ARTICLES

REMOTE TEACHING IN THE PANDEMIC: OPPORTUNITIES FOR A TRANSFORMATIVE LEARNING

Ensino remoto em tempos de pandemia: Oportunidades para uma aprendizagem transformadora

Educación a distancia en tiempos pandémicos: Oportunidades para el aprendizaje transformador

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ABSTRACT

The Covid-19 pandemic has reinforced remote teaching (RT) as a trend in management education. This research reflects on the central elements that make RT a transformative learning (TL) experience, based on a case study of a TL-anchored sustainability discipline that was migrated to RL during the pandemic. Theoretically, we propose a framework or reference that combines TL, education for sustainability (EfS), and communicative ecosystem (CE) theories; we also extend the concept of RL, coining the term 'transformative remote teaching' (TRT). With regard to practice, students' feedback points to three elements that are key for TRT: exploring different windows of knowledge; rethinking the teaching role; and adapting tools to support the teaching-learning process. We conclude by highlighting the need to approach education in ways anchored in epistemological, paradigmatic, and transformative changes.

Keywords: transformative learning, education for sustainability, transformative remote teaching, pandemic, communicative ecosystem.

RESUMO

A pandemia da Covid-19 preconizou o ensino remoto (ER) como tendência no ensino de gestão. Esta pesquisa traz reflexões sobre quais seriam os elementos centrais para tornar o ER uma experiência de aprendizagem transformadora (AT), a partir do estudo de caso de uma disciplina de sustentabilidade, ancorada na AT e migrada para o ER durante a pandemia. Teoricamente, propomos um framework de referência articulando as teorias de AT, educação para sustentabilidade (EpS) e ecossistema comunicativo (EC); e ampliamos o conceito de ER, cunhando o termo ensino remoto transformador (ERT). Na prática, a escuta dos estudantes aponta para três elementos para um ERT: explorar diferentes janelas de conhecimento; repensar o papel docente; e adaptar ferramentas a serviço do processo de ensino-aprendizagem. Concluímos ressaltando ser preciso avanços nos estudos sobre ERT dada a tendência do ER e a necessidade de mais propostas educativas ancoradas em mudanças epistemológicas, paradigmáticas e transformadoras.

Palavras-chave: aprendizagem transformadora, educação para sustentabilidade, ensino remoto transformador, pandemia, ecossistema comunicativo.

RESUMEN

La pandemia de COVID-19 ha predicho la Enseñanza a Distancia (EAD) como una tendencia en la educación de gestión. Esta investigación aporta reflexiones sobre cuáles serían los elementos centrales para hacer de la EAD una experiencia de aprendizaje transformador (AT) a partir del estudio de caso de una disciplina de sostenibilidad, anclada en el AT y migrada a la EAD durante la pandemia. Teóricamente, proponemos un marco de referencia que articula las teorías de AT, educación para la sostenibilidad (EPS) y ecosistema comunicativo (EC); y ampliamos el concepto de EAD acuñando el término Enseñanza a Distancia Transformadora (EADT). En la práctica, la escucha de los estudiantes apunta a tres elementos para una EADT: explorar diferentes ventanas de conocimiento; repensar el rol docente; y adaptar las herramientas al servicio del proceso de enseñanza-aprendizaje. Concluimos destacando la necesidad de avanzar en los estudios sobre EADT, dada la tendencia de la EAD y la necesidad de más propuestas educativas ancladas en cambios epistemológicos, paradigmáticos y transformadores.

Palabras clave: aprendizaje transformador, educación para la sostenibilidad, enseñanza a distancia transformadora, pandemia, ecosistema comunicativo.

INTRODUCTION

The Covid-19 pandemic, which brought classrooms around the world into the virtual environment, led to the emergence of what has been called 'emergency remote teaching' (ERT). ERT should not be confused with distance learning (DL) or typical online education practices, such as distributed, mobile, or blended learning, although it uses many of their resources (Bozkurt & Sharma, 2020; Ferri, Grifoni, & Guzzo, 2020; Hodges *et al.*, 2020; Oliveira, Corrêa, & Morés, 2020). This phenomenon, also observed in management education (Brammer & Clark, 2020; Govindarajan & Srivastava, 2020), was a temporary migration to remote learning due to the pandemic's sui generis circumstance; therefore, it did not necessarily rely on planning, expertise, and preparation required by online learning modalities, whether synchronous or asynchronous. This sudden adaption to ERT was critical and has become the object of studies that seek to understand the temporary and permanent changes arising from this period, especially in business schools (Beech & Anseel, 2020; Brammer & Clark, 2020; Krishnamurthy, 2020).

Therefore, our contribution lies in describing the migration of a sustainability-oriented education experience to ERT, with a view to fostering transformative learning (TL), a relevant theory for studies in the fields of management learning (ML) and responsible management learning and education (RMLE), especially in its social and critical strand (Taylor & Cranton, 2013). This strand intends to train managers so that they can: (a) question their own assumptions and those of mainstream management; (b) work with disorienting collective dilemmas, not just individual ones; and (c) exercise dialogue and critical reflection about commonly held assumptions (Brunnquell & Brunstein, 2018; Brunstein & King, 2018; Brunstein, Walvoord, & Cunliff, 2021).

Among the numerous disciplines that were migrated to ERT, the experience addressed here, which is called Integrated Training for Sustainability (FIS, in Portuguese), is relevant to the debate on remote teaching (RT) in management education. It is the transition from an educational practice grounded on TL and education for sustainability (EfS) which, for over 10 years, used hands-on and outside-classroom methodologies to foster paradigmatic change in an education conception that perpetuates mainstream ideas (Abeydeera, 2021; Ghoshal, 2005). The challenge posed by this transition consisted precisely in keeping the discipline's essence and TL practices in the remote modality. This process enabled us to develop what we call transformative remote teaching (TRT), which, in this experience, allowed preserving TL assumptions with remarkable success. Another reason for this study to address a sustainability-oriented discipline is that the unprecedented disruption caused by Covid-19 provides an opportunity for future managers to rethink and reorient their actions toward sustainability (Abeydeera, 2021). However, how effective is this effort with regard to filling practical and theoretical gaps in ERT, given its recent nature?

With the pandemic and ERT, there was the risk that the TL precepts above could be lost or weakened. Although studies of online TL are growing, there is much about the advancement and effectiveness of these experiences that are yet to be explored (Cranton & Torrisi-Steele, 2021;

2 FGV EAESP | RAE | São Paulo | **V. 63 (1) | 2023** | 1-21 | e2021-0703   eISSN 2178-938X

Wang, Torrisi-Steele, & Reinsfield, 2021). We are going through a stressful context that could affect faculty's and students' engagement (Bozkurt & Sharma, 2020); individual technology needs could become barriers to learning; most faculty have not been trained to teach remote classes (Castaman & Rodriguez, 2020; Oliveira et al., 2020; Ribeiro & Corrêa, 2020); and there are lessons to be drawn about the relationship between the pandemic and sustainability issues (Abeydeera, 2021).

Thus, we describe and analyze an experience of adapting TL precepts to ERT that sought to benefit from the very pandemic disruption to reorient itself pedagogically – a reorientation towards a transformative education approach focused on collective sustainability dilemmas. Our purpose for describing and analyzing this experience was to extend the debate on the concepts of RT and TL in the context of management education. We used the single case study method (Stake, 2000) to capture such learning in an effort to identify and explore the core elements that allow keeping TL even in the virtual environment. Following Stake (2000), we address the specific case of FIS not only to investigate its events but also to reflect on what it represents and reveals as a phenomenon, thus opening the possibility of generalization by those who read this study.

We found that the adaption of FIS to ERT occurs in and through a communicative ecosystem (CE). And for RT to be transformative, it should be understood beyond the use of technology as a lesson tool; it is necessary to acknowledge how shifting media can influence and enhance the inclusion of subjectivities, the quality of interactions, the cognitive stimuli (Barretto, 2019), and the change of assumptions of those involved in the teaching-learning process. Teaching, from the perspective of CE and TL, dialogues simultaneously with the technology-student mediation and its developments, aiming at transformative education (Chory & Offstein, 2017; Gur-Ze'ev, 2007).

By combining these concepts – i.e., TL, EfS, and CE – and by considering FIS as a case of TL-EfS migrated to ERT, this research: (1) presents the pedagogical elements that were central to making RT a TL experience, highlighting the importance of a CE conceived and practiced beyond the use of technology as a tool; (2) introduces the concept of CE into the field of management education; (3) creates a framework for TL in RT; and (4) proposes a theoretical extension to RT, coining the term TRT. The elements that emerged from matching the theories with the empirical field and with FIS students' statements pointed to: (1) exploring different windows of knowledge; (2) rethinking the role of the professor; and (3) adapting tools to support the teaching-learning process. Finally, we present theoretical and practical implications that provide a basis and inspiration for those who seek to approach education in ways founded on epistemological and paradigmatic changes and, therefore, potentially more transformative.

THEORETICAL BACKGROUND

Emergency Remote Teaching: What We Have Learned So Far

Distance learning (DL) is an interdisciplinary area within the field of educational technology, a teaching modality designed for virtual environments, with distinct resources and channels which

are used to allow more interactions in the teaching-learning process. RT is different from DL, as it has more in common with classroom teaching: it has a fixed schedule of synchronous classes and a fixed number of students, among other aspects. In turn, ERT has some RT characteristics but deals with an immediate, extraordinary situations.

Since we began this research (July 2020), scholars have started studying the recent ERT phenomenon from various perspectives. Regarding the model's challenges and opportunities (Beech & Anseel, 2020; Ferri et al., 2020; Pokhrel & Chhetri, 2021), Brammer & Clark (2020) mention the advantages of bringing people from outside the educational institution due to lower costs. For Oliveira *et al.* (2020), it is possible to lead students to adopt a more active and autonomous attitude in their learning process. On the other hand, the few studies conducted so far about teaching in ERT (Bozkurt & Sharma, 2020; Oliveira *et al.*, 2020) point to the need for digital training for teachers and to authors that share few experiences (Castaman & Rodriguez, 2020; Ribeiro & Corrêa, 2020).

Studies addressing specifically the teaching-learning process in ERT explore issues that we will connect to TL theory. These regard ERT's context of stress, trauma, and psychological pressure where the main object of teaching becomes the creation of spaces of support, sharing, and collaboration, rather than the focus on content only since after the emergency context, students will remember mainly how they felt and how they were taken care of (Bozkurt & Sharma, 2020).

Finally, there is no single way of thinking about RT (Pokhrel & Chhetri, 2021): the subjects are many, the needs, the diverse, and the profiles of faculty and students, different, just like their adaption to the model. The same holds for TL.

Reference Framework: Transformative Learning in RT

To reflect on TL in RT, we designed a reference framework that considers the connections between three theories, namely TL, EfS, and CE.

Figure 1. Reference Framework: Transformative Learning in RT
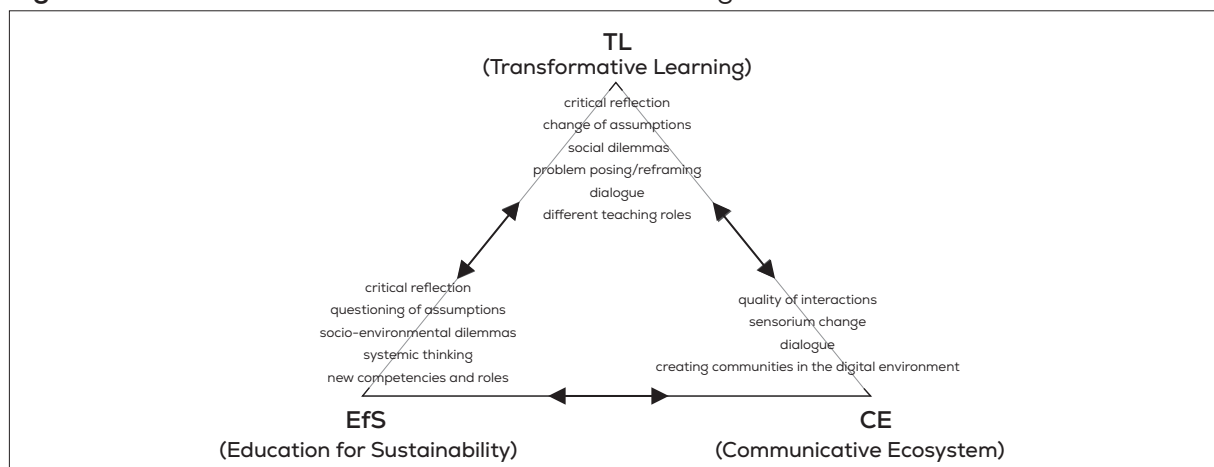
Transformative Learning in Remote Teaching of Management

Born out of andragogy in 1981, with roots in constructivism and heavily influenced by Paulo Freire and Jurgen Habermas, the TL developed by Jack Mezirow has been discussed in studies of critical management learning (ML). Questioning the transmissive education historically practiced in management education, TL proposes learning through discovery, critical reflection, and dialogue, with a focus on real dilemmas and problem posing/reframing, rather than problem-solving (Brunstein & King, 2018; Brunstein *et al*., 2021). Mezirow (1997) defines TL as learning that changes problematic reference patterns into frameworks that are more inclusive, distinct, reflective, open, and emotionally capable of change. When we are in contact with the world and, based on experience and interactions, describe it and change our assumptions, we undergo TL (Brunstein & King, 2018; Hoggan, 2016). The focus is on acquiring the ability to deal critically and reflectively with knowledge, not on accumulating it (Brunstein et al., 2021; Cunliffe *et al*., 2020), and we experience a transformation in the assumptions underlying our thoughts, feelings, and actions (Gambrell, 2016).
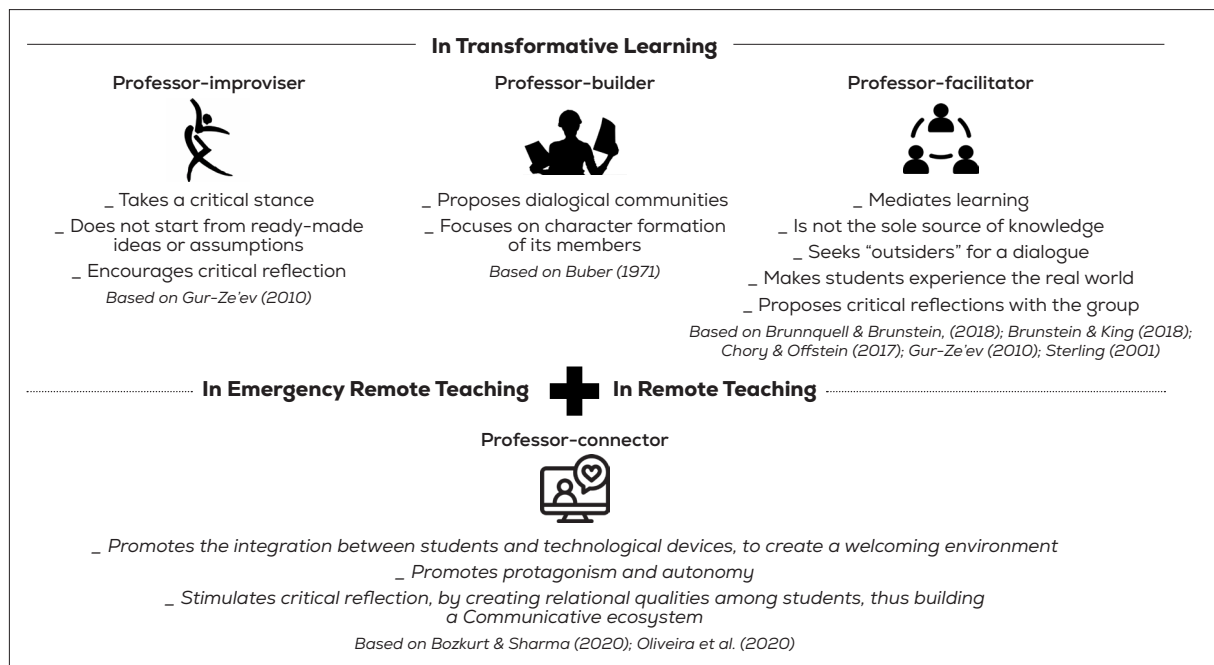
Figure 2. From transmissive education to transformative learning

Aspects	Transmissive Education	Transformative Learning
Learning	Transmissive	Through discovery, through critical reflection
	Individual	Collaborative
	Dominated by theory	Oriented to practice, *problem posing/reframing*
	Lower-level cognitive	Higher-level cognitive
Methodological approach	Centered on professor	Centered on student
Professor's role	*Expert*, knowledge conveyor	Reflective practitioner, engaged in action research
Focus	Knowledge accumulation and orientation to content	Self-regulator, oriented to real issues, social dilemmas
	Emphasis on cognition	Objectives related to cognition, affections and skills
Involved in the process	Institutional, based on employees	Outsiders also as source of knowledge

TL takes place when we face a disorienting dilemma (Mezirow, 1997), which leads us to critical reflection and, therefore, to a change in our frames of reference, or from our point of view, or in both (Ross & Rosenbloom, 2011). Thus, dialogue and critical reflection are central in enabling us to become potentially more open to changing our assumptions (Brunstein & King, 2018; Cunliffe et al., 2020; Ross & Rosenbloom, 2011).

Three important concepts relate to TL regarding the professor's role, namely the improviser-professor, the builder-professor, and the facilitator-professor. These roles are linked to TL and EfS assumptions, as presented below. However, TL, in the context of RT, introduces an additional role: the connector-professor (Figure 3).

5 FGV EAESP | RAE | São Paulo | **V. 63 (1) | 2023** | 1-21 | e2021-0703   eISSN 2178-938X

Figure 3. Teaching roles in TL and ERT

In Transformative Learning

Professor-improviser
_ Takes a critical stance
_ Does not start from ready-made ideas or assumptions
_ Encourages critical reflection
Based on Gur-Ze'ev (2010)

Professor-builder
_ Proposes dialogical communities
_ Focuses on character formation of its members
Based on Buber (1971)

Professor-facilitator
_ Mediates learning
_ Is not the sole source of knowledge
_ Seeks "outsiders" for a dialogue
_ Makes students experience the real world
_ Proposes critical reflections with the group
Based on Brunnquell & Brunstein, (2018); Brunstein & King (2018); Chory & Offstein (2017); Gur-Ze'ev (2010); Sterling (2001)

In Emergency Remote Teaching ➕ **In Remote Teaching**

Professor-connector
_ *Promotes the integration between students and technological devices, to create a welcoming environment*
_ *Promotes protagonism and autonomy*
_ *Stimulates critical reflection, by creating relational qualities among students, thus building a Communicative ecosystem*
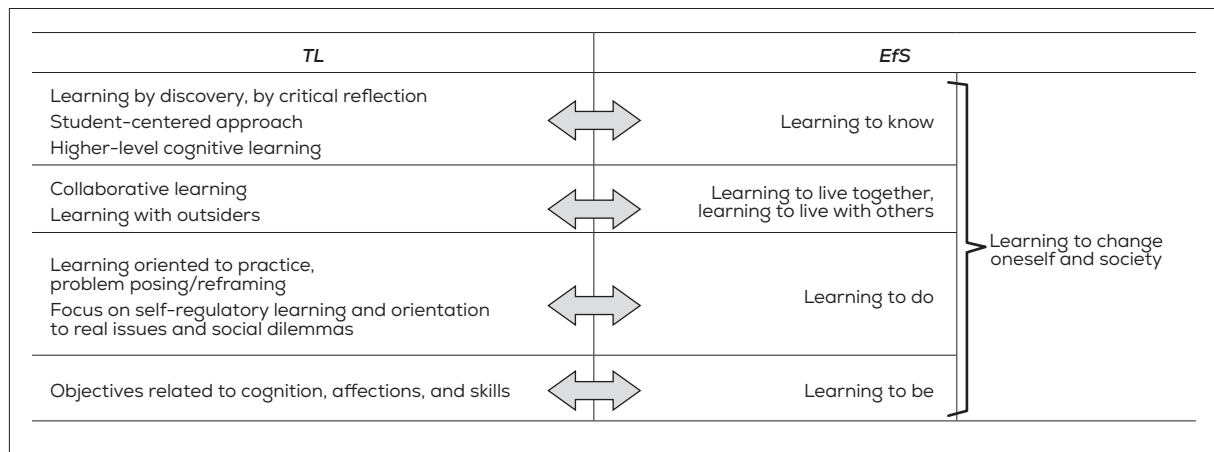*Based on Bozkurt & Sharma (2020); Oliveira et al. (2020)*

In RT, we must pay attention to other barriers that affect the teaching-learning process, such as the technological infrastructure and emotional aspects of students and faculty (Bozkurt & Sharma, 2020). Thus, it is important to enhance the quality of exchanges, acknowledging their specificities (Di Felice, 2017) and fostering a welcoming, collaborative, and student-centered approach to learning (Bozkurt & Sharma, 2020; Ferri et al., 2020; Gur-Ze'ev, 2007).

Because our case is based on TL and EfS, it is important to introduce the latter, even if briefly, since not only does it connect to, but it also influences and is influenced by TL, thus becoming an intertwined and, ideally, inseparable element from TL.

Intertwining: Transformative Learning and Education for Sustainability

Since it is more urgent than ever for organizations to pursue responsible management, i.e., sustainability-oriented and with an ecocentric approach (Cunliffe *et al.*, 2020), management education, whether in-person or virtual, should focus on its emancipatory potential, preparing students for a world of wicked problems, such as the pandemic or climate change (Abeydeera, 2021).

TL is intertwined with discussions of EfS and RMLE (responsible management learning and education) (Brunnquell & Brunstein, 2018; Krishnamurthy, 2020) since sustainability, by radically challenging the assumptions of business schools (Akrivou & Bradbury-Huang, 2015; Ghoshal, 2005), enables the emergence of a new vision of management teaching as a forward-looking education practice. It also considers that students must engage in collective dilemmas (Brunstein & King, 2018; Gambrell, 2016; Krishnamurthy, 2020), question their assumptions through critical reflection (Brunnquell & Brunstein, 2018; Brunstein & King, 2018; Cunliffe *et al.*, 2020), and develop meta-skills that enable them to adapt to different situations and cognitive domains (Gambrell, 2016).

Fernanda Cassab Carreira | Ricardo Barretto | Isabella Cruvinel Santiago | Janette Brunstein

Figure 4. Connections between TL and EfS

TL	EfS
Learning by discovery, by critical reflection Student-centered approach Higher-level cognitive learning	⟷ Learning to know
Collaborative learning Learning with outsiders	⟷ Learning to live together, learning to live with others
Learning oriented to practice, problem posing/reframing Focus on self-regulatory learning and orientation to real issues and social dilemmas	⟷ Learning to do
Objectives related to cognition, affections, and skills	⟷ Learning to be

Learning to change oneself and society

Like TL, EfS breaks with the pedagogy usually practiced in management education, as it introduces problematization and the questioning of values, beliefs, and assumptions in socio-environmental issues and develops systemic thinking and new competencies that allow students to take on new roles in promoting sustainability (Brunstein *et al.*, 2021). Based on the TL-EfS intertwining, and in order to think about how it occurs in RT, we introduce the third theory of this reference framework: the communicative ecosystem (CE).

Communicative Ecosystem: Where Subject-technology Relations Take Place

CE is not a concept found in the field of management teaching, but it contributes to explaining the occurrence of TL in RT. From discussions on the interfaces between communication and education, CE was initially defined as the relationship between people and all kinds of technology that shape the contemporary digital culture (Martín-Barbero, 2000). Updated, the concept also comprises the possibilities of building communities in the digital environment and the symbolic exchanges occurring there, the qualities of interaction, dialogue, experiences, interpersonal relationships, and modes of expression (Consani, 2018).

Barretto (2019) highlights the change in the *sensorium*, an important element of the original concept of CE (Martín-Barbero, 2000). It is little discussed, though very relevant in our case. By *sensorium*, we mean the whole sensory and intellectual apparatus of the body, or its sensoriality and sensibility. For Di Felice (2017), the change in the *sensorium* has been transforming our way of being in the world through the virtual-real integration occurring in our ways of interacting, expressing ourselves, interpreting stimuli and situations, and building and sharing knowledge and thoughts. This change is even more evident among the young; since they relate to technologies in a more expressive and integrated way, they start to recognize space and time in a new fashion: perceptions of what is slow and what is fast, what is near or far (Martín-Barbero, 2000) are changing. Hence, from this change in the *sensorium*, new ways of perceiving and feeling emerge.

Fernanda Cassab Carreira | Ricardo Barretto | Isabella Cruvinel Santiago | Janette Brunstein

During the pandemic, the use of technology was even more necessary for people to relate to each other, and in ERT, we could see the scope and complexity of the CE, which showed the education-communication interface on which TL operates and depends. In the context of migrating from FIS to ERT, we analyze the connections and interrelationships between TL, EfS, and CE.

METHOD

To reflect on the pedagogical elements that can turn RT into a TL experience, we conducted a qualitative research using the case study method (Stake, 2000) with the FIS discipline taught during the pandemic. This single case study sought to examine in depth what happened to those who attended the course. Still, readers can generalize, considering their own interpretations and contexts.

About FIS and its Migration towards ERT

Created in 2010 at Fundação Getulio Vargas's Sao Paulo School of Business Administration (FGV EAESP), the discipline was anchored in EfS and TL, with the mission of expanding students' paradigm of reality, enabling greater awareness of themselves and of their interdependence, and making them better prepared to deal with complex challenges and to reflect on assumptions and beliefs, with socio-environmental dilemmas as the starting point for the process. It is structured on two pillars: the Reference Project, a real and complex challenge whose final deliverable is collective and practical; and the Project of Oneself, a set of self-reflective and experiential activities involving art, body, and mindfulness, among others. Its faculty (from now on 'FIS team') has a multidisciplinary background and acquired TL and EfS specialist skills through both previous training and their experience in conducting each class. More than 450 students have already attended FIS. Since it is well known to use TL methodology, it attracts those who are more open to experiencing this pedagogical approach. Other disciplines in the program employ transformative models, but FIS is the only one created through this TL-EfS combination.

The undergraduate program at FGV EAESP is a classroom course with no virtual disciplines. When the pandemic began, the entire course was migrated to RT. The 20th FIS class attended the discipline's activities between February and June 2020. Its migration to ERT occurred in March: of the 28 classes, two were canceled, 10 were taught in person, and 16 were conducted online (Zoom Platform). Only one of the two scheduled field trips was carried out; only one of the scheduled events was held in person, the remainder being adapted as virtual activities.

FIS' uniqueness makes it an exemplary case as it allows identifying the elements that facilitated the transition of TL precepts to ERT, towards a change of sustainability assumptions in management education. The discipline's critical-reflective profile, its hands-on and outside-classroom features, in combination with the pandemic, allowed students to experience both modalities in a short

period of time; this made its pedagogical approach relevant for building a theoretical framework that would lead to the emergence of a TRT approach to management education.

Data collection

To capture this experience, we chose to listen to those who went through it so as to examine if there was evidence of change, thus giving voice to the students, a usually neglected perspective in the process of thinking about their education (Priyadharshini, 2019). Their speeches and writings were transcribed verbatim. Table 1 presents the data collection process and sources.

Table 1. About data collection

Data source	Created for this study?	Date	Tool/Duration	Students heard	Caption
Focus group	No. Recurring practice for classes' feedback. Conducted by FIS team, with open questions on the discipline and what worked in RT.	6/16/2020	Zoom platform, recorded on video and transcribed/40'	20	FG
Semi-structured interviews	Yes. We used a pilot script with a student, adjusting it for the other interviews. Questions explored FIS and TL in ERT. Each member of the FIS team approached one student.	From 6/23 to 6/25/2020		15 out of 21 were enrolled in more than one discipline concurrently with FIS – for additional perspectives on RT practice in the period.	INT
Analysis of assessment forms	No. FIS has two assessments: one of the field trip and one of the course as a whole. They comprise self-evaluation (the student evaluates himself/herself); hetero-evaluation (peer evaluation); and pedagogy assessment (student evaluates FIS). There are grades with justification and open questions. Because of ERT, we included questions on virtual classes.	6/15/2020	Online form.	21	FORM

Names were codified to ensure anonymity

To minimize the potential discomfort, since the FIS team conducted the focus group and the interviews, we designed the questions with a view to improving the subsequent lessons, considering the experience of that class. Furthermore, as FIS is grounded in TL, it involves a faculty-student relationship conducive to dialogue and critical reflection. However, our focus was not to investigate this particular aspect, and we recognize a potential limitation here. Still, the triangulated data analysis performed out by all authors showed its consistency.

Fernanda Cassab Carreira | Ricardo Barretto | Isabella Cruvinel Santiago | Janette Brunstein

Data Analysis

Our analysis involved the following stages: we condensed data through a constant process of selection, simplification, abstraction, and transformation; conclusions were drawn from the presentation and elaboration of data; and we checked those conclusions (Miles, Huberman, & Saldaña, 2014). We began with the interviews, which we analyzed throughout the data collection process in order to allow the possibility of naturalistic generalization (Stake, 2000) based on the internal validity and reliability of the collected data (Tracy, 2010). Then we added data from the focus group and the forms.

All authors read the data, and from this researcher triangulation (Brinkmann, Denzin, & Lincoln, 2018) first-order concepts emerged (Gioia, Corley, & Hamilton, 2013). We returned to the theoretical framework with an iterative, induction-deduction approach to analysis, and found that some aspects of TL and EfS were potential categories, second-order concepts to be analyzed in a second stage. The constant comparison allowed data triangulation (Stake, 2000), and we observed more convergences than discrepancies. Hence, from the mapped categories, three aggregate dimensions emerged, which we called the core elements of the TL experience in ERT (Figure 5).

**Figure 5.** Categories' emergence
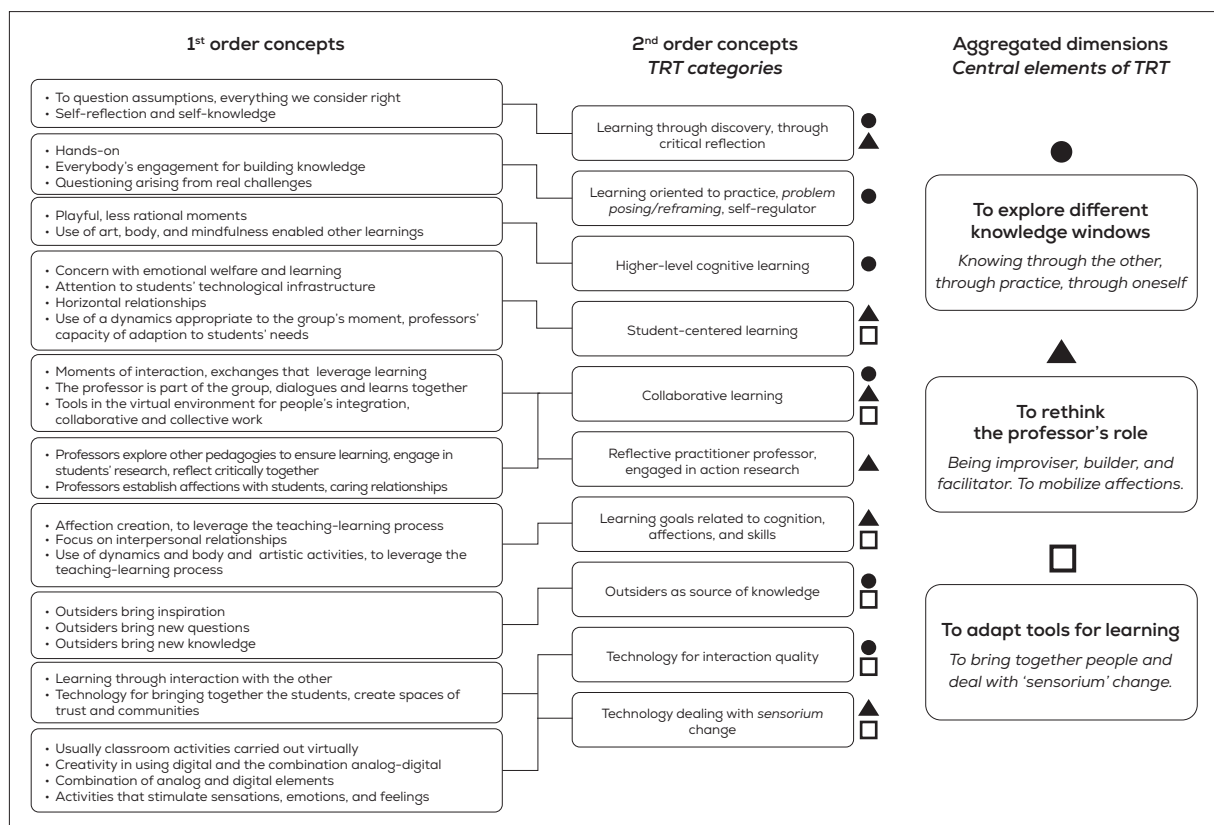
In addition, data triangulation allowed us to add two new aspects linked to CE, which also contributed to support the dimensions.

RESULTS

In the iterative theoretical-empirical process, the categories that emerged are rooted in the main aspects that define TL, EfS, and CE. Based on the connections between them, we were able to identify the three central elements of FIS that make it what we define as a TRT experience: (1) exploring different windows of knowledge; (2) rethinking the role of the professor; and (3) adapting tools to the teaching-learning process. These elements are permeated by CE technological arrangements and their effects for the quality of interactions and change in the *sensorium*.

Figure 6. Elements for Transformative Remote Teaching (TRT)
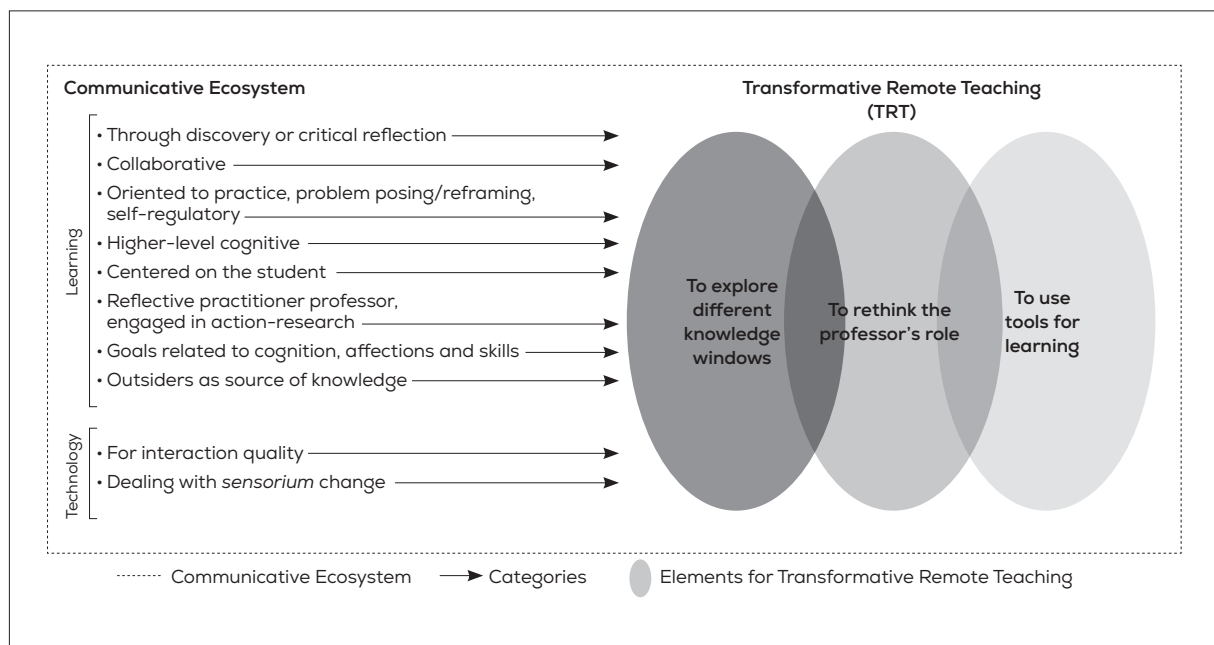
Exploring Different Windows of Knowledge: Knowledge through Others, through Practice, through Oneself

In students' speeches, we saw what the TL-EfS discussions anticipated: knowledge is not restricted to content transmission but includes other sources that lead to TL (Brunstein *et al.*, 2021; Chory & Offstein, 2017; Gur-Ze'ev, 2007; Sterling, 2001). According to one of them, "Scientific knowledge and reason alone are not capable of impacting one to that extent. They need to merge with sensitive elements" (**INT**8). The first element that emerges as central to TRT consists in exploring different windows of knowledge: (1) learning through discovery, through critical reflection; (2) collaborative learning; (3) practice-oriented, problem-posing/reframing, self-regulatory learning; (4) higher-level cognitive learning; (5) outsiders as a source of knowledge; and (6) technology serving the quality of interaction.

Table 2. Different knowledge windows

To explore different knowledge windows *Know through the other, through practice, and through oneself.*	
Quotes	**Categories**
"At the beginning of the pandemic, the gang said 'no, let's use our free time to take unicycle lessons', crazy lessons… let's be productive, we must be productive'. [...] One day I sat down to read the FIS booklet, and it said 'sensitive listening, self-expression'. Then I decided to listen to myself, you see? Listen to what was going on with me. It really helped me keep myself apart from this whole [...] and understand my state and what I need to go more easily through the pandemic." **(INT2)** "The macro perspective [...] allowed me to practice the constant exercise of questioning everything we take for granted." **(FORM5)** "It's as if, each class, each dynamic, I'm driving a hoe into the ground that reveals something. Sometimes a worm, sometimes a precious stone. But, little by little, the whole soil is being plowed and modified." **(FORM6)** "There were many changes along the road, internal and external ones. I felt like I was taking a walk and stopping at the same place, watching the same view; the difference is that I see new colors in this landscape. I have changed, but the people around me also went through the process and changed, including the team. That was really precious because we were all in the same boat, together." **(FORM8)**	Learning through discovery, through critical reflection
"[RE cannot lack] time for interaction, for exchanges among students, which enhances learning itself." (I**NT1)**	Collaborative learning
"The most transformative thing was realizing that it was about studying sustainability from a challenge, and from self-knowledge. This is totally revolutionary, different from any other undergraduate course." (**FORM1)** "It is a very practical, hands-on discipline, where students must engage in learning the content and designing solutions. [...] this is what differentiates FIS from other disciplines." **(INT7)**	Practice-oriented learning, problem posing/reframing, self-regulatory
"The heights were the most fun, least rational moments [...] Virtual life is difficult and tiresome, and what FIS really stands out for is this lightness." **(FORM3)** "I think that it changed a lot every time we were involved with arts [...] we discovered talents or re-discovered them, or just relaxed [...] having art with you, even from a distance, is important." **(FG1)**	Higher-level cognitive learning
"I was discovering other possibilities, talking to people from outside FGV, important, inspiring people. That inspires you to think, who am I? Where do I want to go? What do I want to do? Many questions emerge." **(INT9)**	Outsiders as a source of knowledge
"It was one of the few subjects that it made sense for me to be there, because I was going to learn by actually interacting, talking, listening, participating in activities that were not just writing something on the computer - that I could do by myself in the library". **(INT5)**	Technology serving interaction quality

Learning through collaboration requires spaces in RT for interaction and joint work, and it fosters collective ways of building formal results and ways of seeing and doing, with a concern for how each discussion touches students in their affections and courses of life. Technology should promote the quality of these interactions, and the establishment of spaces of trust and affection, even at physical distance. FIS' emphasis on collaboration drives engagement: cameras on, greater participation in debates, and a higher sense of teamwork and belonging. One student said, "It was by far the discipline in which we students kept in touch with each other most [...] in FIS we built sustained interaction between ourselves and in our talks, mainly because the discipline's work was collective" (**INT7**).

Interaction with outsiders inspires students to look at things from a new perspective, and the virtual environment can boost this interaction by facilitating connections with people around the world (Brammer & Clark, 2020). However, the focus is not only on the guest's knowledge but also on the quality of exchanges, which increases engagement.

Another path to engagement in RT is its practice-oriented, problem-posing nature (Brunstein *et al.*, 2021), which fosters active participation and autonomy (Oliveira *et al.*, 2020). Students' speeches indicate that they had the opportunity to connect the discipline's contents to their context and were able to learn through practice and critical reflection by adding meaning to what was being learned.

Finally, we identified new forms of sensitive expressiveness that emerge from higher-level cognitive learning (abstract learning in a way that is open to playing, art, and to express through one's body) and which are enhanced and enabled by a change in the *sensorium* within the CE (Barretto, 2019; Martín-Barbero, 2000). Challenging the potential convenience of being home, the lessons recognize this learning context as a catalyst of presence and cognitive stimulation, promoting quality interaction in the virtual environment. For one student, "[...] thinking about FIS21, that they will not even have a physical beginning, which was so important for us, it will be essential to stimulate them to access other levels of reality in order to strengthen group connection" (**FORM3**).

Rethinking the Professor's Role: Being an Improviser, a Builder, and a Facilitator. Mobilizing Affections

According to the theoretical framework, the teacher's role changes completely in TL; thus, if we want to encourage TRT, it is essential to rethink that role. Interacting through the camera is different from in-person teaching, so virtual exchanges need to be fostered and their specificities recognized (Di Felice, 2017). Hence the relevance of student-centered learning, with fluidity and collaboration being encouraged by the facilitator-professor (Brunnquell & Brunstein, 2018; Brunstein & King, 2018; Chory & Offstein, 2017; Gur-Ze'ev, 2007; Sterling, 2001).

In RT, it is necessary that faculty be aware of emotional and infrastructure aspects that can create barriers to the learning process (Williamson, Eynon, & Potter, 2020), and open to inviting external resources and guests to add dimensions of formal and sensitive knowledge to the education process which are beyond his/her repertoire.

Table 3. Rethinking the professor's role

Rethinking the professor's role *To be an improviser, a builder, and a facilitator. To mobilize affections.*	
Quotes	Categories
"You notice the professor sees the lesson as an opportunity for dialogue, experiences, and not just 'I have the knowledge and I must talk about it". **(INT11)**	Collaborative learning
"I noticed [...] a concern for student's well-being. The team [FIS] is really concerned with how we are, what is happening, if we´re learning, if the method is working. [...] This concern about student's succeeding in learning [...] is essential online." **(INT2)** "The group's horizontality, including the team, is really beautiful. That is the role, the human role, of professors. You don't stop being a professor because you're not a traditional one. You are a much more efficient professor. You inspire, you motivate, and teach from each student's individual experience. That's what education is all about [...]" **(FORM1)** "Concern with the student online is essential. That includes issues with the student's infrastructure, internet connection, which is key for online classes. Besides, this more emotional part, to see if it's happening, this dialogue to see if students are learning beyond their exams. [...] This concern about the student being able to learn. Feedback between professor and students is essential online too." **(INT2)**	Student-centered learning
"I consider it transformative learning when I realize that the content is not protocol content, the professor is there trying to make you understand, and trying to use other mechanisms that he knows will work better [...]" **(INT2)** "You always brought to the group valuable reflections, you helped us build a safe place in the middle such chaos. [...] You helped us through the end with designing a project that was like us. At various times I felt you on my side, supporting me, giving love, affection, and even scolding a little when necessary. I feel that the bond we created was very sincere and deep." **(FORM8)**	Reflective practitioner professor, engaged in action-research
"What I really felt with this change towards online teaching was a team-group closeness... I felt that you were experiencing that intensely with us. It was funny, because there was this separation about the team, I knew you were there coordinating things, but, at the same time, I felt all of you with me, feeling my pains, understanding and supporting me. This was very important, it built this link with the group". **(FG2)**	Learning goals related to cognition, affections, and skills

This brings us to the learning goals related to cognition, affection, and skills: students' interest and engagement are required for their presence in the virtual class to be consistent. Therefore, there is room for the professor to mobilize affections – emotions, feelings, and bonds – and to foster new skills in them. According to students' accounts, in FIS, the time dedicated to promoting greater closeness – transparency and personality – to the professors and other students made the class more committed: "We gave time for the group to create a sense of respect and care for each other, which I think is missing in the regular classroom. [...] And that kept me online, on the screen, with the camera on, which was difficult for me in most classes" (**INT5**).

Adapting Tools to the Teaching-learning Process: Bringing People Together and Dealing with Change in the *Sensorium*

The quality of the interactions built was more relevant than choosing what technological devices to use, which confirms the assumption about the CE (Consani, 2018). Therefore, this element is not about listing strictly which tools are best for TRT but exploring how to adapt them to stimulate the quality of interactions, the sensoriality, and the sensitivity (*sensorium*) of the human agents who integrate a CE conducive to TL.

Table 4. Tools serving the teaching-learning process

Adapting tools to serve the teaching-learning process. *To bring people together and deal with change in the* sensorium	
Quotes	Categories
"I think [RT cannot lack] tools to integrate people, and then work together […] Tools that make you feel you are producing something, and that encourage you to put it on paper or on the screen, together with other people, what you are expressing." **(INT5)**	Collaborative learning
"The team really surprised me, both for the connections they presented in the lessons, and for their ability to address the right topics and dynamics at the right time. The ability to read the situation and provide instruments and ideas that pulled us out of the inertia or chaos we were stuck in." **(FORM9)**	Student-centered learning
"[…] teamwork in smaller circles […] was the time when we could have an exchange with friends, ask them how they were, and then do the activity, and in the end it would stay in our minds". **(INT5)** "The subject was hands-on… a hands-on course. When it went online, it was a little scary. But I think we managed… We, you… Starting and ending the class with music is something you could keep forever." **(FG2)**	Learning goals related to cognition, affections and skills
"We had many guests, and classes with subjects we didn't know much about […] It's a kind of subject that maybe we will never see in undergraduate courses." **(INT2)**	Outsiders as source of knowledge
"When I saw that the macro-immersion would be virtual, five hours a day looking at Zoom, I thought it wouldn't work. But even for the more skeptical it ended up working. You used the Zoom in a way that brought closeness to human interactions." **(FG3)** "[…] people had their camera on all the time, and that was a big difference compared to the other disciplines. Because in the nine other subjects I took, in a class of 40-50 people, only 3-4 kept their camera open. […] Managing online activities is much more complex than we could imagine at the beginning." **(FORM3)**	Technology serving interaction quality
"In terms of the additional things in FIS, it kept what the in-person course had, the dance, the bonfire, the candle day, when you brought images… That day, when you made the field voices, I felt as if we were all on that deck looking at those papers. That transposition was really magical." **(INT3)** "When it all changed to distance learning, I confess that I was discouraged, afraid of missing the real experience I had imagined for FIS. But it was all possible because of the way the team conducted the group. One of the most distinct and pleasant features was the [virtual] group dinner, so cool, and I still expect to have it with you all. The exercises in space, the creation of sensations, in all senses, the presence. All those things surprised me because I would never have expected something like that." **(FORM14)** "[…] I really liked the classes with candles. […] I promise you the bonfire night was one of the most beautiful in my life. Because you looked at the screen and everybody was in the dark with a small flame… These things build a very strong connection." **(FG4)**	Technology dealing with change in the *sensorium*

Based on the students' statements, we found that the tools have a better performance when they:

- connect outsiders to bring in new visions, realities, and repertoires;

- encourage collaboration and talks in smaller groups;

- build bridges with aspects of students' daily life;

- promote and reveal professor-students interaction, leveraging cognition, affections, and skills: the messy hair in front of the camera, the intimacy of the domestic space, breath and relaxation times, and displays of care.

Thus, the core elements in making RT a TL experience are intertwined: each element is associated with the occurrence of at least one of the others, and the categories appear in different but related ways in more than one element. For example, through their contact with outsiders, students recognize a new window of knowledge while valuing the facilitator-professor role and recognizing how relational and communication technologies can serve the teaching-learning process.

Two dimensions stand out in the FIS context. First, the pedagogical practices that relate to what is proposed in TL and EfS, such as experiencing a collective dilemma and questioning assumptions, should also occur online. Second, the specificity of its CE (Barretto, 2019) beyond technological adaption: in FIS, professors and students appropriated the digital to build different incentives, organize knowledge, and influence the sensorial quality of the experience.

DISCUSSION

"These [conventional] disciplines don't address this transformation issue. I think their approach is different [...] I didn't see myself changed by any discipline in this virtual experience. [...] there must be an extra something, an incentive; otherwise, you won't attend" (**ENT9**). This statement shows the importance of thinking about TL in management education, especially when it takes place via RT. As the FIS experience reveals, "transformative" is an adjective that can be associated with all agents and dynamics involving the CE of the TL-EfS-RT triad. Thus, this research brings theoretical and practical contributions to the field.

As a theoretical contribution, we present a reference framework in which we combine TL, EfS, and CE theories to build, from our analysis of FIS, the concept of TRT. By adding the CE concept, which proved essential for TRT to happen since it comprises the arrangement of technologies, people, activities, and relationships involved in learning, TL theory and practices also benefit. The CE becomes an element that composes and influences the understanding of the field, whether in RT or in the classroom, establishing the new background for building relationships and changing the *sensorium* of those involved in TL, as well as suggesting an integral perspective to the pedagogical resources – technological or not – that enhance teaching.

We have also contributed through a first exercise of conceptualizing TRT: teaching carried out in a virtual environment, which, through the technological arrangements of a CE, enables self-reflection and the questioning of assumptions, values, and beliefs regarding socio-environmental dilemmas, the reframing of problems and, therefore, the development of new competencies and roles in promoting sustainable development.

As for practical contributions to educational institutions, research centers, coordinators, and faculty, it is possible to draw on the logic of TRT and its core elements to make their RT more transformative, especially when focusing on socio-environmental issues. This has direct implications for faculty qualification, both in TL and in TRT elements. FIS' case showed subjective issues involved in faculty's migration to RT, as they will have to deal with their cultural, generational, and epistemic resistance, according to the purpose of TL (Chory & Offstein, 2017; Gur-Ze'ev, 2007). Moreover, technology as a medium that should encourage participation, exchanges, and relationships – all typical dynamics of classroom interaction – may lead to discoveries but also frustration both in professors and in students, therefore requiring attention from educational institutions from the technical and emotional perspectives.

Regarding faculty, we have presented several necessary role changes for TRT. For example, all the adaption – whether in tools or subjective – to RT was addressed in FIS as part of the learning process – not something external or an end in itself –, highlighting the human dimension of the experience, fostering collaboration and strengthening the professor's position as a community builder (Buber, 1971), a community she/he is also part of. This community aims at formal knowledge and collective experiences, and it is pervaded by affections and interactions which are not restricted to theoretical content (Brunstein & King, 2018; Cunliffe *et al.*, 2020) humanizing the student-faculty relationship. This approach, one that is centered on the student and on reflecting on assumptions, does away with the "know it all" professor role, something relevant to models that migrate from transmissive education to TL, whether in RT or in the classroom.

Let us think of a broader context of management education, one directly connected with the way management is done. If TL is to approach what and how we teach about the collective dilemmas of the real world, involving deep reflection on itself and with companies acting in agreement with these contexts (Cunliffe *et al.*, 2020), then we are talking about reducing the gap between qualification and professional practice.

Therefore, TRT should offer and encourage a repertoire for future managers comprising theoretical, technical, emotional, relational, and technological dimensions. In addition, it should design a laboratory on how to deal, in a critical, integrated, and living way, with collective and individual issues that pervade a specific subject or the conception and execution of a project, including challenges such as pandemics, climate change, and human relations. For one student: "That ability to reinvent the whole discipline [...] was brilliant. I suppose it was not easy to give up control, redesign what was already planned and keep (or at least appear to keep) calm. That is a skill I value as a professional and one that I really want to develop. It was an important, unique semester. We lived through a pandemic together" (**FORM2**).

Fernanda Cassab Carreira | Ricardo Barretto | Isabella Cruvinel Santiago | Janette Brunstein

CONCLUSION

Covid-19 has brought the world to ERT, strengthening a trend towards management-focused RT. Since these are recent phenomena, there are theoretical and practical gaps in transformative pedagogies in the virtual environment. This research considers TL as a basis from which to address this shortcoming and to offer a pedagogy that is suitable for the pandemic period and to the world of wicked problems.

In this research, we explored the elements of an already TL-anchored discipline that were central to making it also work in RT. The research contributes not only to practices that can be designed by faculty willing to adopt TL in RT, but it also extends the concept of management RT, a field that is still underresearched. Regarding limitations, it is important to point out that FIS, from the outset, proposes a disruptive pedagogy and, consequently, attracts students who are more open to TL. Its team has multidisciplinary training and previous familiarity with technological devices for education, something unusual and not easily replicable in other disciplines. Finally, the research focused on analyzing the experience of a class that was migrated to RT as an emergency measure at the beginning of the pandemic, which makes the context very specific and local.

Despite the case's specificity, we can reflect on the complex interactions that the change intended by TL-EfS for RT should comprise. Other studies can build upon ours, such as an assessment of the subsequent class, whose activities were held solely via RT, in order to examine whether the elements we proposed keep the same relevance or studying other TL-based disciplines conducted via RT. Likewise, further research can advance in defining a TRT theory, which we explained here in an exploratory and preliminary way. Given the RT trend in higher education, advances in theories and practices that address the TL-RT association are relevant and necessary.

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Fernanda Cassab Carreira | Ricardo Barretto | Isabella Cruvinel Santiago | Janette Brunstein

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Isabella Cruvinel Santiago: Formal Analysis; conceptualization; Data Curation; Writing – First Writing; Writing – Proofreading and Editing; Investigation; Methodology; visualization.

Janette Brunstein: Formal Analysis; conceptualization; Data Curation; Writing – First Writing; Writing – Proofreading and Editing; Investigation; Methodology; Supervision; Validation; visualization.