, in a constant process of interpretation and reinterpretation that establishes the foundations for the consolidation of knowledge management systems at the local, national, and regional levels.

The third discursive pole identified takes the form of a concerted demand for organizational and institutional reform. Indeed, both university models (entrepreneurial university and socially-engaged public university) agree on criticizing and rejecting the paradigm that currently dominates the structure of Chilean higher education: both of them highlight the rigidities, constraints, and conditioning that this paradigm implies for academic activity, and both are united by the desire to transform the country's knowledge systems in a profound manner. The demands for reform of higher education in Chile have acquired particular intensity in the national context after the student movement of 2011 and 2012, through their demands for a free, quality public education. This led to a process of discussion between the different actors in the system about the objectives of higher education institutions, particularly in state entities such as Universidad de Chile, although no clear consensus has yet emerged on this issue (Guzmán-Valenzuela, Barnett, & Labraña, 2019; Bernasconi, 2014). On the contrary, this appears to be one of the main points of controversy in the protests that have ravaged the country since October 2019.

Indeed, this synthesis of the perspectives produced by TD does not bridge the profound gap (theoretical, practical and ideological) between the model of the public university and that of the entrepreneurial university. Certainly, it can be expected that, despite the common agreement to reject the current institutional structure and TD, these differences take on greater importance when proposing specific goals and paths for a transition towards a more transdisciplinary university. This is patently clear in our analysis when considering the profound heterogeneity of perspectives regarding how to develop TD, the barriers it faces, and what instruments should be used to support it. Visible differences thus become clear that, if not carefully considered and processed using suitable dialogic mechanisms (such as those fostered by methods like the metalogue analyzed in this study), could end up undermining any attempt to advance towards TD in the university.

Lastly, we should highlight future lines of research and recommendations for public policy that are revealed thanks to this research.

With regard to the former, as we have shown, the use of the concept of TD in Universidad de Chile emerges from processes of translation that are mediated by the trajectory of the organization, the characteristics of the national context, and the definitions of the specialized literature on the subject. Considering this, future research could analyze whether these processes take place in a similar way in other higher education systems that are also historically influenced by the model of the socially-engaged university, as in most Latin America countries (Mollis, 2006; Pineda, 2015), or if perhaps the weight of the intellectual traditions of each country plays a predominant role in the operationalization of the meaning of TD.

In this vein, it should be noted that, based on the analysis, numerous discursive contents were identified whose association with the notion of TD created argument and divisions among the participants themselves. Among others, these include: whether the transition to a transdisciplinary approach can be resolved within science itself, or whether it necessarily requires the limits between this and other forms of knowledge to be transcended; whether the transformation of the way of conducting research and teaching should be seen as a means to an end (for example, to increase innovation or added value for society) or as an end in itself; and whether, more generally, the shift towards DT means promoting a broader and more radical transformation of the way in which science and its relationship with society are conceived. Since these disputes also divide the specialized literature, it would be interesting to contrast the way in which they are processed in the case of Chile—plagued by the tensions typical of a system with a high degree of privatization—with the trajectories that that they take in other sociohistorical-geographic contexts.

Along the same lines, it should be considered that TD also inspires criticism. This did not emerge explicitly in the material we analyzed, possibly due to a self-selection bias on the part of those who took part in the discussion. However, we can observe certain opposition, particularly with regard to the most radical and transformative

interpretations of TD, and the efforts by some informants to set limits on the scope, type of problems, and specific areas of application of TD. Future research should investigate these latent reservations more carefully, as well as the reluctance to be make them more explicit, in order to shed light on the political-controversial dimension of TD and to better inform the design of initiatives aimed at promoting its acceptance in academic practice.

In terms of public policy, this paper underlines the relevance of TD as the axis of an institutional and organizational reform that allows a response to the pressures to which the university is increasingly exposed, considering the predominance of a knowledge-based economy, without renouncing the traditional social mission of public university institutions. Universidad de Chile is in a privileged position to lead a reform of this nature, both in the country and in the region, by virtue of its cultural heritage in this area and its current commitment to developing pioneering experiences in this regard. In order to do this, giving TD a leading role in the development strategy of the university could help ensure the visibility, comprehensiveness, and continuity of the commitment it requires to achieve its full transformative potential.

In this context, it should be noted that transdisciplinary mechanisms of reflection, as described in this paper, play a crucial role on at least two levels. On the one hand, they are essential to build a common reference and a sufficient degree of consensus on which to base the collaboration and coordination that is needed to institutionalize TD in Universidad de Chile. On the other hand, they provide an opportunity to highlight, contrast, and reflect on different perspectives, interpretations, and narratives on an issue of great contingency considering the current situation in the country, such as the reform of higher education systems. With respect to this point, the metalogue technique has proven to be a particularly appropriate methodology, both to promote dialogue and the establishment of agreements, as well as in its technical quality of research aimed at revealing and investigating narratives and meta-narratives surrounding disputed social objects (Urquiza et al., 2018).

The original paper was received on December 9th, 2019
The reviewed paper was received on June 8th, 2020
The paper was accepted on July 1st, 2020

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